माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर (म.प्र.), भारत
MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.), INDIA
Deemed University
(Declared under Distinct Category by Ministry of Education, Government of India)
NAAC ACCREDITED WITH A++ GRADE

Code Coalescence-2025

(An Institute Level Hackathon) MITS-DU, Gwalior

Problem Statements

Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC1	Student Innovation	Software	Agriculture, FoodTech & Rural Development	Developing solutions, keeping in mind the need to enhance the primary sector of India - Agriculture and to manage and process our agriculture produce
CC2	Mobile App for Direct Market Access for Farmers	Software	Agriculture, FoodTech & Rural Development	Background: Farmers often face challenges in accessing markets, leading to lower income due to middlemen. This gap restricts their ability to sell produce at fair prices. Description: Create a mobile application that connects farmers directly with consumers and retailers. The app should include features for listing produce, negotiating prices, and managing transactions, thereby reducing dependence on intermediaries. Expected Solution: A user-friendly mobile platform that enables farmers to showcase their products and connect with buyers directly, enhancing their income potential.
CC3	AI-Driven Crop Disease Prediction and Management System	Software	Agriculture, FoodTech & Rural Development	Background: Crop diseases can devastate yields, leading to significant financial losses for farmers. Early detection and timely intervention are crucial for effective management. Description: Develop an AI-driven system that analyzes crop images and environmental data to predict potential disease outbreaks. This system will provide farmers with actionable insights and treatment recommendations to mitigate risks. Expected Solution: A mobile and web-based application that utilizes machine learning algorithms to identify crop diseases and suggest preventive measures and treatments based on real-time data.
CC4	Sustainable Fertilizer Usage Optimizer for Higher Yield	Software	Agriculture, FoodTech & Rural Development	Background: Excessive and improper use of fertilizers leads to soil degradation and reduced agricultural productivity, negatively impacting farmers' income. Description: Create a data-driven solution that recommends optimal fertilizer types and quantities based on soil health, crop type, and weather patterns, ensuring sustainable agricultural practices. Expected Solution: An application that analyzes soil data and provides tailored fertilizer recommendations, promoting sustainable farming while enhancing crop yield and farmer income.
CC5	Assured Contract Farming System for Stable Market Access	Software	Agriculture, FoodTech & Rural Development	Background: Farmers often face uncertainties in market access, leading to fluctuating incomes. Contract farming can provide stability by ensuring farmers have guaranteed buyers for their produce. Description: Develop a comprehensive platform that facilitates assured contract farming agreements between farmers and buyers. This platform will enable transparent communication, secure contracts, and timely payments, ensuring farmers have a reliable market for their crops. Expected Solution: An online marketplace that connects farmers with potential buyers, offering tools for contract management, price negotiation, and secure payment processing, thereby enhancing income stability and reducing market risks
CC6	Development of AI-ML based models for predicting prices of agri-horticultural commodities such as pulses and vegetable (onion, potato, onion)	Software	Agriculture, FoodTech & Rural Development	The Department of Consumer Affairs monitors the daily prices of 22 essential food commodities through 550 price reporting centres across the country. The Department also maintains buffer stock of pulses, viz., gram, tur, urad, moon and masur, and onion for strategic market interventions to stabilize the volatility in prices. Decisions for market interventions such as release of stocks from the buffer are taken on the basis of the price trends and outlook. At present, the analyses of prices are based on the seasonality, historical and emerging trends, market intelligence inputs, crop sowing and production estimates. ARIMA based economic models have also been used to examine and forecast prices of pulses.
CC7	Farmers Disease Diagnostic/Reporting Portal - Mobile Portal Al Based	Software	Agriculture, FoodTech & Rural Development	Background- Agricultural productivity and food security are heavily dependent on the health of crops and livestock. Farmers, especially in remote or resource-limited areas, often face challenges in diagnosing and reporting diseases that affect their livestock and crops. Early diagnosis and timely reporting are crucial for effective disease management and prevention of widespread outbreaks. Description - A mobile portal powered by Artificial lntelligence (Al) for disease diagnosis and reporting can revolutionize how farmers manage animal and plant health. This portal enables farmers to use their smartphones to access diagnostic tools, report symptoms, and receive actionable advice. Al algorithms can analyze reported data to provide accurate diagnoses and suggest appropriate treatments or interventions. This technology can empower farmers with the knowledge and tools to manage diseases more effectively, ensuring the health and productivity of their farms. lntegrate Al-based software with existing NDLM to allow farmers to submit images and descriptions of disease signs and symptoms. The Al will generate suspected disease/condition reports with preventive measures and send alerts to veterinarians for appropriate action (Al-based software, Mobile application). Expected Outcomes . Enhanced Disease Diagnosis: . Timely Reporting and lntervention: . lncreased Access to Expert Knowledge: . lmproved Farm Productivity. Data Collection and Analysis: Cost-Effective DiseaseManagement: Empowerment and Education of Farmers: lntegration with Existing Surveillance Systems . Community Engagement and Support: Sustainable Agriculture Practices
CC8	Student Innovation	Software	Blockchain & Cybersecurity	Provide ideas in a decentralized and distributed ledger technology used to store digital information that powers cryptocurrencies and NFTs and can radically change multiple sectors

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CC9	DDoS Protection System for Cloud: Architecture and Tool	Software	Blockchain & Cybersecurity	Background: Many organization are using Cloud for hosting their web applications. The attackers can try to attack these webservers for achieving Denial of Service attack. Specifically, Distributed Denial-of-Service (DDoS) attack is a malicious attempt to disrupt the normal traffic of a targeted server, service or network of Cloud infrastructure by overwhelming the target or its surrounding infrastructure with a flood of internet traffic. DDoS attacks achieve effectiveness by utilizing multiple compromised computer systems assources of attack traffic. Exploited machines can include computers and other networked resources. Therefore, it is essential to develop appropriate security tools to counter and protect against these attacks. • Description: The most obvious symptom of a DDoS attack is that a website or service suddenly becomes slow or unavailable. But since a number of causes such a legitimate spike in traffic can create similar performance issues, further investigation is usually required. Therefore, suitable analytics tools need to be developed to clearly identify an attack as DDoS. Following are some of the patterns for a DDoS attack: 1. Suspicious amounts of traffic originating from a single IP address or IP range 2. A flood of traffic from users who share a single behavioral profile, such as device type, geolocation, or web browser version 3. An unexplained surge in requests to a single page or endpoint 4. Odd traffic patterns such as spikes at odd hours of the day or patterns that appear to be unnatural (e.g. a spike every 10 minutes) There are other, more specific signs of DDoS attack that can vary depending on the type of attack. The tool developer should be creative to consider other signs also. For the above problem statements, following assumptions can be made: 1. Cloud is hosting a website and providing some services to its users. 2. The website should be always up and providing services to its users (high availability). 3. The attackers can flood the website directly or via other nodes (DDoS). 4. The attacker can also sabotage the link between a client and webserver. 5. The attack can come from outside or from within the cloud infrastructure. A solution needs to be built by suitably designing the cloud architecture and developing some tool (s) to automatically detect and recover from the DDoS attack. Expected Solution: A set of developed tool(s) along with a suitable Cloud architecture to be demonstrated. The demonstrated website should be protected well against different types of DDoS attack. In case of an attack, the developed security tools should be able to automatically detect and protect a website hosted on cloud infrastructure against DDoS attacks. The solution should also demonstrate the automatic recovery from the attack. As high availability is an essential feature, the down time (recovery time) should be minimized to the extent possible.
CC10	Creating an application to identify the presence of government issued personally identifiable information (PII) embedded in documents and data, inadvertently or otherwise.	Software	Blockchain & Cybersecurity	Background: In today's digital age, a wide variety of services and processes take place online. Users of these digital facilities are required to upload government-issued containing documents or provide data for successfully availing the services. However, the uploaded documents or data which are required to facilitate these digital services and processes contain personally identifiable information (PII), i.e. any data that can be used to identify an individual uniquely. These documents can be like Aadhaar card, PAN, Credit Card, Driving License etc and can include data like names, address, phone number, email address, and financial information, among others of the user. The handling of PII is crucial as its exposure can lead to privacy breaches, identity theft, and financial fraud among other cyber related issues. Detailed Description: The above problem statement envisages that an application be developed to identify whether PII, in the form of government-issued documents such as Aadhaar, Driving license, MHA-issued ID Cards, etc. is embedded in the uploaded document or provided data. Notable, the PII may be included inadvertently as well. PII, by its nature, is sensitive data, and its exposure must be protected against in order to safeguard users' privacy. Entities and organizations handling documents or data containing users' PII must be mindful of the complex challenges that arise with it – they have to balance data storage, encryption, access controls, data retention policies, data management processes with users' knowledge and consent, notification of breaches by users, grievance redressal, etc. Such an application will aid in alerting individual users to verify whether it is necessary to upload or provide PII-containing document. Simultaneously, it will allow the personal data processing entity to check whether such PII document or data is required, and in case not necessary, help in removing, redacting or masking the PII document or data from the uploaded or provided document or alerting the individual user regarding the same. This application would be useful for the purposes of data protection compliance, risk mitigation, enhanced security, improved data quality, operational efficiency, and legal and regulatory compliance. Expected Solution: A software application or library package to detect and alert users when there is personally identifiable information (PII) related to identified government-issued identification documents (Aadhaar card, PAN, Driving License to start with) embedded in the uploaded documents or providing data, while uploading or reviewing. In addition, the software application may be placed in public domain and shall allow the receiver of the document in removing, redacting or masking the PII from the document and data, if required.
CC11	Software solutions to identify users behind Telegram, WhatsApp and Instagram based drug trafficking.	Software	Blockchain & Cybersecurity	Background: Use of encrypted messaging/social media apps like Telegram, WhatsApp and Instagram for drug trafficking are on the rise. Channels operating on Telegram and WhatsApp and Instagram handles are blatantly being misused by drug traffickers for offering various narcotic drugs and Psychotropic substances for sale. Description: WhatsApp and Telegram channels and Instagram handles are created by drug traffickers to offer various drugs for sale to their subscribers. Customized Telegram bots are also created by some of the drug traffickers to sell drugs. It is most worrisome that majority of the drugs which are being offered on sale through Telegram, WhatsApp and Instagram are dangerous synthetic drugs like MDMA, LSD, Mephedrone etc. The above three apps are also used by drug traffickers for drug communication. Expected Solution: Development of a software solution to identify live Telegram and WhatsApp channels/bots and Instagram handles that are offering drugs for sale in India. Solution also should focus on triangulating identifiable parameters like IP address, mobile number, email id etc of the users behind the channel/bot/handle.

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CC12	Software solution to identify the end receiver of a cryptocurrency transaction	Software	Blockchain & Cybersecurity	Background: Use of cryptocurrencies like bitcoin, USDT, Monero etc. for drug trafficking activities are increasingly becoming common. The relative anonymity and speed provided by cryptocurrencies are misused by drug traffickers as a mode of transaction for drug sales and also as an asset to amass the proceeds of crime. Description: Drug traffickers operating on darknet and elsewhere on internet enabled platforms like social media apps, messaging services etc receive the value of drugs through cryptocurrencies. In a few cases, the drug traffickers save their proceeds of crime in cryptocurrencies. During the course of investigations and also through intelligence, wallet addresses and transactions hash related to drug transactions are obtained by Drug Law Enforcement Agencies, Further, it has also been observed that these finds are often passed through variety of services like tumblers, mixers, bridges etc to further anonymize the transactions. It is important to follow the trial of funds associated with drug transactions to identify the real persons behind the drug trafficking network. Expected Solution: Development of a software solution to follow the cryptocurrency transaction trial associated with a wallet id/transaction to find out the real receiver of the funds in a drug related transaction.
CC13	Web-scrapping tool to be developed to search and report Critical and High Severity Vulnerabilities of OEM equipment (IT and OT) published at respective OEM websites and other relevant web platforms.	Software	Blockchain & Cybersecurity	Background: Critical Sector organisations uses a number of IT and OT equipment (e.g. Networking and hardware device, Operating Systems, Applications, Firmware etc.). These devices/application come with vulnerabilities from time to time. There should be timely information sharing mechanism by which the concerned equipment users at critical sector orgs should be altered regarding any critical / high severity vulnerabilities in their equipment within the shortest possible time. Detailed description: The ICT components (HW/SW) being used by Critical Sector Organisations become vulnerable from time to time. These vulnerabilities can be categorised as Critical, High, Medium and Low. Any exploitation of these vulnerabilities can cause havoc in multiple Critical Sector Organisations where such vulnerable equipment are being used. Keeping in view of the above, there is a need to monitor all such vulnerability information published at the equipment's OEM websites and also other relevant websites. Once a critical or high severity vulnerability information is published at OEM website or any other relevant website, the 'to be developed scrapper' will immediately take that vulnerability input along with possible mitigating strategy published in the website and send the information to predefined email id(s). Note: The NVD website publishes such OEM vulnerable information. But the same comes with a time lag. It is therefore needed to get such information directly from OEM websites and /or from other relevant websites where such vulnerable information is published almost in real time. Expected Outcome: An automatic script using open source tools to be developed for the OEM vulnerability information scrapping and reporting. Tool should know various vulnerability information published data formats/syntax at OEM websites (both for IT and OT hardware and application) and come up with optimum solution for monitoring and reporting of such vulnerability information. The output of the tool that will be emailed to pre-designated email id(s) is as per following (shared with example; all fields may not be available at the time of reporting): * Product Name: Chrome * Product Version: - NA * OEM name: Google * Severity Level (Critical/High): High * Vulnerability: The N-able PassPortal extension before 3.29.2 for Chrome inserts sensitive information into a log file. * Mitigation Strategy: Install patch from https://me.n-able.com/s/security-advisory/aArHs000000M8CCKA0/cve202347131-passportal-browser-extension-logs-sensitive-data * Published Date: Jan 2024 * Unique ID: CVE-2023-47131
CC14	Developing a tool to provide for real time feeds of cyber incident pertaining to Indian Cyber Space.	Software	Blockchain & Cybersecurity	Background: NCIIPC shares detail of cyber incidents to corresponding stakeholders in order to inform them about cyber activities related to their IT/OT infrastructure. This empowers them to take necessary actions to mitigate further risk. Description: In order to achieve objective of protecting Critical Information Infrastructure (CIIs) of the Nation, it is very vital to have real time information related to cyber threats and incidents specific to Indian Cyber space. This may enhance the Threat Assessment potential based on the incidents that have already happened or the ones that currently exists. Therefore, a framework to crawl/scrap/collect the cyber incident activities reported anywhere on the web related to Indian cyber space is required to be developed. Expected Solution: 1. Using Machine Learning, find platforms that publish or works as intermediate platform for sharing cyber incident activities related to cyber incidents. 2. Design a model framework for the cyber incidents feed generator which collects data from various forums, paste sites, social media, developer or any other platforms as identified by Machine learning model generated in accordance to point 1 above. 3. Creation of well-structured database of cyber incidents extracted by framework developed in accordance with point 2 above. 4. Generation of valuable insights from the data collected and its visual representation of cyber incidents specific to sectors, APTs and strategic issues. Note: Students are encouraged not to use paid APIs for solving the problem.

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CC15	RE-DACT	Software	Blockchain & Cybersecurity	Background: Easy to use and secure redaction tool “RE-DACT” which allows redaction/masking/anonymization on various input formats based on a gradational scale defined by the user and providing customized output. Over a time, model will learn and have the ability to generate realistic synthetic data in any sought format. Description: The proposed solution is a natural language processing (machine learning) based redaction tool. The tool will redact or obfuscate from original data leaving the output structurally/logically the same but stripped of key identifiers and other content which may in any way allow the identity, actual data, markers or issues in the input content to be revealed. The correlational logic may be appropriately obfuscated based on the degree of redaction. This will have an easy to use GUI and will be available for use on online and offline systems. The degree of the redaction will be up to the user- the higher the degree set by the user, the more the degree of redaction. This will work with all different commonly used formats for text and data sets. Security of data will be assured by ensuring that the input data is not stored or retrievable in any fashion by third party entities. User will have complete control over the input data. It is also an important aspect that sometimes data may be required to be stored or submitted, however specific sensitive details may not necessarily be required. In such a situation- anonymized data authenticated as having being redacted from original would suffice. Declassification processes are long and arduous; anonymization is largely manual or custom script driven. By providing a gradational redaction option, ordinary users can strip away the specificity to the extent of liking-from merely name removal/anonymization to completely synthetic data with only faint traces of original structure/pattern. This can allow generation of large number of databases with realistic but anonymized data that can be shared for learning, growth and commercial ventures. Expected Solution: Problem Statement: Easy to use and secure redaction tool “RE-DACT” which allows redaction/masking/anonymization on various input formats based on a gradational scale defined by the user and providing customized output. Over a time, model will learn and have the ability to generate realistic synthetic data in any sought format. Stage 1 Data: Curate and use own data set for building PoC Task/Result: Input/Output: Supports common input formats (text files, images) and basic output formats (redacted files, logs). Web based version Training Dataset: Publicly available dataset can be used for the purpose. Metrics: Precision, Recall, F1 Score on Open Source Testing dataset. Stage 2 Data: Dataset will be provided in Grand Finale Task/Result: Input/Output: Expands to handle more data formats (e.g., PDFs, videos) and advanced output options (e.g., redacted versions with annotations). Training Dataset: Diverse data set prepared from commonly used formats Metrics: Precision, Recall, F1 Score on Open Source Testing dataset. Performance/Evaluation Criteria: • PoC will be preferred over just concept or presentation. The performance may be ascertained on the following metrics: • Efficacy of the redaction/anonymization- whether appropriate data has been redacted • Gradational effect achieved based on user preference and ability to calibrate. • Ability to work on a variety of input sources • Security of the input data by minimal retention • Speed • Optimized computing usage and ability to operate at scale. • Ease of use, UI, UX. • Performance benchmarked against COTS solutions. • Web Based and Offline solution. • Minimal API dependency • Use of Secure Coding Practices and cybersecurity built in design
CC16	Development of Audit script for Windows 11 and Linux OS as per CIS (Centre for Internet Security) bench mark	Software	Blockchain & Cybersecurity	Background: Organisations across various industries face significant challenges in maintaining robust cyber security posture. Compliance with industry standard bench marks and guidelines, such as those provided by Center for Internet Security (CIS), is crucial for ensuring the security and integrity of their IT Infrastructure. However, manually auditing and ensuring adherence to these benchmarks and guidelines can be time- consuming, error prone, and resource intensive. Current practises often involve manual checks. To address these challenges, there is a critical need to develop automated auditing scripts tailored to CIS benchmarks. Detailed description: This software solution aimed to list out the control guidelines as per CIS benchmark for the following operating systems: - Windows (Reference www.cisecurity.org/benchmark/Microsoft_winodws_desktop) i. Windows 11 (Enterprise version) ii. Windows 11 (Standalone version) Linux (Reference:www.cisecurity.org/benchmark/red_hat_linux, www.cisecurity.org/benchmark/ubuntu_linux) i. Redhat Enterprise (8 and 9) ii. Ubuntu desktop (20.04 LTS, 22.04 LTS) iii. Ubuntu server (12.04LTS and 14.04 LTS) Preferable scripting language (PowerShell for Windows, bash/python for Linux). Expected solution: i. A user-friendly GUI based solution with capability to generate a report of findings. ii. Should be customizable as per organizational needs and scale to audit large and diverse IT environments effectively. iii. Scripts should be reliable and accurate in identifying the deviations from iv. best practices outlined in CIS benchmarks. v. Should facilitate easy update and maintenance to accommodate changes in benchmarks over time.

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CC17	Universal Switch Set with Data Encryption and Decryption for Legacy Applications without Cyber Safety Measures	Software	Blockchain & Cybersecurity	Background: In metro system OEM install the switches and bind these switches with their MAC address mostly so it is difficult to install or upgrade the different switch in network without compromising the cyber security. Retrofitting these systems with modern security protocols can he challenging and costly, particularly for organizations with limited resources or technical expertise. Description: The problem statement aims to develop a universal switch set equipped with data encryption and decryption capabilities that can be seamlessly integrated into various legacy applications lacking cyber safety measures. The switch set will provide a standardized interface for encrypting sensitive data before transmission and decrypting it upon receipt, thereby enhancing the security of legacy systems. The switch set will support industry-standard encryption algorithms and protocols to ensure compatibility with a wide range of legacy applications. It will be designed to be easily configurable and customizable to accommodate different encryption requirements and data formats used by various applications. Furthermore, the switch set will include robust key management features to securely generate. store, and distribute encryption keys to authorized users. This will prevent unauthorized access to encrypted data and ensure the integrity and confidentiality of sensitive information. Expected Solution: The proposed solution will involve the development of a universal switch set with data encryption and decryption capabilities tailored for legacy applications without cyber safety measures. This switch set will consist of modular components, including encryption/decryption engines, key management systems, and integration interfaces. The switch set will seamlessly integrate with existing infrastructure and protocols. requiring minimal configuration and customization. By retrofitting legacy applications with data encryption and decryption capabilities, the proposed solution will enable organizations to safeguard their sensitive information and comply with regulatory requirements without the need for costly system upgrades or replacements
CC18	Centralized application-context aware firewall	Software	Blockchain & Cybersecurity	Description: Develop an application firewall for end-points that can identity and restrict access of application to external network/hosts. The application firewall should provide further granular control of restricting domains, IP addresses and protocols for each application. The firewall should be manageable through a centralized web console where policies for each end-point and application can be centrally deployed. Firewall agent should also be able to monitor network usage behaviour of each application and generate alerts on central dashboard for any traffic anomaly using AI/ML. Challenge: Applying separate firewall policies for each application running on the end-point and managing them through a central web console. Usage: End-point security, network security Users: Cyber security teams Available Solutions (if Yes, reasons for not using them): Individual components are available Desired Outcome: The solution should provide following components: 1. Solution should identify the domains and protocols that any application is trying to access. Further, it should enable allowing of any such network traffic which is not already allowed via centralized console. 2. Context-aware application firewall agent that shall manage firewall policies for each application running on end-point. The agent shall also collect network usage logs of each application and send it to central server. 3. Central web management console that shall be able to manage all end-points and applications 4. Solution should work for Windows end-points. Bonus points for Linux 5. Solution should also detect abnormal network behaviour of applications
CC19	Creating a cyber triage tool to streamline digital forensic investigation	Software	Blockchain & Cybersecurity	To design and develop an innovative digital forensics and incident response tool with an intuitive and accessible interface for investigators, that streamlines the process of importing evidence, conducting automated analysis, and generating detailed reports. The tool should feature an interface with clear navigation & real-time data visualization and should support: 1. Automated data collection from RAW images (forensic images) and other formats using disk imaging tools 2. Automate the scanning and analysis of data, including files, system logs, registry entries, network activity etc. 3. Identify indicators of compromise (IOCs) and related suspicious activities 4. Integrate AI/ML algorithms for anomaly detection and pattern recognition. The AI/ML feature should incorporate a scoring system and recommendation engine that allow investigators to quickly focus on the important artifacts. 5. User-friendly review options should include interactive timelines and graphical summaries, while comprehensive reporting capabilities should allow exports in various formats such as PDF, JSON, and CSV.
CC20	De-anonymizing of entities on the onion sites operating on TOR Network	Software	Blockchain & Cybersecurity	Background: Dark web is being used for illegal purposes and number of market places are being operated by the underground operators which facilitate illegal buying/selling of drugs/weapons/data leaks/counterfeit moneys/documents etc. Platforms, being anonymise to the LEA, make it difficult to identify the market place running on dark web mainly TOR Network. Description: Running the illegal sites on dark web network only requires the access of TOR Browser and TORRC file to run the market from local system. For hosting the services, people may utilise the paid or freely available hosting servers. Being on TOR network (V3), it is very difficult to identify the underground operator running the market. Amid running market on TOR network, the underground operator provides the access of his portal though his ISP/VPN services which has been taken from the respective ISP of his country and the VPN service provider. Expected Solution: It is expected that any solution like tool or technique may be developed the underground operator running the market may be identified. The participants may target finding the actual IP/VPN IP being used by the players of the onion sites. The participants may also try to find out other personally identifiable information (PII) regarding the underground operators active on the onion sites.

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CC21	Improving open source software security using Fuzzing	Software	Blockchain & Cybersecurity	Background: Fuzzing is an automated process of identifying software vulnerabilities by supplying unexpected and faulty inputs to the software. The main aim of fuzzing is to identify the crucial edge cases where a software might fail. Therefore, fuzzing provides a crucial insight into the stability and security of the software. The process of fuzzing can be divided into following broad steps – 1. Identification of Target Function(s) – Target function(s) are typically those functions that act as entry points for processing input data. They use various APIs to perform operation on the input data. 2. Developing harness – Harnesses are small code stubs whose sole purpose is to invoke the target function by using mutated data inputs. A harness bridges the gap between how the fuzzer generates input and how the target application receives and processes the input. 3. Fuzzing - In this step, a fuzzer is used to generate numerous data inputs which are then passed to the target function using the harness. The fuzzer checks whether the application crashes by processing a certain input. If a crash occurs, then it saves the input and the memory state of the crash to file for later analysis. Description: Fuzzing has proven its effectiveness in discovering thousands of vulnerabilities in file-processing and stateless applications. In fuzzing, and automated testing in general, designing test oracles is crucial. In this challenge the team is supposed to fuzz an open source software namely the Windows variant of Sumatra PDF Reader software (version 3.5.2 or later). Sumatra PDF Reader is a very popular open source and widely used PDF viewing software. In this challenge, teams are required to develop a working harness for fuzzing of the latest version (version 3.5.2 or later) of Windows Sumatra PDF Reader software solution, fuzzed on any fuzzer of their choice. The submission will be evaluated on the following criteria – 1. Target functions identified 2. Live demonstration of fuzzing harness developed 3. Code Coverage achieved 4. Technical report submitted by the team. Expected Solution: Each team must provide a fuzzing harness that is capable of fuzzing the windows software solution of the Sumatra PDF Reader (version 3.5.2 or later). This fuzzing harness must identify target functions and supply appropriate arguments for the invocation of such functions. The fuzzing harness will be run using a fuzzer (preferably WinAFL). Each team must submit a working harness along with a technical report stating – 1. Reversing steps undertaken 2. Target functions identified 3. Dependencies identified
CC22	Recovery of Deleted Data and Associated Metadata from XFS and Btrfs Filesystems	Software	Blockchain & Cybersecurity	Background : Digital evidence has become increasingly crucial in forensic investigations. The recovery of deleted data from storage devices is essential for reconstructing timelines, identifying suspects, and uncovering critical information. Traditional file systems like FAT and NTFS have been extensively studied, and tools for recovering deleted data from them are relatively mature. However, modern file systems like XFS and Btrfs, designed for performance and reliability, employ complex data structures that pose signifycant challenges for data recovery. Forensic investigations often involve recovering various file types, including documents files, log files, and system files. These files contain valuable information about system activities, user behaviour, and potential criminal activities. The ability to recover deleted files along with their complete metadata, such as creation, access, modification, and deletion timestamps, is crucial for establishing timelines and corroborating evidence. Detailed Description :XFS and Btrfs file systems offer advanced features like journaling, copy-on-write, and efficient data allocation. While these features enhance system performance and data integrity, they also complicate the process of recovering deleted data. When a file is deleted in these file systems, the data itself is not immediately erased; instead, the file system marks the allocated blocks as free for reuse. This delayed overwriting of data presents an opportunity for recovery, but it also requires specialized techniques to extract and analyse the deleted data. Moreover, recovering accurate metadata associated with deleted files is equally challenging. Metadata is critical for establishing the context of the recovered data and determining its relevance to the investigation. Extracting metadata from XFS and Btrfs file systems requires a deep understanding of their internal structures and data allocation mechanisms. Expected Solution: An ideal solution would be a comprehensive data recovery technique specifically designed for XFS and Btrfs file systems. These techniques should able to: 1. Efficiently recover deleted data: Develop algorithms and techniques to identify and extract deleted files from the complex data structures of XFS and Btrfs. 2. Support a wide range of file types: Recover Text-Based Document Formats(doc,docx, rtf, pdf, txt, odt, html, xml, ppt, odp, xls, ods, log, csv, tsv, txt, conf, ini, cfg etc), archives file(zip, tar, rar, iso, rpm, deb etc), Image-Based Document Formats(jpg, jpeg, png, gif, tif etc), executables binaries(.elf, .so, .a, exe, dll, bat, cmd) scripts files(ps, ps1, sh, bash, zsh, py etc), database file(.db etc) and other relevant data formats. 3. Extract complete metadata: Recover accurate creation, access, modification, and deletion timestamps, file names, and other essential metadata associated with deleted files. 4. Provide user-friendly interface: Offer an intuitive interface (GUI/CLI) for easily navigate recovered data and generate reports. 5. Ensure data integrity: Implement robust data validation and verification mechanisms to maintain the integrity of recovered data.
CC23	Fake social media accounts and their detection	Software	Blockchain & Cybersecurity	Background: At present the ITBP guards 3,488 km long India-China borders ranging from the Karakoram Pass in Ladakh to Jachep La in Arunachal Pradesh. Apart from this, the Force also has important roles in many internal security duties and operations against the left wing extremism in the state of Chhattisgarh. Creating fake accounts on Facebook, Instagram or at any other platform and fake account uses, should be identify for account suspension or legal action. To safeguard the organization from the unknown fake account messages over any social sites, a tool may be developed for their identification. Also a central agency should be designated to get the information about the identified fake account holder informed by the developed tools and accordingly, concerned social site organization will approach to delete/suspend the fake account in time bound manner worldwide. Description: How to discover/identify fake profiles on Facebook, Instagram, twitter or other social apps using tools. Also subsequently how to ignored/reported/make to delete of these identified fake accounts by the tools/ through concerned agency in India. Expected solution: 1. Tools for identifications of fake account should be developed for popular social sites. 2. A Central Agency should be designated to get the information about the identified fake account holder info by the developed tools and accordingly, concerned social site organization will approach to delete/suspend the fake accounts in time bound manner worldwide.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC24	Student Innovation	Software	Clean & Green Technology	Solutions could be in the form of waste segregation, disposal, and improve sanitization system.
CC25	The technological solutions for capturing AQI values through mobile and other forms of stations	Software	Clean & Green Technology	DPCC is using different stations at fixed sites for measurement of AQI and other pollution parameters. These fixed stations suffered from various limitations and generally do not give representative values e.g. station located near an industrial area will give higher readings due to proximity to such industrial area which may not be representative of the wider area. Similarly, a temporary construction site/activity near these fixed sites give higher pollution readings due to local reasons. The technological solutions may be required for capturing AQI values through mobile and other forms of stations. Drone would be one of the options where they can record real-time pollution parameters through on-board sensors.
CC26	Use of Digital Technology to calculate Water Footprints for different Agricultural Products	Software	Clean & Green Technology	Background The water footprint measures the amount of water used to produce each of the goods and services we use. The water footprint helps us understand for what purposes our limited freshwater resources are being consumed. The impact of it depends on where the water is taken from and when, if it comes from a place where water is already scarce, the consequences can be significant and require action. Detailed Description The increase in the amount of non-available water due to pollution and scarce groundwater level has added more water footprints, at the community as well as at the personal levels. An increased · water footprint directly affects the health and future of the citizens. Preventing severe drought in water-stressed areas is only going to be possible if water is used with more care and efficiency, this can be achieved if we have readily available data of water footprints. Expected Solution Hence, by using digital technologies like AI, Big Data, Block chain etc. and computer languages, a user friendly app or website may be developed which can provide the water footprints of different items/ final products we eat by feeding little inputs like name, or just by scanning through camera like Google lens. The app should support local languages; this will ensure the pan India usage and sensitize the people about water footprints of items they use in daily life.
CC27	Use of Digital Knowledge Sharing Platform like Wikis on sharing of water efficient techniques and methods for minimizing water scarcity.	Software	Clean & Green Technology	Background: The absence of a centralized knowledge-sharing platform like wikis significantly hampers the dissemination of water-efficient techniques, which could mitigate water scarcity. Despite the existence of various methods to conserve water, especially in agriculture, the lack of awareness and accessibility to this information perpetuates inefficient water use. This gap in knowledge sharing contributes to the overuse of water resources and exacerbates water stress, particularly in regions where agriculture is heavily dependent on irrigation. Establishing a comprehensive, accessible platform could catalyze the adoption of sustainable practices, crucial for addressing the global challenge of water scarcity. Detailed Description: A centralized knowledge-sharing platform akin to Wikis would facilitate the exchange of innovative methods, successful case studies, and research findings, fostering local and global collaboration. Without it, valuable insights remain siloed, hindering the adoption of practices that could conserve water resources and enhance sustainability. The creation of an accessible, comprehensive repository of water conservation strategies is thus critical for addressing the pressing challenge of water scarcity worldwide. Expected Solution: To address the lack of knowledge sharing platforms on water efficiency, creating a dedicated wiki-style database is the key. This platform would host peer-reviewed articles on water-saving techniques, community forums for sharing local knowledge, videos and interactive tools for calculating water usage and savings. Additionally, integrating social media sharing can amplify reach and engagement, while mobile app development ensures accessibility for users in remote areas, contributing significantly to the reduction of water scarcity globally.
CC28	SolarQuest: Innovate to Capture More Sunlight and Boost Energy	Software	Clean & Green Technology	As the global shift towards renewable energy intensifies, solar trackers, which adjust solar panels to follow the sun's path, are crucial for maximizing solar energy efficiency. Consequently, it is essential to design controllers for solar trackers that can optimize the angle of incidence between solar panels and sunlight. This tracking of the sun's trajectory can be done accurately by managing at least one mechanical axis (azimuth, elevation, roll). As a preliminary step, a simulation-based control system, using tools such as SimscapeTM MultibodyTM and Simulink®, can be designed with a single-axis control based on location-specific solar paths. The workflow would involve integrating an electrical motor model (developed using tools like SimscapeTM ElectricalTM), designing a PID control system, developing an algorithm for optimal axis positioning, and validating the system through simulation. In the subsequent steps after validation, the motor control system can be deployed on low-cost hardware (e.g., using Simulink® Support Package for Arduino) to demonstrate a prototype of this solar tracking mechanism. References: 1. Pre- Requisite: https://matlabacademy.mathworks.com/details/control-design-onramp-with-simulink/controls?s_eid=PSM_33221 2. Optimizing Solar Array Performance Using MPPT (https://in.mathworks.com/videos/optimizing-solar-array-performance-using-mppt-1657880084126.html?s_tid=srchtitle_site_search_8_solar%20tracker) 3. Pre- Requisite: Power Systems Simulation Onramp - CHAPTER 4 (System Integration) (https://matlabacademy.mathworks.com/details/power-systems-simulation-onramp/orps?s_eid=PSM_33222) 4. Using the Worm and Gear Constraint Block - Solar Tracker (https://in.mathworks.com/help/sm/ug/using-the-worm-and-gear-constraint-block-solar-tracker.html) 5. Program the Device from Simulink | Arduino Light Meter Project, Part 2 (https://in.mathworks.com/videos/arduino-light-meter-project-part-2-program-the-device-from-simulink-106500.html) Require MATLAB® and Simulink® PRODUCT LICENSE for SIH 2024, please send an email to 'ageethag@mathworks.com'.

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Problem Statements

Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC29	Downscaling of Satellite based air quality map using AI/ML	Software	Clean & Green Technology	Description: Develop an AI/ML (Artificial Intelligence/Machine Learning) model to generate fine spatial resolution air quality map from coarse resolution satellite data. It should utilise existing python-based ML libraries. Developed model need to be validated with unseen independent data. Challenge: To utilise large satellite data having gaps under cloudy conditions To select suitable ML algorithm and ensure optimal fitting of ML model for desired accuracy To validate model output with unseen independent data Usage: To enhance air quality knowledge, Sharpen focus at local level Users: Researchers and government bodies monitoring/working on air quality assessment Available Solutions (if Yes, reasons for not using them): Individual components are available, comprehensive and proven solution does not exist. Desired Outcome: Fine resolution air quality map of NO2
CC30	Innovative applications of cloud-optimized geotiffs for INSAT satellite data	Software	Clean & Green Technology	Description: Design and development of novel applications of Cloud Optimized GeoTIFFs for Efficient Streaming and On-the-Fly processing of INSAT Satellite Data. Challenge: 1. Data Acquisition and Preprocessing: Acquire Level 1 INSAT satellite data from relevant sources. Pre-process the data to ensure compatibility with the COG format. 2. COG Generation: Develop a pipeline to convert INSAT Level 1 data into Cloud Optimized GeoTIFFs. Ensure the pipeline supports multiple spectral bands and their efficient encoding. 3. Selective Streaming and Partial Download: Implement selective streaming capabilities to allow users to access specific data regions and bands without downloading entire files. Enable partial downloads for efficient data handling and reduced bandwidth usage. 4. On-the-Fly Manipulations: Develop tools for real-time manipulations of multiple spectral bands, including band arithmetic, colour adjustments, and custom visualizations. Integrate these tools into a user-friendly interface for seamless interactions. 5. System Integration and Testing: Integrate the COG generation pipeline and on-the-fly manipulation tools into a cloud-based system. Conduct thorough testing to ensure performance, reliability, and user experience. Usage: To make INSAT Data Cloud compatible Users: Meteorologist Available Solutions (if Yes, reasons for not using them): No (To be verified if existing tools exist) Desired Outcome: a. A fully functional system capable of generating and serving Cloud Optimized GeoTIFFs from INSAT data. b. Tools for real-time manipulation of multiple spectral bands. Enhanced accessibility and usability of INSAT satellite data for various applications
CC31	Dashboard for Swachhta and LiFE. Develop a dashboard aimed at maintaining cleanliness and LiFE practices, integrating AI-powered image processing technology for effective monitoring of Swachhta and green practices adopted in post offices. The dashboard needs to be accessible from the Divisional Office offering surveillance capabilities and triggering alerts for deviation from prescribed Swachhta and Green Growth standards to prompt on ground intervention to guide the post office concerned to make necessary changes to conform to set expectations.	Software	Clean & Green Technology	Background: The Department of Posts has implemented Swachhta Abhiyaan in its entire network with intense and focused efforts in the last 10 years. In 2023-24 it has introduced more systematic efforts towards institutionalization of Swachhta Protocols in its entire network and also introduced Lifestyle for Environment Practices through an introductory course on the iGOT portal of GOI and Mission Karmayogi portal of the Department. In the year 2024, the Department has prescribed a Swachhta Action Plan (SAP) 2024 template and provided a toolkit to the field units to adopt fit to local context activities under Swachhta Abhiyaan from the menu of activities prescribed for the entire network to choose from. Through the SAP 2024, the Department aims to institutionalize Swachhta protocols across the network with local ownership and adherence to basic standards. To ensure the outcome the solution to the Problem Statement may be useful for the Department to meet its objectives across the network. In addition to the Swachhta Action Plan and related behaviours and practices, the Department is also committed to adopt Lifestyle for Environment Practices for each of its administrative and operative units. Monitoring system for LiFE with modern and emerging technologies is also welcome to make the Swachhta focused solution above even more useful and powerful for the Department. Description: This is a problem statement seeking monitoring and data analytics solution using modern and emerging Industry 4.0 technologies. While the use of AI and pictorial data based automated monitoring is at the heart of the problem, the team working on this problem can choose any combination of available technologies and tools to devise a simple to use and adopt solution to enable its mass adoption across the post office network. Expected Solution: The expected solution is pictorial data and analytics based on AI. Cameras to capture pictorial data are available in various locations in the DoP and actual or dummy data for the solution will be provided. The geolocation and timestamp on the pictorial data is also to be taken as a fundamental data point to capture in the spirit of the outcome expected towards improved internal governance of Swachhta and green, LiFE, practices being adopted by the Department. The solution developed here could have a wide application based on the scalability that is built in by the teams working on this problem statement.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC32	A Digital BRSR Platform for India Post Network "The Department of Posts (DoP) in India requires a cutting-edge, digital solution to implement a Business Responsibility & Sustainability Reporting (BRSR) framework. This platform aims to transform DoP into a leader in environmental and social sustainability while fostering transparency and accountability towards stakeholders."	Software	Clean & Green Technology	Background: The Department of Posts (DoP) plays a vital role in India's social and economic fabric. Its vast network also has a significant ecological impact. Good intentions and individual efforts for sustainability, LiFE and environment friendly practices are visible throughout the network of India Post. Even with these all pervasive sustainability practices, a standardized reporting framework to measure and improve environmental and social performance and impact is missing across the DoP network. By leveraging digital technologies, the BRSR platform can enable and empower the DoP to become a sustainability role model across all socio geographic communities around each post office. It would also help optimize resource use, minimize negative environmental impact, and help socio-economic development across the country with adequate fit to local context in each geography. Description: This challenge seeks a cutting-edge digital solution to implement a Business Responsibility & Sustainability Reporting (BRSR) framework specifically designed for the muti-dimensional network and the service suite of the DoP which has a huge social and ecologocal impact. This BRSR system should: Capture Data Seamlessly: Integrate with existing DoP infrastructure to collect data on energy consumption, fuel usage, waste generation, water usage, and community engagement initiatives across all India Post establishments and installations. Standardize Reporting: Develop a user-friendly interface for DoP staff, employees and partners to easily report on social and environmental parameters aligned with BRSR guidelines. Generate Actionable Insights: Employ data analytics to generate reports with insights on DoP's sustainability performance, identify areas for improvement, and track progress over time. Promote Transparency and Accountability: Facilitate a platform for the DoP to publicly communicate its BRSR report, fostering transparency and accountability towards stakeholders. Cover reports from a mobile workforce working from diverse locations: DoP's extensive network includes post offices in remote locations with varying levels of technological expertise. The solution needs to be user-friendly and accessible for a geographically dispersed workforce. Expected Solution: We envision a cloud-based, secure, and mobile-first BRSR platform with the following functionalities: Seamless Data Collection: Mobile app for postal workers to record data on sustainability parameters (energy readings, waste logs, community outreach activities) even in offline mode. Integration with existing DoP systems for automatic data capture. Potential use of IoT sensors to collect real-time data on energy consumption. User-Friendly Reporting: Standardized interface for DoP staff to easily report on social and environmental parameters. Interactive dashboards with real-time and historical data on DoP's sustainability performance. Generation of comprehensive BRSR reports aligned with BRSR guidelines, minimizing manual effort. Actionable Insights and Transparency: Data analytics tools to generate insights and reports, enabling data-driven decision making for improved sustainability. Public reporting portal for DoP to share BRSR reports, fostering trust and demonstrating commitment to sustainability. Benchmarking tools to compare performance across postal circles, encouraging healthy competition and knowledge sharing. Promoting Sustainability Culture: Gamification elements (leaderboards, badges) to incentivize participation and foster a culture of sustainability within DoP. Expected Outcomes: Standardized Sustainability Reporting: A centralized platform for capturing and reporting on DoP's environmental and social impact. Improved Transparency and Accountability: Increased transparency regarding DoP's sustainability efforts, fostering trust with stakeholders. Data-Driven Decision Making: Actionable insights for optimizing resource use, minimizing environmental impact, and enhancing social responsibility initiatives. Empowered Workforce: A mobile app empowers postal workers to contribute to DoP's sustainability goals. Sustainable Leadership: DoP positioned as a leader in sustainable postal services, serving as a model for other government departments.
CC33	Create a Virtual Herbal Garden that provides an interactive, educational, and immersive experience to users, showcasing the diverse range of medicinal plants used in AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy).	Software	MedTech / BioTech / HealthTech	Background: The AYUSH sector relies heavily on medicinal plants and herbs, which form the backbone of traditional healing practices. However, physical gardens that are not accessible to everyone. A Virtual Herbal Garden will bridge this gap by offering a digital platform where users can explore, learn, and understand the significance of various medicinal plants from the comfort of their homes. Description: Participants are tasked with developing a Virtual Herbal Garden that is engaging, informative, and user-friendly. This virtual garden should include: Interactive 3D Models: Realistic 3D models of medicinal plants that users can rotate, zoom, and explore from different angles. Detailed Information: Comprehensive details about each plant, including its botanical name, common names, habitat, medicinal uses, and methods of cultivation. Multimedia Integration: High-quality images, videos, and audio descriptions to enhance the learning experience. Search and Filter Options: Advanced search functionality to easily locate specific plants and filter them based on various criteria like medicinal uses, region, and type. Virtual Tours: Guided virtual tours highlighting specific themes, such as plants for digestive health, immunity, skin care, etc. User Interaction: Features that allow users to bookmark favourite plants, take notes, and share information on social media. Expected Outcome: The expected outcome is a comprehensive Virtual Herbal Garden that serves as a valuable educational tool for students, practitioners, and enthusiasts of the AYUSH sector. This platform should make the knowledge of medicinal plants accessible to a wider audience, promoting awareness and understanding of traditional herbal practices. It should be visually appealing, informative, and interactive, providing users with an immersive experience that combines technology with traditional knowledge.
CC34	Student Innovation	Software	MedTech / BioTech / HealthTech	Cutting-edge technology in these sectors continues to be in demand. Recent shifts in healthcare trends, growing populations also present an array of opportunities for innovation.
CC35	Queuing models in OPDs/ availability of beds/ admission of patients. A hospital based solution is ideal which can be integrated with city wide module	Software	MedTech / BioTech / HealthTech	Technological solution as per queuing models in OPDs/availability of beds/admission of patients would be one area. Study of dispensation of various types of medicines/consumables and Inventory management modules at hospital level are key areas requiring support. NIC has already developed some modules but their implementation in Delhi is yet to be started. A hospital based solution is ideal which can be integrated with city wide module may be required.
CC36	Online testing and monitoring of quality of medicines and consumables	Software	MedTech / BioTech / HealthTech	Suitable technological module for testing and monitoring of quality of medicines and consumables being received in hospitals would be required so that the system ensures necessary compilance and rejection of low quality supplies without manual intervention

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC37	Health Data Information & Management System Mobile Application (HDIMS)	Software	MedTech / BioTech / HealthTech	Hospitals/Departments shall be able to enter and Update Data in the Mobile Application which can be viewed by the Super Admin dynamically for efficient Implementation of Health and Family Welfare Schemes, other Health programmes and provide key inputs for policy formulation and appropriate programme interventions. This Mobile Application will facilitates the flow of physical performance from the Facility level to the Sub-district, District and State/Union Territory level using Health Data Information & Management System Mobile Application (HDIMS) interface
CC38	Drug Inventory and supply chain Tracking system	Software	MedTech / BioTech / HealthTech	With the aim to provide "Right Quantity of "Right Product" on "Right Place" on "Right Time" in "Right Condition" at "Right Cost" for "Right People" and also to streamline the distribution of drugs to institutions and ensure availability of drugs at all times, a new, innovative system named Drug Inventory and supply chain Tracking system is required: To improve efficiency and effectiveness of procurement and distribution systems through robust quality controls To provide dashboard based online monitoring of all activities at each level Tracking of vendor activities like preparation of Supply Order, Shipment etc. Monitoring of Drug consumption pattern at the Hospitals/Medical Institutions Level
CC39	A comprehensive AYUSH Startup Registration Portal to streamline the registration process for startups in the AYUSH sector, enhancing efficiency, transparency, and accessibility.	Software	MedTech / BioTech / HealthTech	Background: The AYUSH sector, encompassing Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homoeopathy, is burgeoning with innovative startups. However, these startups face challenges in registering their ventures due to cumbersome, opaque, and decentralized processes. An efficient registration portal is crucial for fostering growth, facilitating regulatory compliance, and promoting the integration of AYUSH solutions into mainstream healthcare. Description: Participants are tasked with creating an AYUSH Startup Registration Portal that simplifies and accelerates the registration process. The portal should be user-friendly, secure, and capable of handling a high volume of registrations. Key features must include: User Authentication: Secure login for startups, government officials, and other stakeholders. Application Submission: Streamlined forms for submitting registration applications, with clear instructions and guidelines. Document Upload: Easy upload and management of necessary documents, ensuring compliance with AYUSH regulations. Status Tracking: Real-time tracking of application status, notifications, and updates for applicants. Data Management: Efficient handling and storage of startup data, ensuring privacy and security. Support and Resources: Access to resources, FAQs, and support for startups during the registration process. Expected Outcome: The expected solutions should deliver a functional, scalable, and secure portal that addresses the current inefficiencies in the AYUSH startup registration process. The portal should enhance user experience, reduce processing times, and ensure compliance with regulatory requirements. Participants should demonstrate innovation in user interface design, data security measures, and integration with existing AYUSH databases. The ultimate goal is to empower AYUSH startups, enabling them to contribute more effectively to the healthcare ecosystem.
CC40	Software for Speech Language Therapy Clinical Services	Software	MedTech / BioTech / HealthTech	Background: The rehabilitation institutes involved in this activity face high therapy cases load and more number of student therapists with less number of therapy supervisors. Following this system in manual mode impedes providing prompt services. Description: Clinical services with respect to speech language therapy begins with patient allocation to the therapist. The therapist then prepares therapy plan with goals and activities. The respective case supervisor needs to check the therapy plan and provide the inputs for further continuation of regular therapy sessions. At least post ten therapy sessions the therapist writes the progress report of the therapy case. Further, it is evaluated by the supervisor. This Cycle of speech language therapy clinical services in continuous until the therapy case has completely improved or discontinued due to various reasons. The supervisor based on overall handling of therapy sessions gives clinical ratings. Expected Solution: The process needs to become digitized with the use of software where in right from the allocation of cases, therapy related documentation by both therapist and supervisor, clinical evaluation of therapy, feedback and clinical rating can be performed.
CC41	Student Innovation	Software	Renewable / Sustainable Energy	Innovative ideas that help manage and generate renewable /sustainable sources more efficiently.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC42	A web application specifically designed for Indian coal mines to quantify their carbon footprint and explore pathways to carbon neutrality.	Software	Renewable / Sustainable Energy	Background: India faces a complex challenge in balancing its reliance on coal for energy with its climate change commitments. Coal mining is a major source of carbon emissions, a greenhouse gas contributing to global warming. To achieve carbon neutrality, the Indian coal sector needs to offset its emissions. This can be done through a combination of strategies like reducing emissions from mining activities, adopting cleaner technologies, and offsetting remaining emissions by planting trees that absorb carbon dioxide. A web-based application can be a powerful tool in this journey by helping quantify a mine's carbon footprint and evaluate potential pathways to carbon neutrality. Description: The web based application will have following objectives: Activity wise quantification of Carbon emission in Coal Mines Estimation of existing Carbon Sinks Gap analysis between C emission and sinks and suggesting pathways to carbon neutrality Expected Solution: A comprehensive software solution that includes: Emission estimation: The app would allow users to input data on various mining activities (e.g., excavation, transportation, equipment usage) and estimate the associated carbon emissions based on establishd emission factors. Estimation of Per Capita emissions of a Mine. Carbon Neutrality Pathways: The app could offer features for simulating different emission reduction strategies like: Clean technologies: Assessing the impact of adopting electric vehicles, methane capture systems, and renewable energy sources for mine operations. Afforestation offsets: Calculating the amount of land required for tree plantation to offset remaining emissions based on state specific afforestation plan and Carbon emission reduction. Other Renewables: explore alternative use of energy to reduce direct electricity consumption. Any other pathways: Carbon Credits: Estimation of potential Carbon credit earned as per present market rates. Data visualization: The app should present results visually, using charts and graphs to track emission trends and the effectiveness of implemented strategies. Scalability: Design the app to accommodate different mine sizes and types (underground vs open-cast). Benefits: Transparency: Providing a clear picture of a mine's carbon footprint. Decision support: Helping mine operators make informed choices for emission reduction. Cost savings: Identifying opportunities to optimize operations and potentially reduce costs associated with emissions. Sustainability goals: Aiding Indian coal mines in their journey towards carbon neutrality and supporting the country's overall climate goals.
CC43	Building Integrated Photo-voltaic (BIPV) potential assessment and visualisation using LOD-1 3D City Model	Software	Renewable / Sustainable Energy	Description: Building Integrated Photovoltaic (BIPV) systems are the solar power generating products or systems that are seamlessly integrated into the building envelop. The satellite data from Indian Satellites such as Cartosat-2/3 and Cartosat-1 are capable of generating 3D city models up to LoD-1. These LoD1 models, which are derived by extruding a footprint to a uniform height, can be used for simulating building shadows. This project aims to develop an interactive application for assessing BIPV potential using LOD-1 3D city model. It will involve simulating shadow of adjoining buildings on each face of the building and estimating incident solar energy on the vertical face of the building. The application will render the building surface according to available BIPV potential. Challenge: * 3D Visualisation of LOD-1 City Model * Simulating Building Shadows in 3D * 3D Rendering of BIPV Potential on Building Usage: Application of Space-based inputs for Renewable Energy Users: The application will be deployed on VEDAS portal's '3D City Model and Rooftop Solar Potential' application. It will be usefu for Policy-makers (State & Central Government), Solar Energy Solution Providers, Architects and citizens. Available Solutions (if Yes, reasons for not using them): Commercial Architectural Packages like Autodesk are suitable for building-level analysis and require substantial level of details. 3D GIS packages such as ESRI City Engine or Cesium provide visualisation capabilities. Software for city-wide BIPV potential estimation are currently not available in public domain. Desired Outcome: An interactive application where user provides a date (for calculating sun-position) and daily Global Horizontal Irradiation (GHI) value, and the application generates corresponding 3D city model rendered according to incident solar energy for that day. The application also provide total BIPV and rooftop PV energy potential available in the building.
CC44	Student Innovation	Software	Smart Education	Smart Education, a Concept that Describes learning in digital age.it enables learner to learn more effectively,efficently,flexibly and comfortably.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC45	Enhancing Monitoring and Management of Research, IPR, Innovation, and Start-ups in Gujarat State	Software	Smart Education	Background: Gujarat has long been a leader in fostering innovation and entrepreneurship. The state is home to numerous research institutions, start-ups, and innovation hubs that drive economic growth and technological advancement. However, the current systems for monitoring and managing research activities, intellectual property rights (IPR), innovation developments, and start-up growth are fragmented and inefficient. Information is dispersed across various departments and organizations, leading to challenges in data accessibility, transparency, resource allocation, and overall management. To address these issues, there is a need for a comprehensive web application that can unify and streamline these processes, enhancing efficiency and productivity. Detailed Description: The proposed comprehensive web application aims to address the key challenges faced in monitoring and managing research, IPR, innovation, and start-ups in Gujarat. The application will serve as a centralized platform to integrate various functions and provide seamless access to information and resources. The key features of the web application include: Unified Data Repository: A centralized database where all research projects, patents, innovations, and start-up information are stored and easily accessible. Transparent Monitoring: Tools for stakeholders to track the progress and outcomes of research projects, innovation developments, and start-up growth, ensuring greater transparency. Efficient Resource Allocation: Mechanisms to optimize the allocation of resources, such as funding and mentorship, based on real-time data and insights. IPR Management: A streamlined process for managing intellectual property rights, including patent applications, status tracking, and protection of intellectual property. Support for Innovators and Start-ups: Access to resources, mentorship, and support services for innovators and entrepreneurs, facilitating their growth and success. Collaboration Tools: Features to enhance collaboration among researchers, innovators, policy makers, and other stakeholders, fostering a cohesive ecosystem. Data-Driven Insights: Analytics and reporting tools to provide data-driven insights for policy makers and funding agencies to make informed decisions. The application will cater to various users, including researchers, innovators, entrepreneurs, policy makers, investors, funding agencies, and IPR professionals. By integrating all these functions into a single platform, the application will address the inefficiencies and fragmentation currently hindering the growth and success of research and innovation in Gujarat. Researchers and Academics: Require a platform to manage and track their research projects, collaborations, and funding. Innovators and Entrepreneurs: Need a centralized system to access resources, support, and information related to their innovations and start-ups Policy Makers and Government Bodies: Require data-driven insights to make informed decisions on resource allocation and policy formulation. Investors and Funding Agencies: Need a transparent system to evaluate and support promising research projects and start-ups. IPR Professionals: Require an efficient system to manage patent applications, track IPR statuses, and protect intellectual property. Expected Solution: The implementation of this comprehensive web application is expected to yield significant positive outcomes: Centralized Data Repository: Establishment of a unified platform where all relevant data is stored, reducing fragmentation and improving data accessibility. Increased Transparency: Enhanced transparency in tracking progress and outcomes of various projects, facilitating better oversight and accountability. Better Resource Utilization: More effective allocation and utilization of resources, leading to improved outcomes for research and innovation projects. Accelerated Innovation: Faster and more efficient innovation processes due to improved support systems and collaboration opportunities. Economic Growth: Increased start-up success rates and innovation outputs, contributing to the overall economic growth of Gujarat. Enhanced IPR Protection: More efficient and effective management of intellectual property rights, reducing delays and improving protection for innovators. In summary, the proposed web application aims to create a more efficient, transparent, and supportive environment for research, IPR management, innovation, and start-up growth in Gujarat. By addressing the current challenges and leveraging modern technology, the application will significantly enhance the state's capacity to foster and sustain innovation and entrepreneurship.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC46	Implementation of the Alumni Association platform for the University/Institute.	Software	Smart Education	Background: Alumni associations play a pivotal role in fostering lifelong connections between graduates and their alma mater, facilitating networking, mentorship, and philanthropic support. However, many alumni associations face challenges in maintaining engagement, facilitating donations, and providing valuable services such as job networking and tracking alumni success stories. A comprehensive Alumni Association platform for a University/Institute, encompassing both web and mobile applications, aims to address these challenges effectively. Detailed Description: The proposed Alumni Association platform for the Government Engineering College will feature robust functionalities accessible through both web and mobile applications: Alumni Registration: User-friendly registration processes on both web and mobile platforms, allowing alumni to join the association, update their profiles, and stay connected with peers and the institution. Donation Portal: Secure mechanisms on both platforms for alumni to contribute donations easily and support various initiatives and projects undertaken by the college, fostering a culture of philanthropy. Networking Hub: Dedicated sections on both platforms to connect alumni based on shared interests, professions, and geographic locations, facilitating professional networking, mentorship, and collaboration opportunities. Job Portal: Integrated job search and posting features accessible via web and mobile apps, enabling alumni to explore career opportunities, post job openings, and connect with potential employers within the alumni network. Alumni Directory: Search functionalities available on both platforms to find alumni based on different criteria such as graduation year, field of study, industry, location, etc., promoting networking and community building. Success Story Tracking: Features on both web and mobile apps to showcase and track alumni achievements, success stories, and notable contributions to society, inspiring current students and fostering pride among alumni. Events and Reunions: Announcements, registrations, and management tools available on both platforms for organizing alumni events, reunions, workshops, and professional development sessions to maintain engagement and connection. Feedback and Surveys: Channels on both web and mobile apps for alumni to provide feedback on their experiences, suggest improvements, and participate in surveys to help shape future initiatives of the association. The platform will prioritize user experience, security, and scalability across both web and mobile applications to cater to the diverse needs of the Government Engineering College's alumni community. Expected Solution: Implementation of the Alumni Association platform for the Government Engineering College, comprising both web and mobile applications, is expected to achieve several positive outcomes: Enhanced Alumni Engagement: Seamless access to networking, career opportunities, and alumni events through web and mobile apps will strengthen connections among alumni, fostering a vibrant and active community. Increased Philanthropic Support: Convenient donation processes accessible via both platforms will encourage alumni to contribute towards the college's growth and development initiatives. Career Advancement: Access to job postings, mentorship opportunities, and professional networking on mobile devices will support alumni in their career growth and advancement. Knowledge Sharing: Exchange of knowledge, experiences, and best practices facilitated through both web and mobile apps will enrich professional development and lifelong learning initiatives. Pride and Recognition: Highlighting alumni achievements and success stories on both platforms will instill pride in the alma mater and inspire current students to excel in their academic and professional pursuits. Community Building: Interactive features available on both web and mobile apps will nurture a sense of belonging and camaraderie among alumni, strengthening their bond with the institution. In summary, the Alumni Association platform for the University/Institute, integrated with both web and mobile applications, aims to create a dynamic and supportive ecosystem where alumni can connect, contribute, and thrive, thereby enriching the overall educational experience and legacy of the institution.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC47	Learning App for Deaf And Mute and sign language-English/Gujarati converter	Software	Smart Education	Background: “Inclusivity” is the motto of Education department, Government of Gujarat. Opportunity for all is the new slogan and The Indian Government has come up with Indian Sign Language. There has been lot of work in done in American sign language and focusing on interpretation in English. Majority schools in India adopt local language. In Gujarat, the deaf and mute students would be learning Gujarati by sign language. There are two general methods of deaf education are manualism and oralism..The students learn at school but at home if they want to practice material in Digital form is in limited form especially considering Indian Sign Language and Gujarati as local language. Detailed Description: The proposed comprehensive Mobile Application aims to address the key challenges faced in learning beyond classroom by deaf and mute students. The key features of the application include: Interpretation of Alphabets and numbers in Gujarati: Explaining the alphabets and numbers in Gujarati. The students first should learn and then should get writing pad to practice the writing of alphabets and numbers. Words and Sentences: Explaining the basic words starting from each Gujarati alphabet for example ? –???. Writing Exercises based on this Mathematics : Tables. Basic calculation Sum, Subtract, Multiplication, division in Gujarati. Writing problems for assessment of learning. Science : Prepare learning of science principles to sign language tutorials and writing exercises based on this. Conversion of Gujarati sentences to Sign Language and vice versa: If some Gujarati news/ articles are fed, they should be converted to sign language Conversion of speech to sign Language and vice versa: If some Gujarati conversation/addressing is taking place, they should be converted to sign language Data Analytics : Report card of the student to assess his/her learning of Mathematics and Science The application will cater to various users, including teachers, students, parents and HR(company). By integrating all these functions into a single Application , the application will address the lack of resources and bridge of communication gap. Teachers: Get a platform for teaching and can give repeated exercises to fine tune students with Mathematics and science. . Students: Learning platform where they can learn at their own pace and do the exercises. Parents: Helping aid for parents who do not know sign language. HR: Inclusivity is part of company policy also. While interviewing speech to text and text to speech will be helpful. Expected Solution: The implementation of this comprehensive Mobile application is expected to yield significant positive outcomes: Learning of Basic Mathematics and Science: Establishment of a unified platform where all relevant data is stored, reducing fragmentation and improving data accessibility. Increased Communication: Enhanced transparency in tracking progress and outcomes of various projects, facilitating better oversight and accountability. Better Assessment of learning: More effective allocation and utilization of resources, leading to improved outcomes for research and innovation projects. Including specially abled to mainstream : Conversion of text to sign language, speech to sign language and vice versa will narrow down the communication gap that arises due to non understanding of sign language. In summary, the proposed Mobile application aims to create a more efficient and supportive environment for learning to deaf and mute students in Gujarat. By addressing the current challenges and leveraging modern technology, the application will significantly enhance the learning ability of specially abled students.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC48	Automated System for Career Advancements of the Faculties of Higher Education	Software	Smart Education	Background: This problem requires an innovative approach to enhance the efficiency and transparency of faculty self-appraisal in the university settings. Through a robust web-based platform, the system should address the complexities associated with traditional evaluation processes. It should capture and manages intricate details of faculty activities, encompassing research publications, event participation, seminars, projects, and lectures. The project must aim to create a user-friendly environment for faculty members, optimizing the self-appraisal experience. Employing a secure registration and login system ensures data confidentiality and personalized access. The meticulous automated tracking of research outputs (as done automatically by google scholar) and academic engagements streamlines the evaluation process, providing a consolidated record for administrators. By introducing features for logging events, seminars. projects, and lectures, the system offers a holistic view of faculty contributions beyond the classroom. This comprehensive solution should aligns with the objectives of modernizing appraisal methodologies, fostering a culture of continuous improvement, and supporting Paperless India motive. Administrators, on the other hand, can leverage this data to make informed decisions about faculty development and resource allocation. University Administrators can log in to the Admin Panel and access all the form entries submitted by the faculty members. They can view all the details in the form, sort the form entries according to Name, Employee Code or Date of Submission. They can then download the form submission details in a PDF format. In contemporary academic institutions, the process of faculty self-appraisal plays a crucial role in ensuring quality education, fostering professional development, and aligning individual contributions with institutional goals. However, traditional appraisal methods often entail cumbersome paperwork, lack of transparency, and inefficiencies that can hinder comprehensive evaluation. This real-time application seeks to address these challenges by introducing a streamlined, web-based solution that enhances the efficiency and transparency of the appraisal process. This innovative platform should be designed to meticulously capture and manage a wide range of faculty activity, including research publications (automatically as done by google scholar), event participation, seminars, projects, and lectures. By leveraging technology, the system should provide a user-friendly interface that facilitates easy logging and tracking of academic contributions. The secure registration and login system should ensure that faculty data remains confidential and accessible only to authorized personnel. Moreover, the platform should support administrators by offering a consolidated view of faculty performance. The Admin Panel should enable administrators to access, Sort, and download detailed appraisal data, thereby supporting informed decision- making regarding Faculty development and resource allocation. This digital approach should not only modernizes the appraisal process but also it should aligns with the broader objective of promoting sustainable and paperless administrative practices. Detailed Description: In the dynamic landscape of higher education, the imperative for effective systems to evaluate and enhance faculty performance has become increasingly apparent. Existing approaches to faculty appraisal often lack transparency and a data-driven foundation, hindering the ability to recognize and promote excellence. This underscores the pressing need for an innovative solution. The “Automated System for Career Advancements of the Faculties of Higher Education"" project should addresses this critical gap by introducing a comprehensive and dynamic platform. This application must empower faculty members to engage in a transparent and assessment self-driven of their professional activities. By facilitating documentation and evaluation of contributions in teaching, research, and community engagement, the system must offer a transformative approach to performance appraisal within university context. The project must offer numerous benefits to both faculty members and university administrators. Faculty should be able to maintain a detailed and organized record of their professional activities, helping them track progress and identify areas for improvement. Administrators, on the other hand, should leverage this data to make informed decisions about faculty development and resource allocation. Expected Solutions: The primary objectives of the ""Automated System for Career Advancements of the Faculties of Higher Education"" are to alleviate the challenges inherent in traditional paper-based processes. This project must aim to streamline and modernize faculty self-appraisal by implementing a secure, user-friendly web-based platform. The key focus must be on reducing administrative burdens, minimizing time consumption through digital processes, and enhancing data accuracy. By centralizing faculty information, the system seeks to provide administrators with efficient tools for evaluation, contributing to a more transparent and accountable appraisal process. Ultimately, the project aims to optimize the overall faculty assessment experience, fostering a culture of continuous improvement in higher education institutions. REAL-TIME APPLICATION Faculty should be able to update their activities, such as research publications, event participation, and seminars, in real-time, eliminating delays associated with traditional methods. This dynamic system must ensure administrators have instant access to the latest information for timely and informed decision-making. The website's real-time capabilities enhance the overall efficiency of the faculty self-appraisal process, promoting a more agile and responsive approach to performance evaluation in the academic environment. SOFTWARE REQUIREMENT -Web Browser: Compatible web browser (e.g., Chrome, Firefox) for accessing and interacting with the Faculty Self-Appraisal Database Management Website. -Postman: Postman for testing API endpoints and ensuring seamless communication between the web application and server. -Git and GitHub: Git for version control and GitHub for collaborative development, facilitating efficient code management and collaboration. -VSCode: Visual Studio Code (VSCode) as the integrated development environment (IDE) for code editing, debugging, and project management during the development of the web application. HARDWARE REQUIREMENT -OS: Windows 10 or above or any other OS (e.g. Linux). -Processor (not minimum requirement): A modern quad-core or above for seamless and smooth development process of application. -RAM: At least 4 GB of available RAM to be able to run the Web App on the Browser. -GPU: Any GPU can be preferred. -Storage: Sufficient storage can be fulfilled by SSD or HDD. FUNCTIONAL REQUIREMENTS -User Authentication: Users must register and log in securely. Unique user profiles for faculty members and authorized administrators. -Data Collection Form: Implement a comprehensive ""SELF APPRAISAL FORM"" for faculty activities. Capture personal and professional details in a user-friendly interface. -Manage Database: Establish a secure database to store faculty self- appraisal data. Ensure efficient data retrieval and management for evaluation purposes. -Client-Side Scripting: Employ client-side scripting (e.g., JavaScript) for dynamic and responsive user interfaces. Enhance user experience with real-time form validation and interactive features. -Server-Side Scripting: Utilize server-side scripting (e.g.. Node.js, Python) for processing and storing data securely. Enable seamless communication between the front-end and back-end components. -Event Logging: Enable faculty to log events, seminars, projects, and lectures for a comprehensive assessment. Capture details to provide insights into faculty contributions beyond traditional metrics NON - FUNCTIONAL REQUIREMENTS -Performance: The system must respond promptly to user interactions, with minimal latency during data retrieval and form submissions. -Scalability: The web application should accommodate an increasing number of users and data entries without compromising performance. -Reliability: Ensure high system availability with minimal downtime for routine maintenance, updates, or unforeseen issues. -Security: Implement robust security measures, including encryption and

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC49	Publications summary generator for faculty members profile building	Software	Smart Education	Description: 1. Background: For a much simplified and initial solution, input (publication record) can also be provided in a consolidated single bibtex file. However, it is desirable to provide input as an excel sheet, as mentioned earlier. 2. Description: The proposed solution should be able to crawl different popular academic databases, like Google Scholar, DBLP, etc. Often it is desired to have a publication record in a specific period for submission to various accrediting agencies by HEI's; therefore solution may have a provision for such customized queries. Expected solutions: The desired solution is required for generating publication summary for faculty profile showcase. Following are the identified inputs and expected outcomes Input: 1. Faculty names as mentioned in their respective academic profile (research papers) in an excel sheet 2. Year-wise publication record in journals which is exportable in words and excel 3. Year-wise publication record in conferences which is exportable in words and excel 4. Customized publication records in a particular duration
CC50	Learning path dashboard for enhancing skills	Software	Smart Education	Background: For a much simplified and initial solution, input (publication record) can also be provided in a consolidated single .bibtex file. However, it is desirable to provide input as an excel sheet, as mentioned earlier. Description: The proposed solution should be able. Instructor shall have educational resources files in different formats like pdf, word, etc. and hyper-links of relevant academic literature Expected solutions: The desired solution is required to: -Learning dashboard showing different reading statistics like reading time of a particular topic. Total finishing time of a particular skill. -The instructor should be able to easily create a learning path along with incorporating learning resources, as mentioned ""inputs."" including videos. -Progress made by the learner should be continuously updated. -The desired solution must follow UX principles
CC51	Smart Competency Diagnostic and Candidate Profile Score Calculator	Software	Smart Education	Project Concept: Comprehensive Employment Platform/Portal The current employment portal lacks a personalized and adaptive approach to job matching and skill development. There is a need for an intelligent system that not only matches job seekers with potential employers but also identifies and suggests training courses to bridge skill gaps. We wish to design a competency diagnostic which would ask a series of questions to students to test their competence and based on their scores in the test, recommend jobs to them and also appropriate training courses to them to cover the gaps in their skill curve. Requirements: 1. AI-Powered Job/Training Recommendation System: • Implement an AI-based recommendation system trained on multiple data points (e.g., skills, experience, preferences) to analyze job seekers' profiles and recommend suitable job opportunities. • Training Course Recommendations: Suggest relevant online courses, workshops, and training programs based on the desired job roles. 2. Skill Gap Analysis and Recommendations: • Gap Identification: The recommendation System should assess job seekers' competencies against the requirements of their desired job roles to identify areas for improvement. • Personalized Suggestions: Provide tailored recommendations for online courses, workshops, and training programs to help job seekers upskill and close identified gaps. 3. Adaptive Learning Pathways: • Personalized Learning: Develop adaptive learning pathways based on the job seeker's progress and feedback. • Content Variety: Offer a mix of micro-courses, webinars, and hands-on projects relevant to the job market to enhance learning and skill development. 4. Real-Time Job Market Insights based on candidate's skills and competencies: • Dashboard: Create a dashboard displaying real-time data on trending jobs, skills in demand, and salary benchmarks. • Data Analytics: Use data analytics to provide insights into job market trends and forecast future skill requirements. 5. Skills Verification and Certification: • Skill Assessments: Implement a system for verifying skills and certifying competencies through assessments and tests. • Badges and Certifications: Offer badges and certifications that candidates can display on their profiles and share on social media platforms like LinkedIn. 6. Resume Wizard • Automated Resume Building: Develop a resume wizard to help candidates automatically build their resumes based on their profiles, ensuring a professional and comprehensive presentation of their skills and experiences. 7. Community and Peer Support: • Community Forum: Integrate a community forum where individuals can share experiences, ask questions, and receive support from peers and mentors. • Virtual Events: Organize virtual events, workshops, and webinars focused on employment and career development, including special sessions for people with special needs. Expected Outcome: The system will facilitate a personalized job matching process and offer targeted skill development recommendations, helping job seekers become more competitive in the job market. NOTE : This is an innovation opportunity and students are encouraged to think out of the box to develop solutions which can be presented in newer ways + which can address the needs in out of the box ways for a certain industry OR makes the platform generic. Above description serves as a guide to specify essential needs that can be satisfied for the developed solution and is not limited only to the scope described

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC52	Freelancing Platform	Software	Smart Education	Project Concept : Freelancing Opportunities for India There is a significant gap in connecting freelancers and gig workers with short-term and project-based job opportunities. An platform like upwork is needed to seamlessly connect freelancers with employers and provide tools for managing freelance projects. Requirements: 1. Freelance Job Marketplace: • Develop a marketplace where freelancers can find short-term jobs, gig work, and project-based opportunities. • Allow employers to post projects, specify requirements, and invite freelancers to apply. 2. Freelancer Profile and Portfolio Management: • Enable freelancers to create detailed profiles showcasing their skills, experiences, and portfolio of past work. • Integrate a rating and review system for feedback on completed projects. 3. Extensive Search & Analytics • Enable Employers/Freelancers to do extensive search in the available data / generated data. • Generation of AI enabled insights into the Data and providing newer ways of information availability for job seekers / employers to engage. • AI based Recommendation Systems for seeking opportunities 4.Escrow Account Creation • Create provisions for an escrow account that can be used to hold the money until the job is fully delivered. • Integrate secure payment gateways to facilitate smooth financial transactions between employers and freelancers. Expected Outcome: The platform will connect freelancers with a wide range of job opportunities and provide them with tools to manage projects efficiently, leading to better job satisfaction and increased income opportunities. NOTE : This is an innovation opportunity and students are encouraged to think out of the box to develop solutions which can be presented in newer ways + which can address the needs in out of the box ways for a certain industry OR makes the platform generic. Above description serves as a guide to specify essential needs that can be satisfied for the developed solution and is not limited only to the scope described
CC53	Mentor Connect	Software	Smart Education	Project Concept: Mentoring - The best way Mentoring during the Career/Education is a vital aspect for success of a candidate and this can achieve amazingly positive changes in the life of a mentee. Today , India is known due to its demographic advantage and career directions are infinite. However newer directions are demanding candidates to be coached and mentored for progress. This application or platform can be developed by students understanding this knowledge development need and bring together mentor and mentees. Create a platform where candidates can connect with mentors based on the availability of the mentors and mentors should be able to help candidates with their queries and concerns around careers, skill development etc. Mentors could be senior leaders from the industry or could be subject matter experts who have spent appreciable time in the industry and are aware of intricacies around jobs in a specific industry. Requirements: 1. Create an automated calendar booking system: • Booking Automation: Develop an automated calendar booking system that that could create bookings automatically with a mentor based on the mentor's availability and schedules appointments with mentors based on their availability. The system will check mentors' calendars and automatically find and book suitable time slots for meetings. • User-Friendly Interface: Provide a simple, intuitive interface for candidates to select their preferred time slots, ensuring easy and efficient scheduling. • Integration with Calendly: Consider integrating with existing tools like Calendly to leverage their robust scheduling capabilities. 2. Embedded video call feature: • Video Call Integration: Embed a video call feature within the platform to facilitate virtual meetings between mentors and candidates. • Chat Functionality: Incorporate a chat feature within the video call to allow text-based communication during the session, enabling the sharing of links, documents, and other resources. • Secure and Reliable: Ensure the video call and chat functionalities are secure, reliable, and easy to use. Expected Outcome: The platform will help connect candidates with mentors from the industries and thereby increase their chances of employment through expert guidance and referrals. NOTE : This is an innovation opportunity and students are encouraged to think out of the box to develop solutions which can be presented in newer ways + which can address the needs in out of the box ways for a certain industry OR makes the platform generic. Above description serves as a guide to specify essential needs that can be satisfied for the developed solution and is not limited only to the scope described

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC54	AI-Powered Student Assistance Chatbot for Department of Technical Education, Government of Rajasthan.	Software	Smart Education	Background: There are numerous engineering and polytechnic institutes in Rajasthan running under the Department of Technical Education, Government of Rajasthan. Notably, during the admission process, there is a significant increase in enquiries from various groups, including students, their parents, and other stakeholders. These enquiries cover a wide range of queries related to admission process, eligibility criteria, information about different colleges, fee structure, curriculum , scholarship , hostel facilities, previous year's college and branch-specific allotments placement opportunities and many more. Currently, stakeholders have tocontact colleges individually through phone or email, and sometimes even visit the colleges personally. This process is not only cumbersome for the stakeholders but also demanding to pool manpower for the colleges to manage these inquiries. Detailed Description: With the continuous rise in enquiries, it is becoming increasingly difficult for the colleges to respond promptly and effectively using traditional communication methods. To address this issue more efficiently and ensure timely assistance for everyone, there is a pressing need to adopt new technological solutions. One effective approach is to develop an AI-powered chatbot at centralized level that would serve as a virtual assistant, available 24/7 to answer a wide range of questions. By automating responses to common enquiries, the chatbot would significantly enhance the accessibility to important information and allow staff to focus on handling more complex queries and other critical tasks. For example, the chatbot would provide insights into information about various engineering and polytechnic colleges that falls under the jurisdiction of Department of Technical Education, and guide users through the admission processes, explain fee structures, share curriculum updates, provide details about available scholarships, share alumni information, and share information on job placement opportunities etc This will empower the technical education department because of the ease of providing information, help and advice instantly to prospective students, their parents, and all interested parties. The required information provided by all colleges can be integrated with ease in software. Expected Solutions: 1. Efficient Information Retrieval: The chatbot should rapidly access and provide accurate information from a comprehensive database on topics such as admissions, fees, scholarships, recommendations based on previous years cutoff, minimizing the need for human assistance. Incorporate Natural Language Processing (NLP) to support voice based assistance in English languages and can be extended in Hindi and other regional languages ensuring wide accessibility and understanding. 2. Enhanced User Experience: Design an intuitive interface that allows users to navigate easily and find information quickly. The interface should be straightforward, accessible on common platform, and capable of understanding natural language, ensuring user-friendliness. 3. Reduced Workload: By automating responses to Frequently Asked Questions (FAQ's), the chatbot will reduce the workload on department staff, allowing them to concentrate on more complex and urgent tasks. 4. Data Insights: The chatbot will gather valuable data from user interactions, helping the department to identify common concerns and optimize it's services based on these insights.
CC55	An Interactive Job and Internship Platform for Technical Education Department, Govt. of Rajasthan	Software	Smart Education	Background: In today's competitive job market, graduates are encountering enormous challenges while their transition from education to employment. Most of the existing platforms do not provide access to a wide array of job opportunities comprehensively. This limitation spans both the private and government sectors, as well as international employment avenues. Another critical shortcoming is the lack of essential resources such as counselling and guidance facilities. Additionally, there is insufficient support for students seeking internships and industrial training. Detailed Description: This platform shall offer a holistic approach to job searching and career development. It focuses on: · Advanced algorithms and AI-driven matchmaking through connecting job seekers with employers. · Extensive access to job opportunities across various sectors and regions including Private sector, Government sector and Overseas Employment · Counseling Services and Guidance Resources · Emphasis on securing internships and industrial training opportunities. · Mentorship Programs: Pairing with industry professionals for guidance Expected Solution: To address the challenges faced by graduates in the modern job market, we propose the development of a comprehensive and integrated platform that will: 1. Enhance Job Market Connectivity: · Establish a robust and interactive platform that bridges the gap between job seekers and potential employers. · Utilize advanced algorithms and AI to match candidates with suitable job opportunities based on their skills, qualifications, and preferences. 2. Expand Access to Opportunities: · Provide a centralized portal offering exhaustive listings of job opportunities private sector, government sector and overseas employment opportunities · Ensure that the platform is updated regularly with diverse and current job listings to maximize employment possibilities for job seekers. 3. Offer Comprehensive Critical Resources: · Integrate a suite of resources tailored to job seekers, including professional counseling and career guidance services. · Provide tools and resources for resume building, interview preparation, and job application processes. 4. Improve Student Support: · Implement dedicated sections for internships and industrial training opportunities to assist students in gaining practical experience. · Offer mentoring and support services to guide students through the process of securing internships and navigating early career challenges. By implementing this comprehensive solution, the platform will significantly enhance graduates connectivity with potential employers, broaden their access to diverse job opportunities, and provide the critical resources and support needed to succeed in the modern job market.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC56	Intelligent platform to Interconnect Alumni and Student for Technical Education Department, Govt. of Rajasthan	Software	Smart Education	There is a demand for comprehensive Alumni Student interaction platform for Technical Education Department, Govt. of Rajasthan that can strengthen connections between alumni and current students. Following are the issues currently faced: ? Lack of Centralized System: Technical education currently lacks a centralized system for tracking and updating alumni information, including contact details, specialization, and career paths, which resulting into lack of effective communication and engagement. ? Need for Structured Interaction: Without organized platforms, students lack opportunities on valuable real-world experiences and mentorship from alumni. ? Need for Motivation and Guidance: Many students lack motivation and guidance for clarity in career path . Alumni can be essential mentors and role models, providing insights and advice based on their experiences. Description: This problem aims to establish a platform at Technical Education Department, Govt. of Rajasthan to provide interaction and collaboration among alumni and current students, focusing on: ? Enhancing Alumni Engagement: Increase alumni involvement with the institution and its students. ? Providing Mentorship and Guidance: Inspire students with real-world insights and career guidance from alumni. ? Building a Supportive Network: Develop a robust network for lifelong connections and collaborative opportunities, creating an ecosystem where alumni and students can learn from and support each other. This innovative platform should leverage advanced technologies such as artificial intelligence, machine learning, natural language processing (NLP), etc.. By leveraging these advanced technologies, the platform can significantly enhance its functionality and user experiences such as suggest connections between students and alumni with similar interests or career paths, industry, and skills. Expected Solutions: ? Create an Alumni Database: Develop a centralized database to store and update information on alumni, including their employment status, contact details, educational and professional achievements, and areas of expertise. ? Build an Engagement Platform: Design and implement an online platform for alumni and students to connect, interact, and collaborate. This platform should support: ? Discussion forums ? Mentorship programs ? Career guidance sessions ? Placement assistance ? Academic support ? Conduct Interaction Sessions: Organize regular interaction events, such as: ? Alumni meetups ? Online webinars ? Panel discussions These sessions will provide students with opportunities to learn from alumni, seek advice, and expand their professional networks. Further, the platform shall detect and prevent fake profiles or fraudulent activities on the platform using blockchain or any authenticated technique. It shall detect and filter inappropriate or harmful content in forums, comments, and user profiles. It may integrate AI-driven chatbots to answer common questions, provide guidance, and assist students with navigating the website.
CC57	create an Annual Report Portal for institute where all the departmental reports can be integrated and customized	Software	Smart Education	Description: Problem Overview Educational institutes generate vast amounts of data each year, including academic performance, research publications, financial statements, infrastructure developments, student and faculty achievements, and extracurricular activities. Preparing a comprehensive and insightful annual report that accurately reflects the institute's accomplishments and growth is a complex and time-consuming task. It requires the aggregation, organization, analysis, and presentation of diverse data sources in a coherent and visually appealing manner. Challenge Design and develop a user-friendly, efficient, and robust portal that streamlines the process of preparing the annual report for an educational institute. The portal should facilitate the collection, integration, analysis, and visualization of data from various departments and stakeholders within the institute. The goal is to create a dynamic, interactive, and automated system that minimizes manual effort, enhances accuracy, and provides valuable insights. Key Features and Requirements User Authentication and Role Management: Secure login for different user roles (administrators, faculty, students, etc.). Role-based access control to ensure data privacy and security. Data Collection and Integration: Import data from various sources (databases, spreadsheets, surveys, etc.). Integration with existing systems (student management systems, financial software, research databases, etc.). Support for manual data entry where necessary. Data Analysis and Visualization: Tools for analyzing academic performance, research output, financial data, and other metrics. Customizable dashboards for visualizing key performance indicators (KPIs). Graphs, charts, and other visual aids for presenting data trends and insights. Report Generation: Automated generation of the annual report in various formats (PDF, HTML, etc.). Customizable templates for different sections of the report. Inclusion of multimedia elements (images, videos, infographics). Collaboration and Feedback: Features for collaborative editing and review of report content. Mechanisms for collecting feedback from stakeholders. Version control to track changes and maintain document integrity. User Experience: Intuitive and user-friendly interface. Responsive design for accessibility on various devices (desktop, tablet, mobile). Multilingual support for institutes with diverse language needs. Compliance and Standards: Adherence to relevant educational and reporting standards. Data security and privacy compliance with regulations (GDPR, FERPA, etc.). Expected Outcomes Participants are expected to deliver a functional prototype of the annual report preparation portal that demonstrates the core features and addresses the outlined requirements. The solution should be scalable, adaptable to different types of educational institutes, and capable of handling large volumes of data.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC58	Portal for innovation Excellence Indicators	Software	Smart Education	Problem Overview Innovation is a key driver of growth and success in educational institutions. Tracking and measuring innovation excellence is essential for fostering a culture of continuous improvement, recognizing achievements, and guiding strategic decisions. However, identifying, quantifying, and presenting innovation indicators can be challenging due to the diverse nature of activities, projects, and contributions across different departments. Challenge Design and develop a comprehensive and user-friendly portal that tracks, measures, and showcases innovation excellence within an educational institute. The portal should aggregate data from various sources, provide insightful analytics, and present key innovation indicators in an intuitive and visually appealing manner. The goal is to create a dynamic system that encourages participation, facilitates data-driven decision-making, and highlights the institute's innovative achievements. Key Features and Requirements User Authentication and Role Management: Secure login for different user roles (administrators, faculty, students, etc.). Role-based access control to ensure data privacy and security. Data Collection and Integration: Import data from various sources (research projects, grants, publications, patents, competitions, etc.). Integration with existing systems (research management systems, funding databases, project management tools, etc.). Support for manual data entry where necessary. Innovation Indicators: Define and track key innovation indicators (e.g., number of research papers published, patents filed, grants received, startups incubated, awards won). Customizable indicators to cater to different departments and areas of innovation. Data Analysis and Visualization: Tools for analyzing innovation data and identifying trends. Customizable dashboards for visualizing key innovation indicators. Graphs, charts, and other visual aids for presenting data trends and insights. Recognition and Incentives: Mechanisms for recognizing and rewarding outstanding innovation contributions. Highlighting top-performing individuals, teams, and departments. Generating reports and certificates of achievement. Collaboration and Feedback: Features for collaborative data entry and review. Mechanisms for collecting feedback from stakeholders. Version control to track changes and maintain data integrity. User Experience: Intuitive and user-friendly interface. Responsive design for accessibility on various devices (desktop, tablet, mobile). Multilingual support for institutes with diverse language needs. Compliance and Standards: Adherence to relevant educational and reporting standards. Data security and privacy compliance with regulations (GDPR, FERPA, etc.). Expected Outcomes Participants are expected to deliver a functional prototype of the innovation excellence indicators portal that demonstrates the core features and addresses the outlined requirements. The solution should be scalable, adaptable to different types of educational institutes, and capable of handling large volumes of data.
CC59	Implement Software Solutions to Reduce Student Dropout Rates at Various Educational Stages	Software	Smart Education	Background: Student dropout rates in India are influenced by socio-economic and educational factors, affecting marginalized communities the most. Addressing dropout rates is essential for equitable education and socio-economic development. The National Education Policy (NEP) 2020 emphasizes the importance of reducing dropout rates and ensuring quality education up to at least the secondary level. Description: This solution focuses on creating software tools to address and reduce dropout rates. The tools will help identify at-risk students, provide personalized support, and engage communities. By leveraging technology, the aim is to improve student retention, align with NEP 2020's goals, and support a holistic approach to education. Innovative Software Solutions: a) AI-Driven Early Warning System: o Description: Develop an AI-powered software platform that analyzes student data (attendance, grades, behaviour) to predict which students are at risk of dropping out. The system will provide alerts to educators and administrators, enabling timely interventions. o Features: Predictive analytics, real-time alerts, data visualization, and intervention recommendations. b) Community Learning Hub Platform: o Description: Create an online platform that supports community learning hubs in rural and underserved areas. This platform will offer digital resources, tutoring sessions, and virtual mentoring, providing additional educational support to students. o Features: Online classes, resource library, virtual tutoring, and community forums. c) Mobile Learning Application: o Description: Develop a mobile application that delivers personalized learning experiences, including interactive lessons, quizzes, and educational games. The app will provide resources for students who have limited access to traditional education. o Features: Interactive content, offline access, progress tracking, and personalized learning paths. d) Financial Support Management System: o Description: Build a software system to manage scholarship and financial aid applications. The platform will streamline the application process, track disbursements, and provide information on available financial support to reduce economic barriers. o Features: Application tracking, financial aid management, eligibility assessment, and reporting tools. e) Parental Engagement Portal: o Description: Develop a web-based portal to engage and educate parents about their child's education. The portal will include resources on supporting learning at home, tracking student progress, and receiving updates from teachers. o Features: Parent-teacher communication, educational resources, progress reports, and event notifications. f) Flexible Schooling Management System: o Description: Create a software system to manage flexible schooling options, such as evening classes and part-time programs. The system will allow students to enrol, track their progress, and manage their schedules. o Features: Enrolment management, schedule tracking, progress monitoring, and integration with existing school systems. g) Student Support and Engagement App: o Description: Develop an app that provides personalized support and engagement for students at risk of dropping out. Features will include counselling support, motivational content, and tools for setting and tracking academic goals. o Features: Counselling resources, goal-setting tools, motivational content, and engagement tracking. By implementing these software solutions, the goal is to reduce dropout rates significantly by addressing the key factors that contribute to student attrition. These solutions are designed to align with the NEP 2020's objective of ensuring universal access to education and improving student retention.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC60	Develop Effective Career Counselling and Guidance Programs in Schools to Enhance Student Career Choices	Software	Smart Education	Background: A lack of adequate career counselling and guidance in schools contributes to poor career choices among students, leading to mismatched skills, job dissatisfaction, and unemployment. In India, many students and their families are unaware of the diverse career opportunities available, often leading to choices based on limited information or societal pressure. Effective career counselling and guidance are essential for helping students make informed decisions about their futures and aligning their education with their career aspirations. The National Education Policy (NEP) 2020 emphasizes the need for holistic education, which includes providing students with the guidance necessary to make informed career choices. Description: The proposed solution focuses on implementing comprehensive career counselling and guidance programs in schools. This includes training career counsellors, developing resources and tools for career exploration, and integrating career guidance into the school curriculum. Programs should provide personalized counselling sessions, workshops, and access to information on various career paths and educational requirements. Additionally, leveraging technology to create interactive platforms for career exploration can enhance student engagement and awareness. These initiatives align with NEP 2020's vision of equipping students with the knowledge and skills to pursue their career aspirations. Innovative Solutions: a) AI-Powered Career Guidance Platforms: Develop AI-driven platforms that provide personalized career advice based on students' interests, strengths, and market trends. b) Career Mentorship Programs: Establish mentorship programs where students can receive guidance and support from professionals in their fields of interest. c) Interactive Career Exploration Tools: Create digital tools and apps that allow students to explore different careers through virtual simulations, videos, and interactive content. d) Comprehensive Career Resource Portals: Develop online portals with extensive resources on career options, required skills, educational pathways, and job market trends. By implementing these innovative solutions, we aim to improve career counselling and guidance in schools, helping students make informed career choices that align with their interests and the demands of the job market. This approach supports NEP 2020's goal of providing holistic and relevant education to all students.
CC61	Integrate Industry-Relevant Vocational Training into Elementary and Secondary Education Curriculum	Software	Smart Education	Background: India has a tremendous opportunity to harness the potential of its youth by addressing the skills gap between education and industry requirements. While vocational education programs exist, they are often undervalued compared to traditional academic paths and need enhancement to provide students with the skills demanded by today's job market. Strengthening vocational education is essential for creating a skilled workforce that aligns with industry needs and supports sustainable economic growth. The National Education Policy (NEP) 2020 emphasizes the importance of vocational education and aims to integrate it into the mainstream education system to prepare students for various career paths. Description: The goal is to transform vocational education into a core component of the elementary and secondary education system, as envisioned in NEP 2020. By collaborating with industry experts, we can design a curriculum that is modern and industry-relevant. Investments in infrastructure will ensure schools have the necessary tools and facilities for effective training. Specialized training programs for educators will enhance the quality of vocational teaching. Partnerships with industries will offer students valuable real-world experience through internships and apprenticeships. Awareness campaigns will shift perceptions, highlighting vocational education as a respected and viable career path. Innovative Solutions: a) Virtual Reality (VR) Training Modules: Develop VR-based training modules to simulate real-world scenarios and provide hands-on experience in a virtual environment. b) AI-Powered Career Guidance: Implement AI tools to offer personalized career guidance and skill development pathways for students based on their strengths and industry trends. c) Digital Skill Badges: Introduce digital badges and certifications that students can earn upon completing various vocational training modules, making their skills easily verifiable by employers. d) Mobile Training Labs: Deploy mobile vocational training labs to reach remote and underserved areas, providing practical training and education on the go. e) Online Apprenticeship Platforms: Create online platforms that connect students with apprenticeship opportunities, facilitating easier access to industry partnerships and hands-on experience. By leveraging these innovative solutions, we can enhance vocational education and ensure that students are well-prepared to enter the workforce, thus contributing to India's economic growth and development. NEP 2020's emphasis on vocational education integration will be a guiding framework for these efforts, ensuring alignment with national educational goals.
CC62	Forecasting Future Water Requirements and Assessing Storage Capacities in Reservoirs	Software	Smart Education	Background Water resources are fundamental to sustaining human life, agriculture, industry and ecosystem. Accurate forecasting of future water requirements along with the assessment of current storage capacities are crucial for effective water resources management and planning. With growing population. The domestic, Industrial, Agricultural and ecological demands increase, which in turn leads to strain on existing water Infrastructure. Description Analyzing the storage capabilities of the reservoirs in the country is essential. It is also essential for the policy makers to plan for a sustainable water resource management. The challenge involves in creating a predictive model, that can accurately forecast the future water requirements and evaluate the current and future storage capabilities. The model must integrate various data sources, including historic water usage, climate projections, population growth trends, and agricultural practices. It should also account for variability in climate conditions, demographic shifts and changes in land use. A strategic planning and decision-making support system can to provide clear insights into future water demand and storage needs, by identifying potential risks. Expected Solution It is expected to assess the existing and future storage capabilities, identify the anticipated conditions and impact on the storage capabilities. Identify the potential gaps where additional storage and infrastructure capabilities are needed. It is also required to create a scenario taking into account the extreme weather events and population demands. The Policy makers should have an insight of water management issues for providing sustainable water management. A strategy should be evolved for enhancing water storage capacities, optimizing water usage and mitigating identifying risks.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC63	Development of an educational game (web-based and mobile- based) on groundwater conservation and management	Software	Smart Education	Learn while you play is considered the most effecting way of teaching. Internet/mobile based games could be one of the best ways to lure school kids, youth and water enthusiasts to learn the nuances of ground water management. With this backdrop it is proposed to develop an internet/mobile based game that teaches good practices in groundwater conservation in an interactive and fun way. The game should take into account various interventions (artificial recharge, microirrigation, crop diversification) and possible scenarios (drought, surplus rain, contamination etc). The gamer can earn points or coins based on the choices that he (or she) makes. The scores of registered gamers will be stored online and water-smart youths can be identified and certified. The game can be used for training and awareness creation.
CC64	Let's Learn Constitution in a Simpler Manner-Citizen Perspective	Software	Smart Education	Objective The objective is to develop an innovative digital solution, termed the "Nagrik Aur Samvidhan"/Citizen & Constitution," designed to spread constitutional literacy among citizens. This solution may be in a form of a gamified platform/tool which aims to simplify the language of the Constitution of India pertaining to a Common Man in the form of an engaging activity/ game. Parameters to Consider for integration in the Tool: 1. Simplifications of the Articles of the Constitution of India : o Comprises of Preamble, Fundamental Rights (Part III), Directive Principles of State Policy (Part IV) & Fundamental Duties(Part IV A). o Develop a comprehensive backend database to map the above mentioned concept of the Constitution in a simpler form. o Accessible and user-friendly design, incorporating multimedia elements and language translation features to promote inclusivity and accessibility. 2. Multiple Format o Solution may be in a diverse format of games (Product coming in the form of Spin a Wheel/Cards games/Board Games/Snake & ladder/Monopoly, etc) o Preference may be given if multiple formats are developed. o All the topics need to be covered comprehensively ,(products can cover topics separately or in combination) Deliverables: • A functional prototype of the gamified platform, demonstrating key features and functionality. • User testing and feedback data, indicating the effectiveness and usability of the platform. • A comprehensive report and presentation on the development process, including design decisions, technical challenges, and ethical considerations. Expected impact: • Increased literacy and awareness among citizens regarding the Constitution of India including children and youth (level of minimum 8th Std) in India and common citizens irrespective of their educational standards enabling them to make informed decisions about their rights and duties.
CC65	Interactive Skills Enhancer (ISE): A Virtual Reality-Based Learning Tool for Children with ASD and ID	Software	Smart Education	Project Concept: Enhanced Education System for specially abled Background: Interpersonal skills are learned and mastered by children when they interact with the world, but for children with Autism Spectrum Disorder (ASD) and Intellectual Disabilities (ID) this is where the challenges lie. As traditional classroom settings cannot cater to their unique learning requirements, prompting a demand for innovative educational tools that enhance learning engagement and effectiveness. The Virtual Reality (VR) technology which is capable of simulating controlled and immersive environments. It supports safe, repeatable, personalized, interactive experiences with children with unique sensory and cognitive profiles. Existing research demonstrates the potential that VR has for enhancing social functioning in ASD. supporting the benefits of computer-assisted technology on learning and the quality of life for children with special development needs. Description: The Interactive Skills Enhancer (ISE)-a virtual reality software designed primarily for children with Autism Spectrum Disorder (ASD) and Intellectual Disabilities (ID) to catalyze their social skills interlaces with their personal growth. This piece of VR kit places the user into a range of virtual, socially realistic scenarios that can be customized, including classroom environments and playground social structures. It includes not just advanced AI for emotion recognition, in-the-moment feedback to steer social behavior appropriately, and opportunity for skills reinforcement. Featuring sensitivity & sensory needs specific attributes - ISE provides a fun, nurturing, & secure space that facilitates children to progressively develop, learn, and refine social cues and interactions in a personalized setting. The monitoring dashboard for parents and educators, can help to follow the progress and individualize the learning experience provided through ISE, making the latter a complete package for boosting the social skills in children with children with Autism Spectrum Disorder (ASD) and Intellectual Disabilities (ID). Expected Outcome: The proposed solution titled Interactive Skills Enhancer (ISE) is a Virtual Reality (VR) based application intended for teaching social skills to children with Autism Spectrum Disorder (ASD) and Intellectual Disabilities (ID) ISE leverages interactive VR environments designed to enable children to participate in virtual social scenarios that are typical of everyone daily routine. They are developed in order to foster the skills, both to learn and to reinforce such as recognizing emotion, acquiring, or beginning a social conversation, and to respond appropriately in social interaction. ISE is customizable for individual sensitivities, and includes a dashboard for educators and parents to track progress using data and to offer a wide range of engaging, effective tools for children with ASD and ID, all designed to make the biggest impact on their interpersonal capabilities. NOTE : This is an innovation opportunity and students are encouraged to think out of the box to develop solutions which can be presented in newer ways + which can address the needs in out of the box ways for a certain industry OR makes the platform generic. Above description serves as a guide to specify essential needs that can be satisfied for the developed solution and is not limited only to the scope described""
CC66	Monitoring System for classroom session in skill training programe	Software	Smart Education	Background: In the context of the skill development training program, there is a need to establish a robust automated monitoring system to assess and enhance effectiveness of classroom training so as early detection of below average training institutions can be done. Description: The above problem requires a system capable of analyzing classroom images thus can help identify the types of activites and interactions taking place during training sessions. Undestanding these activites can shed light on the quality and relevance of the training content. A dataset consisting of classroom pictures can be provided for various job roles along with course curriculam, infra requirements etc required for the skill development training programme. Expected Solution: System should be able to analyze the images and flag cases which need enhanced monitoring or cancellation.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC67	Education & Awareness - Effective Use of Technology for Dissemination of Anti-Doping Information	Software	Smart Education	Background: Education and awareness are critical components of the National Anti-Doping Agency's mission to promote clean sport. Despite ongoing efforts, the reach and impact of current educational initiatives remain limited, particularly in remote and rural areas. The rapid advancement of technology presents an opportunity to bridge these gaps and ensure that comprehensive anti-doping education is accessible to all stakeholders in the sporting community. Description: The above problem statement envisages to design and develop innovative technological solutions to effectively disseminate anti-doping information to athletes, coaches, support staff, and the broader sporting community. The solution should utilize modern digital tools and platforms to ensure comprehensive coverage, engagement, and retention of critical anti-doping knowledge. It should cater to diverse linguistic and cultural backgrounds and be accessible across various digital devices. Key Objectives (a) Comprehensive Coverage: Ensure that anti-doping information reaches a wide audience across various sports and regions in India, including remote and underserved areas. (b) Engagement: Create interactive and engaging content that captures and retains the attention of athletes and stakeholders, making learning about anti-doping practices impactful. (c) Retention: Develop methods to ensure that the information is not only received but also retained and applied by the target audience. This includes periodic assessments and interactive elements to reinforce learning. Detailed Requirements (a) Platform Development Create a multilingual mobile application and web portal to disseminate anti-doping information. Ensure the platform is user-friendly, accessible, and compatible with various devices, including smartphones, tablets, and computers. (b) Content Creation Develop engaging multimedia content, including videos, infographics, podcasts, and interactive modules. Include real-life scenarios and case studies to provide practical insights into anti-doping practices. Regularly update the content to reflect the latest anti-doping rules, guidelines, and best practices. (c) Interactive Features Implement quizzes, puzzles, and gamified elements to enhance user engagement. Include discussion forums and chat features for real-time interaction and support. Provide certifications or badges for users who complete specific educational modules. (d) Real-Time Updates Integrate a notification system to provide real-time updates on anti-doping regulations, news, and events. Allow users to subscribe to newsletters and alerts for the latest information. (e) Analytics and Feedback Incorporate analytics tools to track user engagement, progress, and learning outcomes. Collect user feedback to continuously improve the platform and its content. Expected Solution A comprehensive and accessible digital platform for anti-doping education. High levels of engagement and interaction from athletes and stakeholders. Improved understanding and adherence to anti-doping regulations. Measurable improvements in knowledge retention and application among users.
CC68	Gamification of Anti-Doping Information	Software	Smart Education	Background: Traditional methods of disseminating anti-doping information often fail to engage younger athletes effectively. Gamification, the application of game-design elements and game principles in non-game contexts, can be a powerful tool to make learning about anti-doping rules more engaging and interactive. By incorporating gamification, the National Anti-Doping Agency can enhance its educational initiatives and foster a culture of clean sport among young athletes. Description: The above problem statement envisages the creation of a gamified platform to educate athletes on anti-doping rules and practices. The solution should be engaging, informative, and foster a culture of clean sport among young athletes. It should incorporate game elements such as points, badges, leader boards, and challenges to motivate users to learn and apply anti-doping information. Key Objectives (a) Engagement: Develop engaging and interactive content that motivates athletes to learn about anti-doping, leveraging the appeal of gaming to enhance educational outcomes. (b) Education: Ensure that the gamified content effectively conveys critical anti-doping information, covering rules, prohibited substances, testing procedures, and the importance of clean sport. (c) Behavioural Change: Encourage positive attitudes and behaviours towards clean sport, promoting a sense of responsibility and commitment among young athletes. Detailed Requirements (a) Platform Development Develop a gamified mobile app and web-based platform that is accessible to athletes across different devices. Ensure the platform is user-friendly, visually appealing, and easy to navigate. (b) Game Elements Incorporate points, badges, leader boards, and levels to incentivize participation and learning. Design challenges, quests, and mini-games that teach anti-doping concepts in an engaging way. Include social features that allow users to compete with friends, share achievements, and collaborate on challenges. (c) Educational Content Develop comprehensive educational modules covering various aspects of anti-doping. Use multimedia content, including videos, animations, and interactive infographics, to make learning enjoyable. Include real-life scenarios and case studies to provide practical insights and reinforce learning. (d) Assessment and Feedback Implement quizzes and assessments to test users' knowledge and understanding of anti-doping rules. Provide immediate feedback and explanations to help users learn from their mistakes. Offer rewards and recognition for users who demonstrate high levels of knowledge and commitment. (e) Analytics and Reporting Integrate analytics tools to track user engagement, progress, and learning outcomes. Generate reports on user performance, highlighting areas of strength and areas needing improvement. Use data insights to continuously improve the platform and its content. Expected Solution: A highly engaging and educational gamified platform for anti-doping information. Increased knowledge and awareness of anti-doping rules and practices among young athletes. Positive behavioural changes towards clean sport, with athletes demonstrating greater commitment to anti-doping principles. Enhanced engagement and participation rates in anti-doping education programs.

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC69	AI-Driven Inclusive Assessment Tools for Skill Ecosystem	Software	Smart Education	Develop an AI-powered quality assessment tool designed to evaluate candidates across the entire skill ecosystem. Assessment includes pen-paper exam, online MCQs and descriptive exams, practical exam and viva voce exam. The tool should cater to the needs of all candidates, including Persons with Disabilities (PWD), and support assessments in online, offline, and blended modes. Background: The skill ecosystem in India encompasses a diverse range of learners candidates in various skilling programs. Ensuring the quality and fairness of assessments across these different levels and systems is a significant challenge. Additionally, there is a need for assessments that are inclusive of Persons with Disabilities (PWD) and adaptable to various modes—online, offline, and blended. An AI-driven assessment tool that can standardize and enhance the quality of evaluations across the entire skill ecosystem is essential to meet these diverse needs. Key Requirements: 1. Holistic Assessment Coverage: The tool should be capable of assessing a wide spectrum of skills and competencies, suitable for candidates at different educational levels—ranging from schools and ITIs to specialized vocational training under SSCs. 2. Inclusivity for PWD Candidates: The tool must be designed with accessibility features, including voice-to-text, text-to-speech, alternative input methods, and customizable assessment formats, ensuring that PWD candidates are assessed fairly and effectively. 3. Multi-Mode Assessment: The tool should support online, offline, and blended assessment modes, offering flexibility to cater to candidates in diverse environments, including remote and underserved areas. 4. AI-Powered Personalization: Leverage AI to provide adaptive assessments that adjust the difficulty level and question types based on the candidate's performance, ensuring that the assessment is tailored to the individual's skill level and learning needs. 5. Real-Time Analytics and Feedback: The tool should include advanced analytics capabilities to provide detailed feedback to candidates and educators, helping to identify strengths and areas for improvement, and guiding further learning and development. 6. Standardization and Quality Assurance: The tool should ensure that assessments are standardized across different regions and institutions, maintaining consistent quality and rigor in evaluating skills and competencies. 7. Data Privacy and Security: Implement strong data protection measures to ensure the confidentiality and integrity of candidate information and assessment results. Expected Outcomes • Enhanced Quality of Assessments: The tool will provide a standardized, high-quality assessment process across the entire skill ecosystem, from schools to vocational training institutes and specialized SSC programs. • Inclusive and Equitable Assessments: By incorporating accessibility features and adaptive AI, the tool will ensure that all candidates, including PWD, receive fair and equitable assessments that accurately reflect their skills and potential. • Flexible and Scalable Assessment Solutions: The multi-mode functionality will enable assessments to be conducted in any environment—online, offline, or blended—making it accessible to candidates across different regions and contexts. • Data-Driven Insights: The real-time analytics and feedback will empower educators and training providers to make informed decisions, enhancing the effectiveness of their programs and improving learner outcomes. • Consistency Across the Ecosystem: By standardizing assessment practices, the tool will ensure consistency in evaluating skills and competencies across various educational levels and training programs, supporting the overall quality and credibility of the skill ecosystem.
CC70	AI-Enhanced Career Guidance System for Personalized Career Pathways	Software	Smart Education	Develop an AI-powered career guidance system that provides personalized career pathways for students and professionals. The system should consider an individual's aptitude, aspirations, abilities, and work experience to recommend tailored career options and future progression opportunities. Background: Career guidance is a critical component of educational and professional development, yet many individuals struggle to find the right career path that aligns with their skills, interests, and long-term goals. Traditional career counseling methods often lack personalization and may not fully account for an individual's unique profile, including their aptitude, aspirations, abilities, and past experiences. This hackathon challenge invites participants to create an AI-enhanced career guidance system that leverages data to provide personalized, dynamic, and future-oriented career recommendations for students and professionals. Key Areas to Address: o Aptitude Assessment: The system should include AI-driven tools to assess an individual's natural aptitudes and strengths, identifying the areas where they are most likely to succeed and find satisfaction in their work. o Aspirations and Interests: Incorporate methods to capture and analyze the user's career aspirations, interests, and values, ensuring that the recommendations align with their long-term goals and passions. o Ability and Experience Mapping: The system should evaluate the user's current abilities, skills, and experiences, mapping these against potential career paths to identify where they stand and what further development might be needed. o Future Progression and Skill Gaps: Use predictive analytics to identify potential future career progression opportunities based on industry trends and individual growth potential. The system should also highlight any skill gaps and suggest targeted learning opportunities to help users advance. o User-Friendly Interface: Develop an intuitive, user-friendly interface that makes the career guidance process accessible and engaging for users at all levels, from students exploring initial career options to professionals considering a change or advancement. Expected Outcomes • Personalized Career Recommendations: The system will deliver highly personalized career recommendations that take into account the user's unique profile, including their aptitudes, aspirations, abilities, and experiences. • Enhanced Career Satisfaction: By aligning career recommendations with the user's strengths and interests, the system will help individuals find more fulfilling and satisfying career paths. • Improved Career Progression: The system will provide users with clear, actionable guidance on how to progress in their chosen careers, including identifying skill gaps and recommending targeted learning or development opportunities. • Informed Decision-Making: Users will be empowered to make more informed career decisions, with a clear understanding of the opportunities available to them and the steps needed to achieve their goals. • Scalable and Adaptable Solution: The AI-enhanced career guidance system will be scalable across different educational levels and professional stages, making it a valuable tool for a wide range of users, from students to mid-career professionals.
CC71	Student Innovation	Software	Transportation & Logistics	Submit your ideas to address the growing pressures on the city's resources, transport networks, and logistic infrastructure

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Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC72	Enhancing Navigation for Railway Station Facilities and Locations	Software	Transportation & Logistics	Background: Railway stations are complex environments with numerous facilities and locations such as ticket counters, platforms, restrooms, food courts, and waiting areas. Passengers often face difficulties in navigating these spaces, especially in large or unfamiliar stations. Efficient and user-friendly navigation systems are crucial for improving passenger experience, reducing congestion, and ensuring timely travel connections. Description: The problem involves developing a comprehensive navigation solution for railway stations that assists passengers in locating various facilities and destinations within the station premises. This includes creating detailed maps, providing real-time directions, and integrating features such as accessibility options for individuals with disabilities. The solution should be intuitive, easy to use, and accessible via multiple platforms, including mobile devices and digital kiosks. Key challenges include updating navigation information in real-time, ensuring accuracy, and accommodating the diverse needs of all passengers. Expected Solution: The expected solution is a multi-platform navigation system that provides detailed, real-time directions to all facilities and locations within a railway station. This system should include: A mobile application with 3D interactive maps and step-by-step navigation. Digital kiosks located throughout the station with touch-screen interfaces. Voice-guided navigation for visually impaired passengers. Regular updates to reflect changes in station layout and facility locations. Integration with existing railway apps and services for seamless user experience. The solution should enhance the overall passenger experience by reducing confusion, saving time, and improving accessibility within the station
CC73	Road Transport Network Telematics Develop a telematics solution to enable efficient trucking operations for the long haul to connect the country through route optimization, live tracking and monitoring, optimal capacity utilization analysis and to enable appropriate response.	Software	Transportation & Logistics	Background: The Department of Posts operates 76 national routes under All India Road Transport Network (RTN). Commercial trucks of 5-14 tonnes capacity ply on these routes carrying parcels and mail. There are also state or intra-circle routes operated through a combination of commercial and departmental trucks for carrying parcels and mail. Description: The RTN trucks, operating on various routes, touch intermediate points, where parcels and mail are off-loaded and loaded. The capacity utilization of the trucks fluctuates depending upon the volume of parcels/mail being carried by it [illustration: On the Ahmedabad-Ajmer-Jaipur route, Ahmedabad loads the truck up to 80% capacity for Ajmer. At Ajmer, 20 % of the volume is offloaded, and 30% loaded, bringing total loading to 90% capacity (80-20+30 = 90). Similarly, at Jaipur, 40% volume is offloaded and 50 % loaded, bringing total loading to 100% (90-40+50= 100)]. Real time data is required for optimal utilization of truck capacity and adequate planning. In order to monetize spare capacity, integration with 3PL partners for capacity sharing through API (as described in the previous point) is also required. RTN trucks traverse a fixed route with specific touch points. The trucks may be delayed due to various factors, such as vehicle breakdown, poor traffic conditions, detours, detention at one or more touch points etc. GPS, geofenced locking should be enabled for any detours or delays so that alerts may immediately be triggered for verification and corrective action in time. Live tracking of trucks, with points of delay is required for efficient and timely movement of parcels and mail in the value chain. There should be a system for dispatch and schedule management as per live data automatically populated and analyzed in real time. Any changes or deviations should automatically flow into the system so that schedules, which are downstream, automatically get updated and adjusted to the delay in real time. All data should be captured and populated automatically, and relevant MIS reports generated automatically with visualization where relevant. Expected Solution: As described above the expected solution is based of GPS leading to a strong GIS for the network for it to send alerts and prompt necessary adjustments on the interlinked parts of the supply chain for every run of the truck.
CC74	Bridging the Measurability Gap - A Digital Solution for validated Citizens Charter norms' adherence across public interfaces and customer touchpoints of DoP	Software	Transportation & Logistics	Background: The Department of Posts (DoP) prioritizes citizen satisfaction with its "Citizens' Charter" outlining service delivery standards. However, ensuring consistent service quality across a vast network of operative offices remains a challenge. Real-time measurability and transparent communication are crucial for building trust and accountability. This innovative solution can transform DoP's Citizens' Charter monitoring system, leading to: Increased Accountability and Transparency: Enhanced citizen trust through readily available data on service delivery performance. Data-Driven Decision Making: Identifying areas for improvement based on real-time insights. Improved Service Delivery: Proactive measures to address delays and bottlenecks, leading to faster delivery times and higher citizen satisfaction. By fostering a culture of data-driven decision making and citizen engagement, this solution can solidify DoP's commitment to its Citizens' Charter and elevate its service delivery to new heights. Description:The challenge lies in developing a digital platform that streamlines and enhances the measurability of Citizens' Charter compliance in DoP offices. This platform should enable DoP to: Track Service Delivery Standards: Capture data on key performance indicators (KPIs) defined in the Citizens' Charter, such as delivery timelines, customer wait times, and complaint resolution rates. Standardize data collection procedures across all operative offices for accurate and reliable information. Real-time Performance Monitoring: Implement a real-time dashboard accessible to DoP officials and citizens. This dashboard should provide a dynamic view of KPI performance across different regions and offices. Utilize data visualization tools to present complex information in easy-to-understand formats like charts and graphs. Enhanced Transparency and Communication: Allow citizens to track the status of their postal services (e.g., mail delivery, money order processing) using a unique tracking ID through the dashboard. Enable DoP to proactively communicate with citizens regarding any potential delays or service disruptions through the dashboard and other channels (SMS, email). Expected Solution: Seeking a mobile-first, cloud-based platform with the following functionalities: Mobile App for Data Collection: Develop a user-friendly mobile app for operative office staff to capture real-time data on Citizen's Charter KPIs. Data Aggregation and Analysis Engine: Build an automated system to collect data from the mobile app, integrate it with existing DoP systems, and analyze it for performance insights. Interactive Dashboard Design: Create a visually appealing and interactive dashboard accessible through web and mobile platforms for DoP officials and citizens. Citizen Tracking Feature: Integrate a secure citizen portal within the dashboard for tracking postal service progress using unique tracking IDs. Alerting and Notification System: Design an automated system to send SMS and email alerts to citizens regarding potential service disruptions or delays.

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CC75	India Post A Bridge for Indian Diaspora to access things Indian " Building a community of Indian Diaspora for meeting their needs of Indian Products (traditional/ ethnic / handicrafts) through India Post by connecting PIOs with local sellers / MSME / Artisans"	Software	Transportation & Logistics	Background: Department of Posts (DoP) covers around 219 countries where a large diaspora of India in different economic capacities exists. PIOs still take/use Indian Products such as Puja Samagri/Traditional Attires/ Handicrafts. Most of them are dependent on e-commerce platform. Through this they cannot be assured of the quality of the products they get and transportation cost may also be very high. Secondly local sellers/small handicrafts artisans who are the actual manufacturers are not able to ship high quality products because of limited resources and information at their disposal. Hence there is a need to connect the Indian Community abroad with the local artisans. Description: In order to overcome this issue an application is required through which one can go to a particular local seller as per their preference and should be able to onboard the seller as well. The following data points may be required to be integrated in the said Application. 1. Global Indian Diaspora Data on the basis of their needs namely – Income/ Financial data, Consumption pattern and buying behavior pattern. 2. There should be Buyer and Seller Registration so that Quality Assurance and standard Transit Cost can be ensured. 3. Product and customer segments identification of target population, this includes utilizing Artificial Intelligence (AI) and Machine Learning (ML) so that specific needs can be assessed like Puja Samagri of Kumartuli, Handicrafts of Santiniketan, Moya of Joynagar (famous sweets), Terracotta Arts of Bishnupur, etc. 4. Special preference should be given on keeping in the mind of Seasonal needs, Traditional Attires for Wedding ceremony, Festival needs as this varies geographically depending upon Special Socio Economic Culture. 5. A range of products which are prepared (by MSME and others) in the different parts of India , which can match the buying needs of global diaspora. So that a global link through Postal Export may be created towards fulfillment of needs. Therefore, it is about bringing the Diaspora close to India and remains emotionally connected to their roots.
CC76	AI-Powered Delivery Post Office Identification System “ The wide, evolving delivery network of the Post Office makes it difficult for customers to write the correct pin code on the postal items for delivery. The Post Office also merges Pincodes together to mechanise and streamline delivery in the emerging volume and mix of mail handled at different stages, including the point of delivery. An intelligent solution, powered by AI is needed to meet the dynamic design of the supply chain both for customers as well as operators within India Post.	Software	Transportation & Logistics	Background: The Department of Post in India boasts the world's largest postal network, with over 165,000 post offices. Through nearly 19,000 pin codes across the country the postal network manages the delivery of postal items across its network. One common issue is the mismatch between the specified Delivery Post Office name and the area PIN code on mail items, leading to delays and customer dissatisfaction.The delivery network design keeps on evolving as Nodal Delivery Centres and Delivery Hubs are introduced to bring in more efficiency in operations. From the perspective of the customer, the challenge is two fold: (a) to know the correct Pin Code, which is itself a challeng; (b) the dynamic nature of operations inside with merged pin codes etc for all or certain categories of mail is also a challenge. Though the customer does not need to bother about (b), the internal system of India Post needs to take care of both issues (a) and (b) for efficient and correct delivery at all times. Description: Postal services are essential for various government, financial, educational, corporate, and public entities, both in urban and rural areas. Despite the widespread use of postal services, inaccurate addressing persists, hampering efficient delivery. Each mail item must clearly indicate the recipient's Delivery Post Office name and area Pin Code. However, inconsistencies in this information often result in misrouted mail, with approximately 5% of articles handled daily at distribution hubs containing incorrect Pin Codes. Even if correct Pincodes are provided as per information available with the customer, there is a mismatch in the internal operations as the constant upgradation of delivery network with Nodal Delivery Centres with merged pincodes etc makes it too dynamic for internal operators to keep pace with the changes. This leads to mistakes, delays and wasteful movement of mail pieces in the system. Expected Solution: An AI-based scanning solution is proposed to identify the correct delivery location for mail items with unclear or mismatched addresses. This system will utilize advanced machine learning algorithms to analyze and interpret address information, determining the appropriate Delivery Post Office based on available data. By automating the identification process, this solution aims to improve last-mile delivery efficiency, reducing delays and enhancing customer satisfaction. Having taken care of the first problem, the system is also expected to align with internal operational databases for clubbing and mapping of different pincodes for delivery purpose and thereby suggest the right destination for dispatch and delivery of the articles.

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Problem Statements

Problem Statement ID	Title of the Problem	Category	Theme	Problem Description
CC77	DYNAMIC MAIL TRANSMISSION SOLUTION USING BEST CONNECTIVITY ACROSS MODES "Serving a large country like India with the habitations across states, cities, towns, blocks and villages with geographic diversity as well is a complex task. The availability of multiple modes of transport for secure transmission of mail, parcels, cargo and people is a boon. Postal mail with its volume, value and weight profile has unique requirements for efficient and effective transmission to cover all delivery points around the sorting and transmission hubs that have been created over the years. With a focus on dynamic allocation and use of available transport within the structure of mail operations defined by the Department of Posts, we need a system to help choose the best mode across land, rail, air and water for fastest transmission of mail in each local context. "	Software	Transportation & Logistics	Background: India Post boasts the world's largest postal network. However, ensuring the timely and accurate transmission of mail remains a significant challenge. Transmission of mails in the Department of Posts is done through its own Mail Motor Service and hired contractual Road Transport Network. Apart from that Postal Mail transmission is also heavily reliant on third party operators, viz., Railways, Flights, Ships, Helicopters etc. Few issues that hamper timely transmission are natural calamities, rescheduling or cancellation of flights / trains / ships / helicopters etc., security detention, Embargo, Road / Rail accidents, blockage etc. Description: Postal services are the backbone on written communication even today. In a country like India, that is heavily dependent on migrant workers and earning members of families living in far off places, parcels / gifts / medicines etc. sent through the postal network too play a vital role.In order to transmit all such mails in a streamlined way, and in a time-bound manner, methodical planning and utilizing all available transport channels in the most effective manner is of utmost importance. Expected Solution: 1. Predicting optimum mode of routing and transmission using the best available connectivity, considering real-time data and availability of space. 2. Mode of transmission that will be interactive with the transport agency. 3. The solution should also have interface for monitoring mail transmission, suggesting alternative routes, self-learn from previous situations to identify the fastest mode of transmission utilizing all available channels. 4. Alerts to the customer (both sender and addressee) may be sent conveying information about any changes/delay in normal transmission caused by any beyond-control situations.
CC78	AI based Customized time slot Delivery of Articles/Parcels " To align with the needs of the modern lifestyles of customers and their expected time of availability at the home or office address where an item needs to be delivered, the time slot can be decided in consultation with the customer based on an AI Driven correspondence system as per demand/request of the Sender or Receiver"	Software	Transportation & Logistics	Background: Due to fast and hectic lifestyle, in modern era, GenZ often desires to get more customised, time bound doorstep service for their opted products or services. E-commerce organisations like Amazon,Flipkart, financial organisations like ICICI, HDFC etc are providing door step products/services with use of advanced technology like digital platform or machine learning through AI. This creates another level of acceptance across the world among the recipient for the organisation. This is becoming part of basic customer expectation and needs to be included in the Department's common value proposition with the help of a robust system tied to its operational system. Description: India Post as the largest mail delivery organisation in India delivers articles/parcels at the door step of customer. The delivery is one of the key services the Department offers to the citizens of India. Department reaches last mile of delivery through its branches. The delivery process initiates at the booking Post office after receiving mails/articles. After sorting, the concerned Postman of the delivery Post Office has to reach to the recipient for delivering article mostly during the office hours, i.e. in between 10am to 5pm. In many instances, recipient cannot receive the article within that time range of the delivery due to his absence at the delivery address. In that case i) Post man either has to make 2nd attempt or next day delivery which falls within same time range orii) after unsuccessful delivery Postman has to serve intimation for next day delivery or for window delivery at Post Office by the recipient personally. In both cases, wastage of valuable working hours of the Postman happens for sure. Moreover, due to such incident, recipient has to take leave from his/her work as delivery time range/slot gets coincided with his/her working hours for collecting the article. In many cases article gets returned to sender because of non-availability of the addressee within time range of Postman delivery. This creates dissatisfaction on the delivery service among both Sender and Receiver of the article/consignment, thus lowering departmental performance index. Hence Department is losing the extra mile of delivery performance in the eye of customer of modern era as well as e-commerce like product oriented organizations who uses last mile unique delivery system of this organisation. Expected Solution: - At time of booking of any consignment sender should have option to select time slot for delivery and share the same with the recipient which can be modified by the sender online at any point of time before the date of delivery. Whenever recipient will receive sms/alert about the consignment to be delivered at his/her end with the mentioned time slot, the recipient should have the option/flexibility to make change of time slot online before the day of delivery. Initially such data will create training data for AI which will develop a reference frame of time slot for sender and also for delivery person of department for timely and customer friendly future delivery of article for same recipient. Last mile of delivery information will become integral part of booking which will help both consignment movement across the country and effective delivery.

Code Coalescence-2025

(An Institute Level Hackathon) MITS-DU, Gwalior

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CC79	Building a National Web Community of Philatelists "This is to overcome challenges faced by philatelists across India and to design a solution that enhances their experience and fills up gaps in access to information, raising demand and ensuring fulfillment as per interest for each Philatelic item and ancillaries released and made anywhere in the country through a web based community and a National Philately Deposit Account.	Software	Transportation & Logistics	Background: One of the primary concerns for philatelists in our country is the limited access to philatelic material released nationwide. Currently, each postal circle releases its own material, catering primarily to philatelists within its respective jurisdiction and immediate reach. Consequently, philatelists from other circles often find it challenging to obtain such material. Additionally, there is a lack of awareness regarding ancillary releases among the philatelic community nationwide. Description: To address these issues, the development of a comprehensive website dedicated to philately, which would serve as a centralized platform for philatelists across India is the prospective solution suggested. This website would facilitate the creation of a National Philately Deposit Account, enabling philatelists to access philatelic material released pan India. Other supporting mechanisms to strengthen the community can also be thought of and integrated to the main solution. Expected Solution: The proposed website would offer the following features: Centralized Platform: The website would display philatelic material released by all postal circles across India, ensuring that philatelists have access to a wide range of items. Online Ordering and Payment: Philatelists would be able to order and pay for philatelic material online through the website, streamlining the purchasing process and eliminating geographical barriers. Standard Postal Services: Postage for ordered items would be charged at the standard rates for Registered/ Speedpost services, ensuring reliable and efficient delivery. Cancellation Releases: Information regarding cancellation releases would be made available on the website, allowing philatelists to obtain cancellations on postal stationery through the website. Rates for such services can be determined accordingly.
CC80	Student Innovation	Software	Travel & Tourism	A solution/idea that can boost the current situation of the tourism industries including hotels, travel and others.
CC81	Online Chatbot based ticketing system	Software	Travel & Tourism	Background: Visitors to museums often face several significant challenges due to manual ticket booking systems. One prominent issue is the inefficiency and time consumption associated with the process. Long queues are common, especially during peak hours, weekends, or special exhibitions, leading to frustration and impatience among visitors. Besides the wait times, the manual system is prone to errors, such as incorrect ticket issuance, double bookings, or lost records, which can cause further delays and inconvenience. Overall, these challenges associated with manual ticket booking systems significantly detract from the visitor experience, reducing satisfaction and potentially impacting the museum's reputation and visitor numbers. Description: The implementation of a chatbot for ticket booking in a museum addresses several critical needs, enhancing the overall visitor experience and streamlining museum operations. Here are the key reasons for adopting a chatbot ticket booking system: 1. Improved Customer Service 2. Efficient Handling of High Volumes 3. Cost-Effective Solution 4. Data Collection and Analysis 5. Accessibility 6. Reduced Human Error 7. Multilingual Support 8. Enhanced Marketing and Promotion Expected Solution: An efficient and responsive multilingual chatbot based ticketing system that can handle all kinds of bookings from gate entry to shows. Payment gateway should also be integrated to make it fully free from human intervention. It will also provide analytics to aid in more efficient decision making process.