GNA HACKATHON 3.0

Problem Statements

Sr. No.	Problem Statement Title	Description	Category	Theme
1	Learning App/website for Deaf And Mute and sign language-English/Punjabi converter	The implementation of this comprehensive Mobile application/Website is expected to yield significant positive outcomes: 1. Learning of Basic Mathematics and Science: Establishment of a unified platform where all relevant data is stored, reducing fragmentation and improving data accessibility. 2. Increased Communication: Enhanced transparency in tracking progress and outcomes of various projects, facilitating better oversight and accountability. 3. Better Assessment of learning: More effective allocation and utilization of resources, leading to improved outcomes for research and innovation projects. 4. 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 application aims to create a more efficient and supportive environment for learning to deaf and mute students in Punjab. By addressing the current challenges and leveraging modern technology, the	Software	Smart Education

		application will significantly enhance the learning ability of specially abled students.		
2	Centralized application-context aware firewall	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	Software	Blockchain & Cybersecurity
3	Development of AI-ML based models for predicting prices of	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,	Software	Agriculture/ Food

	agri-horticultural commodities such as pulses and vegetable (onion, potato, onion)	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.		Tech/Rural development
4	Creating a Framework for Static Analysis of Vulnerabilities in Android Applications	Background: Android applications are increasingly becoming an integral part of daily life, offering various services and functionalities. However, their widespread use also makes them prime targets for security vulnerabilities. Identifying and mitigating these vulnerabilities during the development phase is crucial for ensuring the security and integrity of these applications. Static analysis provides a method to examine code for vulnerabilities without executing it, allowing developers to catch and fix security issues early. Detailed Description: This report outlines a comprehensive framework for conducting static analysis to detect vulnerabilities in Android applications. The framework covers the following key aspects: 1.Preparation Gather Requirements: Define the scope and objectives of the static analysis process. Determine which parts of the application will be analyzed and the specific types of vulnerabilities to look for. Select Tools: Choose appropriate static analysis tools tailored for Android development such as MobSF, SonarQube, Android Lint, FindBugs, and PMD. 2. Code Review Manual Code Review: Perform a thorough review of the source code to identify obvious security flaws. This step involves examining the code for insecure coding practices, such as hardcoded credentials, improper exception handling, and insecure data storage. Automated Static Analysis: Use automated tools to scan the codebase for vulnerabilities. These tools can quickly identify issues such as insecure API usage, improper permissions, and potential injection points. 3. Configuration Analysis Manifest File Review: Analyze the	Software	Blockchain & Cybersecurity

		AndroidManifest.xml file for insecure configurations, such as exported components that should be private, overly broad permissions, and improper use of intents. Build Configuration Review: Examine build.gradle files to ensure secure configurations and identify potential issues related to dependency management and build settings. 4. Dependency Analysis Third-Party Libraries: Identify and evaluate third-party libraries for known vulnerabilities. Ensure that all dependencies are up-to-date and do not introduce security risks into the application. 5. Reporting Document Findings: Prepare a detailed report outlining the identified vulnerabilities, their severity, and potential impact. The report should include specific examples of the code where vulnerabilities were found and explanations of why they pose a risk. Prioritize Issues: Rank vulnerabilities based on their severity and potential impact on the application. This helps in focusing remediation efforts on the most critical issues first. 6. Mitigation and Remediation Propose Fixes: Provide specific recommendations for addressing the identified vulnerabilities. This includes suggesting secure coding practices, configuration changes, and updates to third-party libraries. Integrate Fixes: Work with the development team to integrate the recommended fixes into the codebase. This step may involve revising the application architecture, modifying code, and updating dependencies. Expected Solution: 1.Early Detection of Vulnerabilities: Identifying security issues early in the development process, allowing for timely remediation. 2. Improved Code Quality: Encouraging secure coding practices and reducing the likelihood of introducing security flaws. 3. Increased Security Awareness: Raising awareness among developers about common security issues and how to avoid them.		

		4.Enhanced Application Security: Reducing the risk of exploitation by addressing vulnerabilities before the application is deployed to production.		
5	Data download Duplication Alert System (DDAS)	Background: In an institute environment, multiple users often require access to the same datasets for various purposes. However, due to lack of communication or visibility, these users may unknowingly download duplicate copies of the same data. This leads to unnecessary consumption of resources, including bandwidth and storage, and complicates data management. The DDAS (Data download Duplication Alert System) addresses this issue by notifying users with an alert if a potential duplicate download is identified. This system helps optimize resource usage, save time, and streamline data management processes. Description: Managing data downloads efficiently is crucial for optimizing resources and maintaining order in any organization. A DDAS addresses the issue of multiple users inadvertently downloading duplicate copies of the same datasets across various fields. The DDAS operates by maintaining a repository or database that records metadata of all downloaded datasets. This metadata includes details such as file names, sizes, timestamps, and download locations. When a user initiates a download request, the system checks the database to determine if the dataset has already been downloaded by any user. To identify duplicates accurately, the system uses file history or unique identifiers, ensuring duplicates are detected even if file names differ. If a potential duplicate is detected, the system prompts the user with an alert. This alert provides comprehensive information about the existing dataset, including its location and the timestamp of the original download. By doing so, the DDAS helps users avoid unnecessary downloads, thereby optimizing resource usage, saving time, and streamlining data management processes. This system is designed to be flexible and applicable across various fields and industries, including academic institutions, research facilities, and any other domain where efficient data management is critical. By preventing duplicate downloads, the DDAS	Software	Blockchain & Cybersecurity

		ensures that resources are used effectively, contributing to overall organizational efficiency. Expected Solution: To mitigate this issue, a robust solution is needed to design and develop a system that generates alerts when users attempt to download data already available within the institute's repository or any of the user accounts. The alert system should promptly notify users about the existence, properties (such as the period, spatial domain, and other relevant data attributes), and location of the required data, thereby preventing unnecessary duplication and promoting efficient resource utilization. Implementing this solution allows organizations to streamline data access processes and reduce redundancy. This system has to be applicable across various fields and industries, including academic institutions, research facilities, government agencies, and more.		
6	A web application specifically designed for Indian coal mines to quantify their carbon footprint and explore pathways to carbon neutrality	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	Software	Clean & Green Technologies

		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: 1. Clean technologies: Assessing the impact of adopting electric vehicles, methane capture systems, and renewable energy sources for mine operations. 2. 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. 3. Other Renewables: explore alternative use of energy to reduce direct electricity consumption. Any other pathways: 1. Carbon Credits: Estimation of potential Carbon credit earned as per present market rates. 2. Data visualization: The app should present results visually, using charts and graphs to track emission trends and the effectiveness of implemented strategies. 3. Scalability: Design the app to accommodate different mine sizes and types (underground vs open-cast). Benefits: 1. Transparency: Providing a clear picture of a mine's carbon footprint. 2. Decision support: Helping mine operators make informed choices for emission reduction. 3. Cost savings: Identifying opportunities to optimize operations and potentially reduce costs associated with emissions. 4. Sustainability goals: Aiding Indian coal mines in their journey towards carbon neutrality and supporting the country's overall climate goals.		
7	Conversational Image Recognition Chatbot	Background: Ever since the birth of AI and computer vision, modeling conversations remains one of the field challenges, especially to combine	Software	AI & Data Science

		both natural language processing and image recognition. Chatbots are now widely used as part of platform as applications like Apple Siri, Google Google Assistant or Microsoft Cortana. Detailed Description: Generally, a conversational Chatbot is an application that can communicate with humans using natural language. However there exists a need for an image recognition deep learning based Chatbot is an application to recognize the images, uploaded by user and answer the questions about the image. The main problem domain of this project is building a image recognization Chatbot, which is capable of recognize the object in an image and generating the best response for any the user query about the image. Expected Solution: Image recognition Chatbot is expected to detect the object in the image and have the related dialog of the image after training, also have understanding of the sender messages so that it can predict which sort of response will be relevant and it must be correct lexically and grammatically while generating the reply.		
8	AI driven Inspection of Institutions	An AI-driven Inspection System for Institutions aims to revolutionize the way inspections are conducted by incorporating AI technologies to enhance accuracy, efficiency, and consistency. This system would leverage AI algorithms to analyze various aspects of an institution, such as infrastructure, faculty qualifications, student performance, and adherence to regulations. The system can utilize image recognition for facility inspections, natural language processing for analyzing reports and documentation, and machine learning for identifying patterns and potential issues. Real-time data collection and analysis would enable inspectors to make informed decisions and provide actionable insights for institutional improvements. Expected Solution: 1. Automated Facility Inspections: Use image recognition to assess infrastructure and facilities.	Software	Smart Automation

		2. Document Analysis: Employ natural language processing to evaluate reports, qualifications, and compliance documents. 3. Real-time Data Collection: Continuously gather and analyze data from various sources to provide up-to-date insights. 4. Pattern Recognition: Identify trends and potential issues using machine learning algorithms. 5. Actionable Insights: Generate comprehensive reports with suggestions for improvements and compliance adherence		
9	Dynamic route rationalization model based on machine learning/AI would be required based on real-time traffic and road parameters.	Transport Sector - DTC is trying to work out various modules for route rationalization. The real-time monitoring of buses for effective route rationalization may be one of the challenges to prevent bunching of buses on a specific route or long delays in arrival of buses. The problem cannot be addressed by fixed time schedule owing to various factors like traffic Conditions, road conditions and other such factors. A dynamic route rationalization model based on machine learning/AI would be required based on real-time traffic and road parameters.	Software	Smart Automation
10	AI-Driven Inclusive Assessment Tools for Skill Ecosystem	Develop an AI-powered quality assessment tool aims to standardize and enhance skill evaluations across India's diverse educational and vocational training programs. It supports multiple assessment formats, including pen-paper exams, online MCQs, practical exams, and viva voce, ensuring fair and high-quality assessments for all candidates, including Persons with Disabilities (PWD). Key features include multi-mode assessment (online, offline, and blended), adaptive AI for personalized evaluations, real-time analytics for performance insights, and robust data security. By ensuring standardization, inclusivity, and flexibility, the tool will improve assessment quality, provide data-driven insights, and maintain consistency across the skill ecosystem.	Software	Smart Education
11	AI-Enhanced Career Guidance System for	Develop an AI-powered career guidance system aims to provide personalized career pathways for students and professionals by assessing	Software	Smart Education

	Personalized Career Pathways	their aptitude, aspirations, abilities, and work experience. Traditional career counseling often lacks personalization, making it difficult for individuals to find suitable career options. This system leverages AI to offer dynamic and tailored career recommendations through key features such as aptitude assessment, aspiration and interest analysis, ability and experience mapping, and predictive analytics for future career progression and skill gap identification. With a user-friendly interface, it ensures accessibility for individuals at different career stages. Expected outcomes include highly personalized career suggestions, enhanced job satisfaction, improved career progression, informed decision-making, and a scalable solution adaptable to various educational and professional levels.		
12	An online system to automatically verify new title submissions by checking for similarities with existing titles	Background: The Press Registrar General of India (PRGI) maintains a database of 160,000 titles, and new submissions must be verified for uniqueness. The system will check phonetic similarity, spelling variations, and common prefixes/suffixes to prevent duplication. It will enforce guidelines by rejecting titles with disallowed words (e.g., "Police," "CBI"), preventing title combinations, and blocking periodicity modifications. A verification probability score will indicate the likelihood of approval, ensuring clear user feedback. The system must be efficient and scalable, using optimized searches to handle a growing database. It will meet accuracy, performance, and robustness criteria, ensuring quick verification, resilience to errors, and a user-friendly experience.	Software	Open Innovation
13	AI driven Inspection of Institutions	Background: Institutional inspections are crucial for maintaining educational standards and ensuring compliance with regulatory guidelines. Traditional inspection methods are manual, time-consuming, and often lack consistency. There is a need for a more efficient, consistent, and data-driven approach to institutional inspections. Detailed Description: An AI-driven Inspection System for Institutions aims to revolutionize the way inspections are conducted by incorporating AI technologies to enhance accuracy, efficiency, and consistency. This system	Software	Smart Automation

		would leverage AI algorithms to analyze various aspects of an institution, such as infrastructure, faculty qualifications, student performance, and adherence to regulations. The system can utilize image recognition for facility inspections, natural language processing for analyzing reports and documentation, and machine learning for identifying patterns and potential issues. Real-time data collection and analysis would enable inspectors to make informed decisions and provide actionable insights for institutional improvements. Expected Solution: 1. Automated Facility Inspections: Use image recognition to assess infrastructure and facilities. 2. Document Analysis: Employ natural language processing to evaluate reports, qualifications, and compliance documents. 3. Real-time Data Collection: Continuously gather and analyze data from various sources to provide up-to-date insights. 4. Pattern Recognition: Identify trends and potential issues using machine learning algorithms. 5. Actionable Insights: Generate comprehensive reports with suggestions for improvements and compliance adherence		
14	Intelligent Enterprise Assistant: Enhancing Organizational Efficiency through AI-driven Chatbot Integration	Description: Develop a chatbot using deep learning and natural language processing techniques to accurately understand and respond to queries from employees of a large public sector organization. The chatbot should be capable of handling diverse questions related to HR policies, IT support, company events, and other organizational matters. (Hackathon students/teams to use publicly available sample information for HR Policy, IT Support, etc. available on internet.) Develop document processing capabilities for the chatbot to analyse and extract information from documents uploaded by employees. This includes summarizing a document or extracting text (keyword information) from documents relevant to organizational needs. (Hackathon students/teams can use any 8 to 10 page	Software	Open Innovation

		document for demonstration). Ensure the chatbot architecture is scalable to handle minimum 5 users parallelly. This includes optimizing response time (Response Time should not exceed 5 seconds for any query unless there is a technical issue like connectivity, etc.) Enable 2FA (2 Factor Authentication email id type) in the chatbot for enhancing the security level of the chatbot. Chatbot should filter bad language as per system-maintained dictionary. Youtube Link/Video Link (3 Minute video explaining the Problem Statement): https://youtu.be/Q3pP7mRk5Qk NOTE: GAIL (INDIA) LTD will not provide any hardware, software, license, data or any other resource to SIH hackathon Teams. The teams should use free and/or open-source resources, as applicable, for the entire project.		
15	AI-Driven Research Engine for Commercial Courts	Background: The Commercial Courts Act, 2015 was enacted to expedite the resolution of commercial disputes and enhance the ease of doing business in India. While various reforms have been undertaken, delays persist due to the high volume of pending cases. To address this, an AI-Driven Research Engine is proposed to streamline legal research for judges and judicial officers, ultimately accelerating dispute resolution. This engine will aggregate and process legal data, including case laws, statutes, and rules, extracting relevant information and identifying key legal principles and precedents. It must be customizable, providing tailored results based on the specific needs of each case, and should incorporate predictive analytics to forecast case outcomes based on historical trends. The engine must ensure data localization, catering to the unique requirements of different High Courts while emphasizing local laws, rules, and procedures. Additionally, it should be technically feasible, reliable, user-friendly, and multilingual to enhance accessibility. Ethical concerns must also be addressed, ensuring the AI functions as a neutral and transparent facilitator rather than a decision-maker. The proposed solution aims to be a pilot project for judicial reforms, contributing to faster legal research and improved efficiency in	Software	Smart Automation

		commercial courts, ultimately fostering a more business-friendly environment in India.		
16	To develop an Artificial Intelligence (AI) based model for electricity demand projection including peak demand projection for Delhi Power system	Background: Delhi's power demand fluctuates drastically between seasons and within a day, peaking at 8,300 MW in summer and dropping to 2,000 MW in winter. The city's highly peaky load profile, dominated by domestic and commercial consumption, lacks the stability provided by industrial and agricultural loads in other states. Solar power follows a Duck-curve effect, further complicating load management. To address these challenges, an AI-based model is proposed to predict demand by factoring in weather, holidays, load growth, and real estate development, along with a compensation mechanism for better power purchase and stability.	Software	Smart Automation
17	A smart AI based solution for traffic management on routes with heavy traffic from different directions, with real-time monitoring and adaptation of traffic light timings.	Background: Urban areas often face significant traffic congestion, especially at intersections where multiple routes converge. Traditional traffic management systems rely on pre-set traffic light timings, which may not adapt well to fluctuating traffic conditions. This can lead to increased waiting times, fuel consumption, and emissions. Description: An AI-based traffic management system can dynamically adjust traffic light timings based on real-time traffic data, improving traffic flow and reducing congestion. Expected Solution: Problem statement is to develop a smart, AI-based traffic management system that can monitor traffic conditions in real-time and adapt traffic light timings accordingly. The system should be capable of handling heavy traffic from multiple directions and optimizing traffic flow to minimize delays and improve overall efficiency.	Software	Smart Automation
18	Student Innovation	Creating intelligent devices to improve the commutation sector	Hardware	Smart Vehicles
19	The technological solutions for capturing AQI values through mobile and other forms of stations	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.	Software	Clean & Green Technology

		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.		
20	Student Innovation	Innovative ideas that help manage and generate renewable /sustainable sources more efficiently.	Software	Renewable / Sustainable Energy
21	Student Innovation	There is a need to design drones and robots that can solve some of the pressing challenges of India such as handling medical emergencies, search and rescue operations, etc.	Hardware	Robotics and Drones
22	Fake social media accounts and their detection	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,	Software	Blockchain & Cybersecurity

		concerned social site organization will approach to delete/suspend the fake accounts in time bound manner worldwide.		
23	A smart AI based solution for traffic management on routes with heavy traffic from different directions, with real-time monitoring and adaptation of traffic light timings	An AI-based traffic management system can dynamically adjust traffic light timings based on real-time traffic data, improving traffic flow and reducing congestion	Software	Smart Automation/ AI & Data Science
24	Development and Implementation of Face Recognition Technology in the Police Department	The police department aims to enhance its operational capabilities through the development and implementation of face recognition technology (FRT). This advanced technology can significantly aid in identifying suspects, locating missing persons, and maintaining public safety. However, the deployment of FRT involves complex challenges that need to be addressed to ensure its effectiveness, reliability, and ethical use.	Software	Smart Automation
25	Development of map-matching algorithm using AI-ML techniques to distinguish vehicular movement on highway and service road	Algorithm development using AI-ML techniques to distinguish vehicular movement on highway and service road. Challenge: The algorithm shall be able to distinguish the vehicle movement on highway or service road even if intermittent GNSS position is not available or large bias is observed in GNSS coordinates.	Software	Smart Automation/ AI & Data Science
26	Student Innovation	There is a need to design drones and robots that can solve some of the pressing challenges of India such as handling medical emergencies, search and rescue operations, etc.	Software/ Hardware	Robotics & Drones
27	Development of a non-electrical device for tracking the movement of the sun for	Traditional solar tracking systems often rely on electrical components and motors, which can be costly and require maintenance. A non-electrical tracking system offers a sustainable and low-maintenance alternative to enhance the efficiency of solar panels.	Hardware	Renewable / Sustainable Energy

	movement of the solar panels, increasing their efficiency.			
28	Drone-based Intelligent ET sensing system and irrigation water use accounting system for irrigation commands.	The idea is to estimate the actual water consumption by the crops (i.e. AET) in a targeted irrigated command area (ranging from 50 Ha to 5000 Ha) with the help of a drone based system. This system should have a portable drone control module along with an in-built Artificial Intelligence and Machine Learning (AI&ML) mechanism to work out AET and calibrate against the satellite-based ET inputs. Once integrated with cadastral maps, it should be tailored for individual farm level water control.	Hardware	Robotics & Drones
29	Real-Time Disaster Prediction and Early Warning System	Develop a software-based solution that leverages AI/ML and IoT data to predict natural disasters (e.g., earthquakes, floods, cyclones) in real-time and provide early warnings to affected communities.	Software	Disaster Management
30	Autonomous Disaster Relief Drone Network	Design a hardware-software integrated system of autonomous drones capable of delivering emergency supplies (food, medicine, etc.) to disaster-affected areas and conducting search-and-rescue operations.	Hardware + Software	Disaster Management
31	Crowdsourced Disaster Damage Assessment Platform	Create a platform that allows citizens and responders to upload images, videos and location data of disaster-affected areas. The system should use AI to analyze and categorize the damage for efficient resource allocation.	Software	Disaster Management
32	Smart Wearable for Disaster Survivors	Develop a wearable device (hardware) that monitors vital signs of disaster survivors and sends real-time health data to rescue teams, along with GPS location tracking for easy identification.	Hardware	Disaster Management
33	AI-Powered Evacuation Route Optimizer	Build a software solution that uses real-time data (traffic, weather, disaster spread) to dynamically generate and update the safest and fastest evacuation routes for affected populations.	Software	Disaster Management
34	Flood Monitoring and Mitigation System	Create a hardware-software integrated solution that uses IoT sensors to monitor water levels in rivers and reservoirs in real-time, coupled with an AI-based system to predict flood-prone areas and suggest mitigation measures.	Hardware + Software	Disaster Management

35	Innovating for Sustainability: Driving Smart Resource Conservation in Home Appliances	Description: Develop technology ideas focused on smart resource conservation (energy and water) in home appliances such as refrigerators, air conditioners, washing machines, and desert air coolers.	Software/ Hardware	Smart Automation
36	Wearable Sensors for Prevention of Falls in Elderly People	Develop wearable sensors designed to prevent falls in elderly individuals by monitoring movement and providing alerts or assistance as needed.	Hardware + Software	Smart Automation
37	Autonomous Water Surface Cleaning Robot using Autodesk Fusion 360	Provide a self-sufficient water surface cleaning robot with high-efficiency cleaning capability, free from human involvement, for environmental preservation.	Software	Robotics and Drones
38	DIY Fire Fighting Robot	Develop a do-it-yourself fire-fighting robot capable of detecting and extinguishing fires, enhancing safety measures in various environments.	Software / Hardware	Robotics and Drones
39	Student Innovation	Develop applications of advanced technologies to build smarter devices aimed at advancing the commutation industry and improving vehicle system functions.	Software / Hardware	Smart Vehicle
40	Innovate Smart Vehicle Technologies	Develop smart vehicle technologies to improve safety, connectivity, and sustainability in transportation.	Software / Hardware	Smart Vehicle
41	Research and Redesign of a Conventional Aerospace Component Using Autodesk Fusion	Utilize Autodesk Fusion to remodel a conventional aerospace component. Apply generative design, topology optimization, and additive manufacturing techniques to enhance the performance characteristics of the part, fostering advancements in aerospace design and manufacturing efficiency.	Software	Smart Vehicle
42	AI-Based Personal Finance & Budgeting Assistant	People struggle with budgeting, saving, and investment planning. Create an AI-powered personal finance app that helps users track expenses, set budgets, and receive personalized financial advice. Expected Solution: • AI-powered expense categorization & tracking.	Software	FinTech/ AI & Data Science

		• Smart saving & investment recommendations. • Voice-enabled chatbot for financial guidance. • Integration with UPI/bank accounts for automated analysis.		
43	Design a Ticket Booking Platform for Events with Offline Payment	Design a user-friendly website or mobile app for booking tickets to events at a theatre. The platform will feature dynamic seat pricing, where the cost of each seat varies depending on its row and proximity to the stage. Additionally, the platform will support offline payment methods, where customers can reserve seats, but the final booking confirmation is dependent on the admin receiving the offline payment. The platform will also collect the user's mobile number during the registration or booking process for communication purposes, such as payment confirmation and reminders. **Key Features to Include:** User Registration & Login Event Discovery Seat Selection with Dynamic Pricing Booking Flow Offline Payment Integration Admin Panel Notifications & Reminders Responsive Design You are free to use any tech stack for the frontend (React, Angular, Vue.js, etc.), backend (Node.js, Django, etc.), and database (MySQL, PostgreSQL, MongoDB, etc.). The platform will not require an online payment gateway but should support the functionality to handle offline payment status updates and user communication via SMS and email. **Bonus Points:** Implement tiered pricing for different seat locations (e.g., premium seating in front rows with higher prices). Generate unique booking IDs or QR codes that the user can present at the theatre after confirming the booking through offline payment.		FinTech/ AI & Data Science

		Create a system for tracking payment deadlines and sending automatic reminders to users. Provide users with the option to cancel or modify their booking before payment confirmation. Implement an SMS reminder system that alerts users 24 hours before the event. Implement a review or rating system for each comedy show, where users can rate their experience after attending.		
44	AI-Powered Mental Health Companion	Mental health issues like anxiety and depression are rising, but access to therapy remains limited. Develop an AI-powered chatbot or mobile application that provides emotional support, guided meditation, mood tracking, and connects users with professionals when needed. Expected Solution: • AI chatbot trained on cognitive behavioral therapy (CBT) techniques. • Voice recognition for emotional state detection. • Emergency SOS feature for critical cases. • Privacy-focused implementation with AI-based sentiment analysis.	Software	MedTech / BioTech / HealthTech
45	Smart AI Assistant for Differently-Abled Individuals	People with visual, speech, or hearing impairments struggle with everyday communication. Build a smart assistant that interprets gestures, converts speech to text, or uses AI to help differently-abled users interact effortlessly. Expected Solution: • AI-powered sign language-to-speech conversion. • Smart voice-to-text system for deaf and mute individuals. • Gesture-controlled interfaces for seamless interaction. • IoT integration for smart home control.	Software	MedTech / BioTech / HealthTech
46	Smart Waste Management & Recycling System	Urban waste management remains inefficient, leading to overflowing garbage, pollution, and inefficient recycling. Develop an IoT-enabled waste management system that monitors waste levels, optimizes collection routes, and promotes recycling habits. Expected Solution:	Software	Clean & Green Technology

		• Smart bins with sensors to detect waste levels. • Route optimization for garbage collection using AI. • Mobile app-based waste tracking & recycling rewards system. • AI-driven waste segregation technology.		
47	AI-Powered Resume & Interview Analyzer	Job seekers often struggle to create strong resumes and prepare for interviews. Build an AI-driven platform that analyzes resumes, gives improvement suggestions, and provides mock interview sessions using AI avatars. Expected Solution: • AI-based resume scoring system with keyword optimization. • Speech analysis to detect confidence, clarity, and communication skills. • Virtual interviewer with real-time feedback. • Job-matching AI to suggest roles based on candidate skills.	Software	Open Innovation
48	Smart Wearable for Elderly & Chronic Patients	Elderly individuals and chronic patients require continuous health monitoring. Develop a wearable device that tracks vitals, detects falls, and sends emergency alerts to caregivers or hospitals. Expected Solution: • Wearable wristband or smart patch to track heart rate, oxygen levels, blood pressure. • Fall detection sensors with auto-alerts to caregivers. • AI-based health prediction system to detect early signs of illness. • Remote health monitoring app for real-time access.	Software/ Hardware	MedTech / BioTech / HealthTech
49	Disaster Response & Relief Coordination Platform	During disasters, coordination among relief agencies, donors, and affected communities is inefficient. Design a real-time disaster management platform that connects rescue teams, volunteers, and affected individuals. Expected Solution: • AI-based disaster prediction & early warning alerts. • Crowdsourced emergency response map (shelters, hospitals, food supply). • Chatbot for emergency assistance & rescue coordination. • Blockchain-powered donation tracking system to prevent fraud.	Software	Open Innovation

50	AI-Powered Personalized Learning Assistant	Education is not one-size-fits-all. Develop an AI-based personalized tutor that adapts learning materials based on a student's pace, strengths, and weaknesses. Expected Solution: • AI-driven adaptive learning engine that customizes topics. • Voice-based interactive Q&A assistant. • Gamified progress tracking to encourage student engagement. • AI-based doubt-solving assistant available 24/7.	Software	Open Innovation
51	Smart Water Conservation & Leak Detection System	Water wastage due to leaks and inefficient usage is a critical issue. Build an AI-powered IoT system that detects leaks, optimizes water usage, and provides real-time insights on water consumption. Expected Solution: • Smart sensors for leak detection in pipelines. • AI-based water consumption analytics for homes, industries, and agriculture. • Mobile app integration for real-time water usage monitoring. • Automated water-saving recommendations based on usage patterns.	Software	Clean & Green Technology
52	AI-Powered Fake News Detector	Misinformation and fake news spread rapidly through social media. Develop an AI-based browser extension or app that analyzes news credibility and flags false content. Expected Solution: • NLP-based fact-checking model. • Social media fake news detection & flagging system. • AI-based news credibility scoring with reliable source verification. • Browser extension to detect manipulated images/videos.	Software	Open Innovation
53	Smart Agricultural Monitoring System	Farmers face challenges in predicting weather, soil health, and crop diseases. Build an AI-powered monitoring system that provides real-time insights for better farming decisions. Expected Solution: • IoT-based soil sensors to monitor moisture & nutrients.	Software / Hardware	Agriculture, FoodTech & Rural Development

		• AI-driven disease prediction system from crop images. • Smart weather forecasting for optimal sowing & irrigation. • Mobile app integration with voice support in regional languages.		
54	AI-Based Precision Farming for Small-Scale Farmers	Small-scale farmers lack access to data-driven insights for soil health, crop selection, and irrigation management. Develop an AI-based mobile app that helps farmers optimize yield and reduce costs. Expected Solution: • Soil health & crop suitability analysis via AI. • IoT-based sensors for automated irrigation control. • Real-time pest & disease detection using image processing. • Voice-based chatbot in regional languages for farmer assistance.	Software	Agriculture, FoodTech & Rural Development
55	IoT-Based Smart Greenhouse for Year-Round Farming	Traditional farming is seasonal and weather-dependent, leading to inconsistent food supply. Develop an IoT-enabled smart greenhouse that automates temperature, humidity, and light control for year-round farming. Expected Solution: • IoT-based climate control for optimized crop growth. • AI-driven yield prediction & automated farming schedules. • Remote monitoring via mobile app for farmers. • Integration with renewable energy sources for sustainability.	Software / Hardware	Agriculture, FoodTech & Rural Development
56	Blockchain-Based Farm-to-Consumer Supply Chain	Food supply chains suffer from fraud, middlemen exploitation, and lack of transparency. Develop a blockchain-based traceability system that ensures fair pricing and quality assurance from farm to consumer. Expected Solution: • QR code-based product tracking from farm to table. • Smart contracts for fair pricing & direct farmer payments. • AI-powered demand forecasting for optimal supply management. • Mobile app for consumers & farmers to track transactions.	Software	Agriculture, FoodTech & Rural Development Bloackchain & Cyber Security
57	AI-Powered Smart Irrigation & Water Conservation System	Water scarcity affects agricultural productivity. Build an AI-based smart irrigation system that monitors soil moisture, weather data, and automates irrigation to optimize water usage.	Software / Hardware	Agriculture, FoodTech &

		Expected Solution: • IoT sensors for real-time soil moisture analysis. • AI-based weather prediction & water usage optimization. • Mobile dashboard for remote irrigation control. • Solar-powered pump integration for sustainability.		Rural Development
58	Smart Food Waste Management & Redistribution System	Tons of food go to waste daily, while millions remain undernourished. Design a tech-driven food redistribution system that connects surplus food sources with NGOs, food banks, and communities in need. Expected Solution: • AI-powered food quality assessment system for surplus food. • Real-time matching algorithm to connect donors & recipients. • Mobile app & chatbot for donation coordination. • Blockchain for food safety & distribution tracking.	Software	Agriculture, FoodTech & Rural Development Bloackchain & Cyber Security
59	AI-Based Smart Home Energy Management	Electricity consumption in homes is often inefficient, leading to wastage. Develop an AI-powered energy management system that helps users optimize power usage and reduce electricity bills. Expected Solution: • IoT-based smart meters to monitor appliance consumption. • AI-based power usage predictions & efficiency recommendations. • Mobile app integration for remote control of appliances. • Automated appliance scheduling for energy conservation.	Software / Hardware	Sustainable/Renewable Energy
60	Low-Cost Solar Desalination System	Access to clean drinking water is a major issue in remote areas. Develop a solar-powered desalination unit that converts seawater/brackish water into potable water. Expected Solution: • Solar-thermal desalination with AI-based efficiency tracking. • IoT-based water quality monitoring. • Scalable and low-cost design for rural areas. • Mobile app integration for usage tracking and alerts.	Software / Hardware	Sustainable/Renewable Energy

61	Smart Energy Harvesting from Roads & Footpaths	Heavy traffic and pedestrian movement generate untapped kinetic energy. Design a smart road/pavement system that converts motion into electricity for streetlights, traffic signals, or EV charging. Expected Solution: • Piezoelectric energy harvesting panels for footpaths. • Smart integration with streetlights & charging stations. • AI-based usage prediction & power optimization. • Public dashboard to track power savings.	Software / Hardware	Sustainable/Renewable Energy
62	Blockchain-Based Secure Medical Records System	Healthcare data is often fragmented across hospitals, making it difficult to access complete patient history. Develop a blockchain-based system for secure, tamper-proof, and decentralized storage of medical records. Expected Solution: • Blockchain-based encrypted patient data storage. • Smart contracts for secure record access (only authorized doctors can view). • Interoperability between hospitals, insurance providers & patients. • QR-code-based easy retrieval for emergency cases.	Software	Blockchain & Cybersecurity MedTech / BioTech / HealthTech
63	Smart Prosthetics & Assistive Devices Using AI	Traditional prosthetics and assistive devices lack adaptability for different movements and user needs. Develop a smart AI-powered prosthetic limb or assistive device that adapts to the user's behavior and provides real-time support. Expected Solution: • Machine learning-based movement prediction & adaptation. • Integration with neural signals for natural movement. • IoT-enabled remote diagnostics & updates. • Lightweight & cost-effective material innovation.	Software / Hardware	MedTech / BioTech / HealthTech
64	Sustainable Packaging Using Biodegradable Materials	Plastic waste from packaging materials contributes significantly to environmental pollution. Develop eco-friendly, biodegradable, and cost-effective packaging solutions for industries. Expected Solution:	Software / Hardware	Clean & Green Technology

		• Bio-based plastic alternatives from plant waste. • Smart coating for food-safe biodegradable packaging. • Water-resistant and durable green materials. • Supply chain integration for eco-friendly production.		
65	Smart Tourist Safety & Emergency Assistance App	Tourists often struggle with language barriers, safety concerns, and emergency situations. Develop a real-time assistance app for tourists. Expected Solution: • Live location tracking & emergency SOS button. • AI-powered language translation chatbot. • Guided navigation to nearby attractions & services. • Integration with law enforcement & local authorities.	Software	Heritage & Tourism
66	AI-Powered Virtual Heritage Tour Guide	Many historical sites lack engaging, interactive guides for tourists. Develop an AI-powered virtual guide that provides audio-visual narrations and AR-based immersive experiences. Expected Solution: • AR/VR-based interactive heritage tours. • AI-powered multilingual virtual guide chatbot. • Gamification elements to enhance user engagement. • Mobile app integration for seamless experience.	Software	Heritage & Tourism
67	AI-Based Personalized Learning Platform	Students have different learning speeds and styles, but traditional education lacks customization. Develop an AI-powered platform that adapts to individual learning needs. Expected Solution: • AI-powered personalized lesson plans. • Automated assessment & progress tracking. • Gamification to boost engagement. • Multi-device accessibility (mobile, web, tablet).	Software	Smart Education
68	Virtual Reality-Based Science & Engineering Labs	Many students lack access to advanced labs for practical learning. Develop a VR-based virtual lab where students can conduct experiments in an immersive 3D environment.	Software	Smart Education

		Expected Solution: • VR-powered interactive science experiments. • AI-based virtual instructors for guidance. • Gamified learning experiences for better retention. • Cloud-based access for students worldwide.		
69	Cloud-Based Multiplayer Game Development Platform	Developers face challenges in setting up multiplayer game infrastructure, requiring high computing power. Create a cloud-based platform that simplifies multiplayer game development and deployment. Expected Solution: • Cloud-hosted multiplayer gaming servers. • Scalable architecture for high-performance gameplay. • Low-latency, real-time player synchronization. • Cross-platform compatibility (PC, mobile, console).	Software	Gaming & Animation
70	AI-Powered Animation Tool for Automated Character Movements	Creating realistic animations for games and movies is time-consuming and expensive. Develop an AI-driven animation tool that generates realistic character movements based on motion capture and physics-based simulation. Expected Solution: • AI-powered procedural animation generation. • Real-time motion prediction & blending. • Machine learning-based motion correction. • Compatibility with popular animation software (Blender, Maya, Unreal Engine, Unity or any other).	Software	Gaming & Animation
71	Realistic AI NPCs for Enhanced Gaming Experience	Most Non-Playable Characters (NPCs) in games have scripted, predictable behavior. Develop AI-driven NPCs that learn, adapt, and react dynamically to players' actions, making the gaming experience more immersive. Expected Solution: • AI-powered dynamic NPC decision-making. • Behavioral adaptation based on player interaction.	Software	Gaming & Animation

		• Procedural dialogue generation for unique conversations. • Integration with existing game engines (Unity, Unreal, etc.).		
72	Implementation of the Alumni Association Platform for the University/Institute	Develop a comprehensive Alumni Association Platform that enables universities and institutes to engage, track, and connect with their alumni. The platform should include: 1. Alumni Database & Profiles 2. Networking & Communication 3. Event & Fundraising Management 4. Job Referral & Career Assistance 5. Technology Stack & Deployment 6. Mentorship module connecting alumni with current students.	Software	Smart Education
73	Personalized Budget Planner	Many individuals struggle with managing finances, tracking expenses, and saving effectively. A lack of personalized insights leads to poor budgeting and financial stress. Expected Solution: Develop a web app that allows users to: • Track daily, weekly, and monthly expenses using an intuitive dashboard. • Set custom savings goals and get AI-powered spending recommendations. • Get real-time financial insights & reports using AI-driven analytics. • Receive alerts & reminders for bill payments and budgeting tips.	Software	FinTech
74	Product Recommendation System	Online shoppers often struggle to find the right products that match their preferences. Generic recommendations fail to provide personalized experiences, leading to low engagement and conversions. Expected Solution: Develop an AI-driven web app that: • Analyzes user behavior, search history, and purchase patterns. • Uses machine learning algorithms to suggest personalized product recommendations. • Tracks trending products and recommends based on market insights. • Integrates with e-commerce platforms for real-time suggestions.	Software	AI & Data Science

75	Customized Gift Finder	Choosing the perfect gift for someone can be overwhelming due to a lack of personalized suggestions based on the recipient's interests, occasion, and budget. Expected Solution: Create a gift recommendation web app that: • Asks a few questions about the recipient (age, hobbies, interests, occasion, budget). • Uses AI-powered algorithms to suggest tailored gift ideas. • Filters products from multiple platforms based on user preferences. • Provides purchase links and deals for convenience.	Software	AI & Data Science