

PROBLEM STATEMENTS

1. Open Innovation

1.1 Problem Statement : AI-Powered Personal Finance Intelligence System

Description:

Design and develop an AI-powered personal finance agent that delivers deeply personalized financial insights through natural language interactions. The solution should analyze structured financial data (assets, liabilities, investments, credit score, EPF, etc.), simulate financial scenarios, and provide actionable recommendations while ensuring user privacy and data control.

Requirements:

- Structured financial data ingestion (MCP-compatible JSON format or publicly available/ synthetic dataset)
- AI-driven reasoning and contextual response generation
- Scenario simulation and predictive financial modeling (prototype-level)
- Secure authentication and privacy-aware architecture design
- Flexible interface (chat-based, voice-based, mobile-first, or API-driven)
- Cloud-based or local deployment prototype

Expected Outcomes:

- Functional AI-powered personal finance prototype
- Demonstration of personalized insights and scenario simulations
- Secure user-controlled data interaction workflow
- Performance indicators (response relevance, personalization quality, latency, privacy approach)
- Clear differentiation from generic budgeting tools through reasoning and strategy optimization

1.2 Problem Statement: AI-Based System for Remote Sensing Data Insights

Description:

Satellite and remote sensing platforms generate large amounts of imagery such as multispectral, hyperspectral, and Synthetic Aperture Radar (SAR) data. Manual analysis is complex and time-consuming. This project aims to develop an AI-based system that integrates Computer Vision and Large Language Models (LLMs) to automatically analyze satellite images, detect changes over time, and provide insights through simple natural language queries.

Requirements:

- Computer Vision models for object detection or land-use analysis
- Time-series based change analysis focusing on one core detection capability.
- LLM-based natural language query interface
- Support for publicly available satellite datasets (e.g., Sentinel, Landsat)
- Cloud or local scalable processing prototype
- Simple dashboard for visualization and query-based interaction
- Simulation-based integration capability with geoportals

Expected Outcomes / Deliverables:

- Automated detection of changes or key features in satellite imagery
- Identification of selected features such as buildings, roads, water bodies, or vegetation
- User-friendly system enabling natural language insights
- Demonstration use case (urban planning, disaster monitoring, environmental analysis, etc.)
- Working prototype with evaluation metrics (detection accuracy, response time, clarity of insights)

1.3 Problem Statement: Carbon Footprint Tracker for MSMEs

Description:

Design and develop a SaaS-based prototype that enables Micro, Small, and Medium Enterprises (MSMEs) to measure, monitor, and reduce their carbon emissions in a simplified and affordable manner. The system should provide automated carbon footprint estimation, basic benchmarking, and actionable recommendations for sustainable operations.

Requirements:

- Emission data collection and carbon calculation engine (Scope 1 and 2 mandatory, Scope 3 optional)
- Comparative analytics module with existing
- AI-driven recommendation system for emission reduction strategies
- Compliance-style reporting prototype
- User-friendly dashboard for emission trends and progress tracking
- Cloud-based SaaS prototype with secure data handling

Expected Outcomes:

- Functional carbon tracking prototype
- Demonstration of automated emission calculations and reduction insights
- Dashboard displaying emission trends and sustainability goals
- Performance indicators (calculation logic clarity, cost-efficiency potential, usability, scalability)

1.4 Problem Statement: Smart Disaster Response Coordination Platform

Description:

Design and develop a disaster response coordination prototype that integrates satellite data, simulated IoT inputs, and crowd-sourced alerts to enable improved situational awareness and emergency response planning. The system should demonstrate risk analysis and coordinated communication workflows.

Requirements:

- Integration module for satellite or geospatial data
- Simulated IoT sensor data aggregation module
- Crowd-sourced alert submission and validation mechanism
- Risk analysis or predictive alert engine (prototype-level)
- Resource tracking and response coordination module
- GIS-based interactive dashboard for visualization
- Secure notification or communication workflow design

Expected Outcomes:

- Functional prototype demonstrating disaster monitoring and coordination
- Multi-source alert processing (real or simulated data)
- Dashboard displaying affected zones, alerts, and resource updates

- Performance indicators (response workflow clarity, alert accuracy, system responsiveness, usability)

1.5 Problem Statement: AI-Based Urban Traffic Flow Optimization

Description:

Design and develop an AI-driven urban traffic management prototype that leverages computer vision and predictive modeling to optimize traffic signal timings dynamically in a simulated or controlled environment. The system should analyze traffic density and demonstrate congestion reduction strategies.

Requirements:

- Computer vision module for vehicle detection or density estimation
- Predictive modeling engine for congestion forecasting (prototype-level)
- Adaptive signal timing simulation algorithm
- Real-time or simulated traffic data processing
- Centralized monitoring dashboard with traffic analytics
- Scalable design architecture

Expected Outcomes:

- Prototype demonstrating adaptive traffic signal optimization (simulation allowed)
- Live demo showcasing vehicle detection and congestion prediction
- Dashboard displaying traffic metrics and signal adjustments
- Performance indicators (reduction in simulated waiting time, congestion estimation accuracy, system responsiveness)

2. Gender Diversity & Inclusion

2.1 Problem Statement : AI-Based Bias Detection in Hiring Systems

Description:

Design and develop an AI-driven tool that detects and reports gender bias across recruitment workflows, including job descriptions, resume screening algorithms, and candidate shortlisting patterns. The system should analyze linguistic patterns, algorithmic decision-making, and selection data to identify potential bias and promote equitable hiring practices.

Requirements:

- NLP-based bias detection module for job description analysis
- Statistical analysis module for shortlisting pattern evaluation
- Bias scoring and fairness evaluation framework
- Interactive dashboard for bias reporting and insights
- Secure deployment prototype
- Use of provided or publicly available or sample hiring datasets

Expected Outcomes:

- Functional prototype identifying bias indicators
- Demonstration using sample datasets
- Dashboard displaying fairness scores and improvement suggestions
- Performance indicators (bias detection consistency, fairness metric clarity, explainability)

2.2 Problem Statement : Gender-Neutral Skill Assessment Engine

Description:

Design and develop a blind recruitment system that evaluates candidates purely based on skill-based assessments, eliminating demographic indicators such as name, gender, age, or other personal identifiers. The solution should ensure objective, merit-driven hiring decisions by anonymizing candidate data and focusing entirely on measurable competencies and performance outcomes.

Requirements:

- Candidate anonymization and identity masking module
- Skill-based assessment engine (coding, aptitude, domain-based tests, etc.)
- Automated scoring and ranking mechanism
- Fairness monitoring system
- Dashboard for reviewing anonymized results
- Secure deployment prototype

Expected Outcomes:

- Functional blind recruitment prototype
- Demonstration of skill-based evaluation
- Dashboard displaying rankings and fairness indicators
- Performance indicators (evaluation consistency, bias reduction approach, transparency)

2.3 Problem Statement : Digital Literacy Platform for Rural Women Entrepreneurs

Description:

Design and develop a multilingual micro-learning platform aimed at empowering rural women entrepreneurs with essential knowledge in financial literacy, digital payments, and e-commerce onboarding. The system should provide simple, accessible, and mobile-friendly learning modules tailored to different literacy levels and regional language preferences, enabling inclusive participation in the digital economy.

Requirements:

- Multilingual content delivery (at least two languages)
- Structured micro-learning modules
- Interactive quizzes and progress tracking
- Mobile-first and low-bandwidth optimized interface
- Optional AI-based personalization
- Engagement monitoring dashboard

Expected Outcomes:

- Functional learning platform prototype
- Demonstration of multilingual access
- Dashboard displaying enrollment and completion metrics
- Performance indicators (usability, accessibility, learning progression tracking).

2.4 Problem Statement : AI-Powered Harassment Reporting & Escalation System

Description:

Design and develop a confidential, AI-assisted harassment reporting and escalation platform for workplaces or educational campuses. The system should ensure anonymity for complainants, securely handle sensitive data, and integrate structured legal and organizational workflows to enable transparent, timely, and compliant case resolution.

Requirements:

- Secure anonymous reporting interface
- AI-based complaint classification (prototype-level)
- Automated escalation workflow design
- Role-based access control model
- Case tracking and audit trail module
- Dashboard for monitoring resolution timelines
- Secure data storage design

Expected Outcomes:

- Functional confidential reporting prototype
- Demonstration of complaint categorization and escalation flow
- Dashboard displaying case statistics and resolution progress
- Performance indicators (response workflow efficiency, data security approach, reliability)

2.5 Problem Statement : Career Re-Entry Platform for Women Professionals

Description:

Design and develop a comprehensive career re-entry platform that supports women professionals returning to the workforce after career breaks. The system should provide structured mentorship, targeted upskilling programs, confidence-building resources, and intelligent job-matching services to enable smooth reintegration into professional environments.

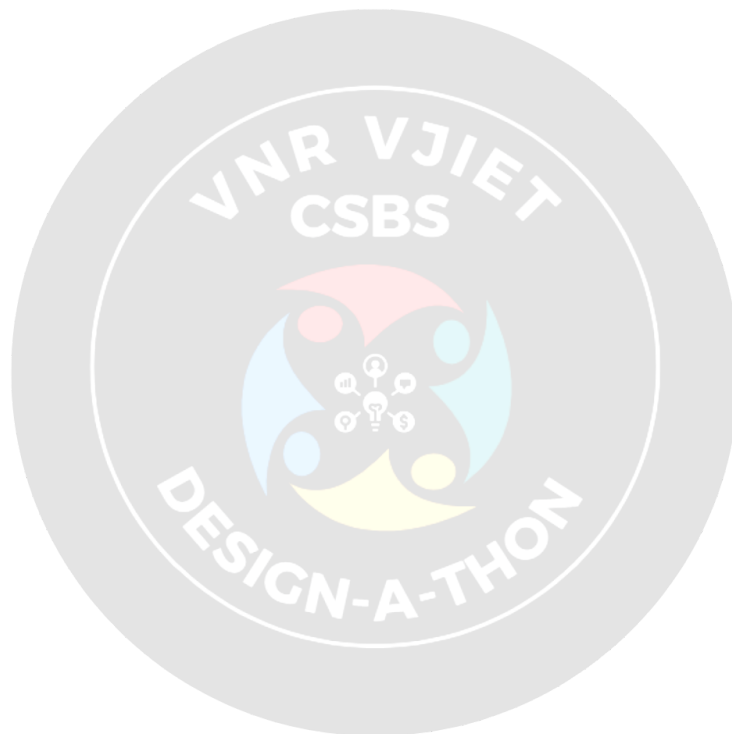
Requirements:

- User profiling and career gap assessment module

- AI-driven skill gap analysis
- Personalized upskilling recommendations
- Job-matching prototype
- Progress tracking dashboard
- Scalable architecture design

Expected Outcomes:

- Functional re-entry support prototype
- Demonstration of skill analysis and job matching
- Dashboard displaying progress and match relevance
- Performance indicators (match relevance score, skill improvement tracking logic, usability)



3. Cyber Security

3.1 Problem Statement : AI-Powered Phishing Detection for Indian Enterprises

Description:

Design and develop an AI/ML-based cybersecurity system capable of detecting phishing emails and domain spoofing attempts in real time. The solution should analyze suspicious URLs, deceptive language patterns, and abnormal sender behavior while supporting multilingual threat detection across English and Indian regional languages.

Requirements:

- Phishing classification model
- A module for multilingual analysis
- URL/domain risk detection module
- Real-time or simulated email scanning
- Risk scoring and alert system
- Monitoring dashboard
- Use of public phishing datasets or synthetic dataset

Expected Outcomes:

- Functional phishing detection prototype
- Demonstration of email and URL risk detection
- Dashboard displaying alerts and risk scores
- Performance indicators (accuracy, precision, recall, false positive rate)

3.2 Problem Statement : Deepfake Detection for Digital Identity Verification

Description:

Design and develop a real-time deepfake detection system capable of identifying manipulated video and audio content during digital identity verification processes such as KYC (Know Your Customer) and remote hiring. The solution should detect facial manipulations, voice cloning, synthetic media artifacts, and inconsistencies in biometric behavior to ensure secure and trustworthy verification.

Requirements:

- Deepfake detection model (custom-built or integrated pretrained model)
- Basic audio forgery detection module (optional enhancement)
- Liveness or anti-spoofing demonstration
- Risk scoring mechanism
- Integration-ready architecture design
- Secure data handling model

Expected Outcomes:

- Prototype capable of identifying synthetic media artifacts
- Demonstration under controlled test scenarios
- Dashboard displaying verification results and risk scores
- Performance indicators (detection accuracy, robustness, explainability)

3.3 Problem Statement : IoT Security Risk Monitoring for Smart Campuses

Description:

Design and develop a comprehensive IoT security monitoring system for smart campuses or industrial environments. The solution should identify device-level vulnerabilities, detect abnormal network behavior, and provide real-time threat intelligence to prevent cyberattacks targeting connected infrastructure and critical systems.

Requirements:

- IoT device discovery or simulation module
- Network anomaly detection engine (using sample traffic data)
- Threat alert generation system
- Risk scoring and prioritization mechanism
- Centralized monitoring dashboard
- Integration-ready architecture

Expected Outcomes:

- Functional IoT security monitoring prototype
- Demonstration of anomaly detection using sample data
- Dashboard displaying device health and alerts
- Performance indicators (detection rate, response time, system stability)

3.4 Problem Statement : Real-Time Fraud Detection in UPI Transactions

Description:

Design and develop a real-time predictive fraud detection engine for UPI (Unified Payments Interface) transactions. The system should leverage anomaly detection and behavioral analytics to identify suspicious patterns in small-value but high-frequency transactions, while minimizing false positives and maintaining seamless user experience.

Requirements:

- Fraud detection model
- Behavioral profiling and anomaly detection engine
- Real-time or simulated transaction monitoring
- Risk scoring and alert mechanism
- Fraud analytics dashboard
- Use of synthetic or publicly available transaction datasets

Expected Outcomes:

- Functional fraud detection prototype
- Demonstration of anomaly detection in transaction patterns
- Dashboard displaying alerts and transaction trends
- Performance indicators (accuracy, precision, recall, false positive rate)

3.5 Problem Statement : Cyber Threat Intelligence Aggregation Platform

Description:

Design and develop a centralized Cyber Threat Intelligence (CTI) platform that aggregates open-source cyber threat feeds and transforms them into actionable insights for Indian organizations. The system should collect, normalize, correlate, and analyze threat data to enable proactive risk mitigation and informed cybersecurity decision-making.

Requirements:

- Aggregation of public threat intelligence feeds (or simulated feeds)
- Threat data normalization and correlation module
- AI-based threat prioritization engine
- IOC extraction and enrichment mechanism
- Real-time alerting prototype
- Interactive dashboard for threat visualization

Expected Outcomes:

- Functional CTI prototype integrating multiple threat sources
- Dashboard displaying categorized threats and trends
- Demonstration of prioritized risk insights
- Performance indicators (coverage, prioritization logic clarity, response time, reliability)

