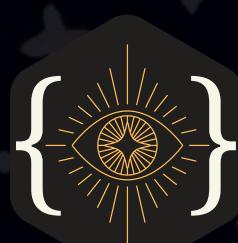


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CodeTantra

PRESENTS

NEED FOR CODE 4.0

Dominate the race track of innovation

PROBLEM
STATEMENTS



GENERAL INSTRUCTIONS

- Read the problem statements carefully
- All the teams should make a Github repository and name it as follows : NFC4_<TEAMNAME>
- We Recommend you to update Repositories every 2 hours
- It is Forbidden to plagiarize or reuse previously published content. If found upon inspection that the project has reused code that was not revealed with the submission, the project will be disqualified
- You are free to use any data sets you find appropriate for the respective Problem statements



WEB APP DEV

1. Residential Society Issue Tracker

Problem Statement:

Residential societies frequently face civic maintenance issues like overflowing garbage bins, broken elevators, water leakage, streetlight outages, and noise disturbances. These issues are currently reported informally via WhatsApp, SMS, or verbal complaints, leading to disorganization, slow resolution, lack of transparency, and recurring problems. Residents are left frustrated as there is no structured system to track issue status, follow up, or analyze root causes. The absence of data also limits management's ability to make evidence-based decisions or track vendor performance. Develop a centralized digital platform accessible via web and mobile to help residents report and track issues, enable committee members to assign and resolve them, and provide real-time insights for better community management. The expected outcome is a seamless and accountable workflow that improves service efficiency, ensures resident satisfaction, and provides actionable analytics to society managers.

Key Functionalities:

- User Roles: Resident, Committee Member/Admin, Technician/Maintenance Staff.
- Issue Reporting Form: With image/video upload, geotagging, priority levels, and categories (e.g., sanitation, security, water).
- Status Dashboard: Track complaint status (New, Assigned, In Progress, Resolved).
- Automated Alerts: Email/SMS/push notifications for updates and resolution.
- Admin Panel: Assign tasks to staff, monitor performance, generate monthly reports.
- Analytics: Heatmaps of common issues, recurring problem alerts, maintenance cost insights.
- User Feedback & Rating: Allow residents to rate the resolution.
- Multilingual Support & Accessibility: Hindi, Marathi, etc., with simple UI for elderly users.
- **Compulsory Functionality: Incorporate a multi-agent system where AI agents autonomously coordinate issue reporting, task assignment, and follow-up.**



WEB APP DEV

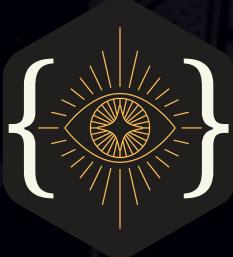
2. Smart Study Group Finder

Problem Statement:

Students often struggle to find peers with compatible learning styles, academic subjects, or schedules to form study groups. This disconnect results in missed collaboration opportunities, poor peer-to-peer learning, and reduced exam preparedness. Educational institutions lack digital systems to facilitate efficient group formation beyond social circles. As hybrid learning expands, the need for intelligent, automated study group formation tools has become more pressing. Design a web platform that uses intelligent matchmaking to help students discover or form productive study groups based on shared academic goals, interests, and learning preferences. The expected outcome is a smarter, more inclusive, and data-driven study experience where students thrive in collaborative environments.

Key Functionalities:

- Student Registration: With fields for institute, courses/subjects, preferred languages, availability schedule, and learning style (visual, auditory, kinesthetic).
- Group Matching Algorithm: Based on subject compatibility, availability, and learning preferences.
- Integrated Scheduler: Sync with Google Calendar or in-app weekly planner.
- Group Chat & Notifications: For discussions, file sharing, and reminders.
- Virtual Study Rooms: Real-time collaboration using whiteboard, screen sharing, and timers.
- Progress Tracker: Shared to-do list, study hours tracker, milestone badges.
- Privacy Controls: Approve/decline group invitations, report misuse.
- Gamification Elements: XP points, peer ratings, leaderboard for study consistency.
- **Compulsory Functionality: Empower the platform with agentic AI to enable autonomous matchmaking and group formation based on student preferences and learning behavior**



WEB APP DEV

3. CodeCollab –Real-Time Coding for Interviews and Teams

Problem Statement:

Live coding interviews, collaborative programming sessions, and remote team coding require robust, real-time platforms. However, most existing solutions are complex, over-engineered, or not tailored for interviewers or bootcamps. They lack features like multi-language support, code versioning, and candidate-friendly environments, and often require separate tools for communication. Develop a lightweight, browser-based real-time collaborative coding platform with integrated chat and video features, tailored for interviews and learning. The expected outcome is an intuitive, interview-ready code collaboration tool for universities, startups, and training programs.

Key Functionalities:

- Real-Time Code Sharing: With syntax highlighting for popular languages (Python, JavaScript, C++, Java, etc.).
- Live Execution Environment: Support for compiling and executing code with input/output console.
- Built-in Chat & Video Integration: Text or video chat for real-time communication.
- Prompt Window: For interviewers to share problems and test cases.
- Code Playback & History: Replay code sessions to review logic and edits.
- Role-Based Access: Interviewer/interviewee modes, admin controls.
- Multi-file Support: For modular projects and larger exercises.
- Mobile Compatibility: Lite interface for tablets/phones.
- **Compulsory Functionality: Integrate agentic AI assistants to provide intelligent coding suggestions and feedback during collaborative sessions**



WEB APP DEV

4. Maternal Health Tracker for Rural Areas

Problem Statement:

In rural India, pregnant women face life-threatening risks due to inadequate prenatal care, poor health monitoring, and limited connectivity with healthcare providers. Many are illiterate and unaware of nutrition, check-up schedules, or signs of complications. Family members and ASHA workers lack tools to guide or monitor their health journey effectively. Develop an AI-assisted maternal health tracking application tailored for low-literate and semi-literate users. It should guide expectant mothers using local languages, voice prompts, and emergency support, while enabling ASHA workers to track and assist them. The expected outcome is a life-saving tool that improves maternal outcomes and ensures safe pregnancies in rural regions.

Key Functionalities:

- Voice-Based Daily Log: Capture symptoms, fetal movement, nutrition via guided audio prompts.
- Automated Reminders: IVR/SMS for medication, check-ups, vaccinations, and nutrition.
- Emergency Labor Button: One-tap call with GPS location sent to nearest hospital/PHC/ASHA worker.
- ASHA Worker Integration: Dashboard to track assigned beneficiaries and their risk factors.
- Offline Support: Store logs and sync when online.
- Family Member View: Allow husbands/family to receive reminders on their phones.
- Language Localization: Marathi, Hindi, Gujarati, etc.
- Data Privacy & Security: With OTP-based logins and encryption.
- **Compulsory Functionality: Assign agentic AI health assistants to pregnant users for personalized guidance, symptom monitoring, and emergency escalation**



WEB / APP DEV

5. Smart Navigation & Accessibility App for Railway Stations

Problem Statement:

Railway stations in India, especially metro stations and large junctions, are difficult to navigate—particularly for first-time travelers, elderly people, and persons with disabilities. Lack of clear signage, real-time updates, and accessibility mapping leads to stress, missed trains, and unsafe conditions. Design a real-time digital navigation assistant that helps users orient themselves within railway stations, locate facilities, get voice guidance, and access real-time updates. The expected outcome is an inclusive and intelligent mobility solution that enhances travel confidence and accessibility in Indian railways.

Key Functionalities:

- Interactive 3D Map: With live positioning and turn-by-turn directions.
- Facility Locator: Platforms, restrooms, elevators, ticket counters, food stalls, etc.
- Voice-Guided Navigation: For visually impaired or elderly passengers.
- Live Train Position & Alerts: Platform changes, delays, announcements.
- Accessibility Support: Show wheelchair-accessible routes and elevators.
- Offline Station Maps: Download in advance for use without internet.
- Emergency Help Button: Connect with RPF or railway help desk instantly.
- Language Selector: Hindi, English, Bengali, Tamil, etc.
- **Compulsory Functionality: Use agentic AI to deliver personalized navigation and accessibility support for elderly and differently-abled users.**



WEB / APP DEV

6. Personal Health Dashboard for Families

Problem Statement:

Families today juggle medical information across multiple people—parents, children, elders—with prescriptions, vaccination dates, test results, and doctor appointments often scattered across apps, papers, and SMS. This fragmentation causes missed medications, poor chronic care management, and confusion in emergencies. Build an intuitive personal health dashboard where families can track, store, and share health information for all members in one secure space. The expected outcome is a reliable health management app that empowers preventive care, reduces errors, and enables informed decisions at home and at hospitals.

Key Functionalities:

- Family Member Profiles: With individual health records, history, and allergies.
- Medication Reminders: With dosage, timing, and stock alerts.
- Appointment Calendar: Book and track doctor visits, vaccinations.
- Vitals Tracker: Log blood pressure, sugar, weight, etc., manually or via device sync.
- Prescription Upload and OCR: Convert prescriptions into medication schedules.
- Doctor Communication Portal: Secure chat or upload reports for consultation.
- Health Data Visualization: Trends of vitals, missed doses, progress tracking.
- Emergency Contact Integration: Share key data with paramedics or relatives.
- Integration with Wearables: Fitbit, Apple Health, etc.
- Secure Cloud Sync: Accessible across devices with password protection.
- **Compulsory Functionality: Each family member is paired with an AI health agents that tracks vitals, medications, and raises alerts proactively**



AI/ML

1. Early Detection and Cause Analysis of Patient Deterioration in ICUs

Problem Statement:

In Intensive Care Units (ICUs), patients are connected to various monitors that continuously record vital signs such as heart rate, respiratory rate, oxygen saturation (SpO_2), and blood pressure. While these readings are crucial for timely medical intervention, the volume and velocity of data often overwhelm medical staff, making it difficult to identify subtle changes that precede critical events like cardiac arrest, sepsis, or respiratory failure. In many cases, there is a window of opportunity where early interventions can save lives—but these early warning signs are easily missed by the human eye. Moreover, the absence of an explainable, automated system to analyze these vitals contributes to delayed diagnoses, medical errors, and increased ICU mortality. Build an AI-powered web application that continuously processes and interprets patient vitals to detect signs of deterioration, provide real-time alerts, and explain the cause through interpretable outputs.

Key Functionalities:

- Real-time vital sign data ingestion (simulated or open-source ICU data).
- Predictive ML models for event detection.
- Visual dashboard showing live and historical vitals.
- Explainable AI (SHAP/LIME) to identify contributing parameters.
- Alerting system with role-based access (nurse, doctor).
- Patient-specific deterioration history and trend analysis.
- Optional: Integration simulator with EHR systems.
- **Compulsory Functionality: Deploy a multi-agent AI system where patient and environment agents collaborate to detect and explain critical conditions early**



AI/ML

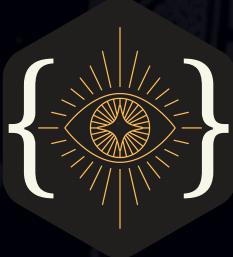
2. Smart Companion Safety App Using AI

Problem Statement:

Incidents of harassment, kidnapping, and physical assaults—especially involving women and children—often occur during transit, where the individual is alone and unable to signal for help. Most safety apps depend on the user pressing a panic button or manually activating alerts, which may not be feasible in threatening or unconscious states. There is a dire need for a smart safety solution that can monitor user behavior and trigger emergency responses automatically when signs of distress are detected. Additionally, family members or guardians should have visibility into live journeys, route deviations, or potential emergencies. Develop a smart companion app using AI to detect distress situations based on voice cues or movement patterns and automate alerts, location tracking, and emergency communication.

Key Functionalities:

- Passive distress detection using voice and motion (ML-based).
- Whisper detection or secret phrase-based SOS trigger.
- Route tracking with real-time deviation alerts.
- Emergency contact auto-alerts via SMS/email with location/audio.
- Audio/video recording upon distress activation.
- Map-based live journey tracking shared with trusted contacts.
- Web dashboard for family/police monitoring.
- Optional: Wearable/smartwatch integration for fall detection.
- **Compulsory Functionality: Embed agentic AI that passively monitors behavior and autonomously triggers safety protocols when distress is detected**



AI/ML

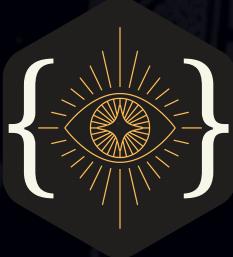
3. Document Summarizer with Contextual Q&A

Problem Statement:

Legal professionals, researchers, and executives frequently deal with extensive documents like contracts, research papers, project reports, or policy briefs. Reading and understanding such documents consumes significant time, and locating key information (like deadlines, obligations, or risks) often requires manual scanning. Even tools that summarize documents fail to retain the context or support follow-up questions. An intelligent AI assistant that not only summarizes but also answers specific queries contextually from within the document can revolutionize document handling in legal, academic, and corporate sectors. Create a web-based AI tool that enables document upload, automatic summarization, and contextual Q&A, enabling users to interactively explore the content with semantic accuracy.

Key Functionalities:

- Upload support for DOCX, PDF, TXT formats.
- LLM-powered summarization with section-wise breakdowns.
- Chat-based interface for context-aware Q&A.
- Chunking and embedding for long document processing.
- Highlighted answer referencing within the document.
- Retention of question-answer memory through threads.
- Multi-document support and comparison mode.
- Optional: Downloadable summary and Q&A report.
- **Compulsory Functionality: Utilize Retrieval-Augmented Generation (RAG) to retrieve contextually relevant content before generating accurate responses**



AI/ML

4. AI Fake News and Deepfake Detection System

Problem Statement:

The rise of misinformation—whether through textual fake news or visually manipulated deepfake videos—has become a threat to democracy, public safety, and social trust. Misinformation spreads rapidly through social media, and distinguishing between genuine and fake content is increasingly difficult for everyday users. Existing fact-checking tools are slow, non-interactive, or limited to textual content. What's needed is an intelligent, real-time AI platform that empowers users to verify content (text, image, or video), assess its credibility, and understand the rationale behind classification—without requiring technical expertise. Build an interactive AI-powered tool that enables users to upload or input any form of content and receive an authenticity verdict with evidence-backed explanations.

Key Functionalities:

- Inputs: text, article URLs, images, and videos.
- NLP classifiers for fake text detection using style/content analysis.
- Deepfake detection using CNN/Autoencoders or pretrained vision models.
- Cross-referencing engine using fact-checking databases/APIs.
- Credibility scoring system with source reputation indicators.
- Explanatory visualizations and similarity scores.
- Chrome extension or mobile browser plugin (optional).
- Flagging/reporting tool for community feedback.
- **Compulsory Functionality: Employ a multi-agent architecture where specialized AI agents validate text, images, and videos, supported by retrieval-based fact-checking**



AI/ML

5. AI-Based Fraud Detection with Contextual Explanation

Problem Statement:

With the explosion of digital payments, online banking, and e-commerce, financial fraud has become increasingly sophisticated and hard to detect. Traditional rule-based fraud detection systems often fail to identify novel fraud patterns, and AI-based models, while more accurate, frequently operate as black boxes—labeling transactions as "fraud" or "not fraud" without giving reasons. This lack of explainability prevents analysts and customers from trusting the system, hinders investigation, and allows some fraudulent patterns to go unnoticed. Design an AI system that not only detects potentially fraudulent transactions in real-time but also offers human-readable explanations by referencing similar past cases and detected anomalies.

Key Functionalities:

- Transaction ingestion API (amount, merchant, IP, device ID, time).
- Classification model trained on imbalanced datasets.
- Explainable AI to show reasons for flagging (similar past patterns).
- Visualization of transaction clusters and anomaly scores.
- Risk scoring engine and alert thresholds.
- Case manager panel to investigate and label cases.
- Feedback loop for human-in-the-loop training.
- Optional: Geo-visualization of transaction patterns.
- **Compulsory Functionality: Integrate agentic AI that not only flags suspicious transactions but also explains patterns using past contextual data.**



AI/ML

6. Smart Real-Time Street Parking Management System

Problem Statement:

In many cities, finding a street parking spot during peak hours is a frustrating and time-consuming process. Lack of real-time information about available spaces leads to increased traffic congestion, fuel wastage, and stress. On the administrative side, city officials lack data to enforce parking policies, forecast demand, or optimize usage. Current parking apps often focus only on commercial lots, neglecting dynamic, on-street parking scenarios. Create a smart and scalable web/mobile application that uses AI/IoT integration to help users find and reserve parking spaces in real time, while enabling city planners to monitor usage patterns and enforce rules effectively.

Key Functionalities:

- Real-time availability map using simulated sensors/CCTV feeds.
- Slot reservation and automated UPI payment gateway.
- Predictive analytics for slot availability based on time/location.
- Admin panel for occupancy monitoring, enforcement alerts.
- QR code or vehicle-based check-in/check-out.
- Heatmaps for traffic and parking usage.
- Dynamic pricing module for high-demand areas.
- Optional: OCR-based number plate recognition.
- **Compulsory Functionality: Implement AI-driven agents that communicate availability, reserve slots, and manage dynamic pricing in real-time**



AI/ML

7. AI Screenplay & Dialogue Enhancer

Problem Statement:

Writers of screenplays, dramas, or short films face multiple challenges—ensuring character consistency, maintaining scene mood, improving dialogue impact, and avoiding clichés. Manual editing and peer feedback are time-intensive, and even then, the quality of storytelling may lack polish or realism. Emerging generative AI tools can support the creative process, but few are tailored specifically for screenplay formatting, multi-character analysis, or emotional tone refinement. Develop a web-based AI writing assistant that helps screenwriters enhance their scripts through tone detection, character analysis, and automatic dialogue improvements, offering insights typically found in professional editing rooms.

Key Functionalities:

- Multi-character screenplay editor with standard formatting.
- Emotion/tone analysis per scene (tension, humor, conflict).
- Dialogue enhancement suggestions for clarity and impact.
- Character-specific language/style suggestions for consistency.
- AI-generated punchline or alternate dialogue suggestions.
- Character consistency checker across scenes.
- Scene preview with voice-over simulation (optional).
- Export to PDF, Fountain, or Final Draft format.
- **Compulsory Functionality: Leverage multi-agent generative AI to refine character dialogue, emotional tone, and consistency throughout the script**



AI/ML

8. AI Legal Clause Generator with Risk Classification

Problem Statement:

Drafting contracts requires domain expertise, and even experienced professionals can overlook risky phrasing or ambiguous clauses. Startups and small businesses without access to legal counsel often use templates, which may not be appropriate for specific deals, leading to long-term disputes. There's a need for a system that can intelligently generate legal clauses from plain language descriptions and classify the level of legal risk based on content clarity, liability, and completeness. Develop a web application that translates plain legal intents into contract-ready clauses using Generative AI and highlights their potential risk levels with reasoning and safer alternatives.

Key Functionalities:

- Natural language prompt → clause generation.
- Clause classification (Low/Medium/High risk) based on clarity, balance, and liability.
- Legal safeguard detection (e.g., indemnity, jurisdiction, IP ownership).
- Alternative clause suggestions for safer variants.
- Side-by-side comparison with industry best practices.
- Clause export with formatting support.
- Clause repository search with tags and metadata.
- Optional: Contract builder for assembling multiple clauses.
- **Compulsory Functionality: Use RAG and multi-agent generative AI where one agent drafts clauses and others assess legal risk and provide safer alternatives**



AI/ML

9. Data Privacy Redaction Tool Using AI

Problem Statement:

Organizations need to share reports, logs, contracts, and customer communications externally, but often forget or fail to properly remove sensitive data such as names, email addresses, phone numbers, or account numbers. Manual redaction is labor-intensive and error-prone. Moreover, redacting too much information can render documents useless for analysis or communication. A smart, selective AI solution is needed to automate redaction while preserving readability and contextual meaning. Build an AI-powered platform that scans unstructured documents and redacts personal or sensitive information intelligently, balancing data privacy with utility.

Key Functionalities:

- Document input: TXT, DOCX, PDF, JSON.
- PII detection using fine-tuned NER models (e.g., spaCy, BERT-based).
- Entity types: name, phone, email, account numbers, addresses, etc.
- Redaction interface with manual override and approval.
- Redacted document download (with and without annotations).
- Compliance modes (GDPR, HIPAA, DPDP) for configurable entity detection.
- Batch redaction for bulk uploads.
- Contextual validation: ensure redactions preserve document readability.
- **Compulsory Functionality: Apply agentic AI to intelligently redact sensitive information while preserving document meaning**



AI/ML

10. AI-Powered Content Creation Platform for Brands and Influencers

Problem Statement:

In today's fast-moving social media landscape, brands and influencers seek timely, relevant, and impactful content to engage their audiences. Yet, creating platform-specific posts—especially for LinkedIn and Twitter/X—is often time-consuming and inconsistent. While AI tools exist, there's a growing need for a streamlined, conversational platform that helps users generate tailored content reflecting their voice, target audience, and current trends—without auto-posting.

Design a prototype web app that uses AI (like GPT) to help influencers and brands create draft-ready social content for LinkedIn and Twitter/X. The platform should feature a chat-based interface, learn the user's tone by analyzing past posts, and support scheduled content generation. It won't post automatically, but will focus on helping users produce professional, audience-aligned drafts efficiently—streamlining ideation while giving users full control over publishing.

Key Functionalities:

- Conversational AI interface where users prompt content ideas or topics.
- AI analyzes past user posts (mock or real) to capture tone, niche, and writing style.
- Generates platform-specific content (LinkedIn, Twitter) aligned with target audience and trends.
- Users can define custom content generation schedules (e.g., weekly posts every Monday).
- AI auto-generates drafts on schedule, stored for user review (no auto-publishing).
- Access a collection of proven, high-performing post formats for various categories (e.g., startup updates, leadership tips, milestones).
- Onboarding screen for entering profile details, tone preferences, and content goals.
- Focus on Manual Review, the platform strictly avoids automated posting, reinforcing user agency over final content.
- **Compulsory Functionality: Integrate generative AI to assist users in drafting personalized, platform-optimized social media content based on past tone and trends**



SOCIAL CAUSE

1. Safety & Sustainability Platform for Coal Mining

Problem Statement:

Coal mining remains an integral part of India's energy mix, providing fuel for thermal power and heavy industries. However, the sector is often criticized for being unsafe, inefficient, and environmentally harmful. Mining companies frequently lack real-time visibility into operational parameters, safety compliance, and environmental metrics. Site accidents, outdated tracking of S&T (Science & Technology)/R&D projects, and lack of data on carbon emissions result in productivity losses, regulatory penalties, and unsustainable practices. As India moves toward climate commitments and net-zero goals, there is an urgent need for digital transformation in this sector. Participants are expected to build a platform that enhances coal mine operations by enabling real-time monitoring of worker safety and equipment, digitizing the tracking of innovation and R&D initiatives, and quantifying environmental impact, particularly carbon emissions. The expected outcome is a unified web or mobile-based system that increases transparency, ensures regulatory compliance, and assists coal companies on the path toward carbon neutrality.

Key Functionalities:

- Real-Time Monitoring Dashboard: Worker location tracking, machinery status, environmental sensor data (air quality, gas leaks, etc.).
- Safety Protocol Alerts: AI-generated alerts for non-compliance, danger zones, or lack of protective equipment.
- Digital Management of R&D/S&T Projects: Project lifecycle tracking, budget vs. utilization, outcomes, and timeline tracking.
- Carbon Footprint Estimation Tool: Auto-calculate emissions based on equipment usage, fuel, material logistics.
- Carbon Neutrality Simulator: Suggest emission reduction alternatives (e.g., bio-reclamation, cleaner fuels).
- Automated Reports for Ministry/Policy Submission: Export insights for government audit/review.
- Offline Sync for Remote Sites: Data collection even without internet; syncs upon reconnection.
- Worker App with Incident Reporting: Mobile interface for ground-level workers to report near-misses, hazards.
- **Compulsory Functionality: Use agentic AI to simulate real-time worker safety and carbon monitoring through autonomous digital twin agent**



SOCIAL CAUSE

2. Offline-First PWA for Remote Villages

Problem Statement:

Over 65% of India's population lives in rural areas, many without reliable internet. This digital divide limits access to vital services like healthcare, education, and agricultural support. Though government and NGO programs exist, their digital nature makes them inaccessible offline. Villagers often can't access entitlements, online learning, or maintain digital records.

The task is to design a mobile-friendly Progressive Web App (PWA) that works fully offline—letting users access content, store data locally, and sync when online. It should support education, agriculture, and health, empowering teachers, farmers, and community workers for real-time service delivery.

Key Functionalities:

- Offline Functionality: Full data entry, learning modules, and service access without internet.
- Education Module: Local language video/text/audio lessons, quizzes, and certificate-based tracking.
- Healthcare Module: First-aid guides, maternal/child health tips, vaccination alerts, local clinic directory.
- Agriculture Module: Crop calendars, weather alerts, fertilizer usage guides, AI chatbot for FAQs.
- Auto Sync: Secure sync to central servers when device connects to internet.
- Local Storage Encryption: Ensure user data privacy in offline mode.
- Multilingual and Voice Support: Hindi, Marathi, tribal dialects; TTS and voice input for low-literacy users.
- NGO/Govt Integration: Syncs with national/state dashboards when online.
- **Compulsory Functionality: Embed agentic AI assistants for offline access to health, education, and agriculture services.**



SOCIAL CAUSE

3. Crop Disease Prediction and Farmer Support System

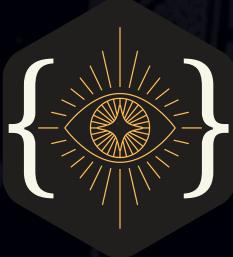
Problem Statement:

Crop failure from plant diseases is a major challenge for Indian farmers, worsened by limited access to expert advice and disease awareness. This leads to pesticide misuse, lower yields, and economic loss. With rising smartphone use in rural areas, there's an opportunity to offer smart, early disease detection tools.

Participants must build a mobile-friendly AI solution where farmers upload crop images to get instant disease diagnosis and treatment tips. The app should also link them to local nurseries, agri-experts, and region-specific farming advice. The goal is a user-friendly tool that reduces losses, boosts productivity, and supports digital agriculture.

Key Functionalities:

- Photo-Based Disease Detection: ML model for image classification of plant leaf symptoms.
- Diagnosis Confidence Score: Confidence % and similar images.
- Treatment Recommendation Engine: Organic/inorganic remedies, pesticide guidance, dosage tracking.
- Agri-Expert Connect: In-app appointment booking or chat with local certified advisors.
- Geolocation-Based Nursery Finder: Nearby input dealers or plant medicine shops.
- Seasonal Care Reminders: Irrigation, pruning, pest alerts by crop and geography.
- Multilingual UI & Voice Input: For accessibility to low-literacy farmers.
- Offline Data Collection: Photo capture and symptom logging without network.
- **Compulsory Functionality: Introduce local farm-level AI agents that diagnose crop issues and autonomously suggest targeted remedies.**



SOCIAL CAUSE

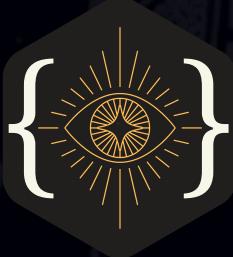
4. Cognitive Retraining App for Children with Disabilities

Problem Statement:

Children with cognitive or developmental disabilities such as ADHD, autism spectrum disorder, or learning disabilities often require structured interventions to improve memory, attention, problem-solving, and behavior. Unfortunately, access to professional therapy is limited, expensive, and geographically unavailable to many families, especially in rural or lower-income settings. As a result, caregivers are left without guidance or tools to support their child's development at home. This problem statement aims to create a computerized cognitive training platform for children with special needs that is flexible, adaptive, and accessible. The system should offer daily mental exercises tailored to individual capabilities and progression speed, and assist parents with guidance, encouragement, and analytics. The expected outcome is an interactive web or mobile solution that acts as a home-based therapist for families and helps bridge gaps in access to specialized care.

Key Functionalities:

- Adaptive Exercise Engine: Puzzles, memory games, attention-building tasks based on child's age and ability.
- Progress Analytics Dashboard: Graphs showing improvement across cognitive domains.
- Parental Guidance Layer: Recommendations for reinforcement, calming techniques, and environment design.
- Gamified Rewards: Stars, badges, avatars to maintain motivation.
- Accessible Interface: Color-coded, minimal distraction, dyslexia-friendly fonts.
- Multilingual and Voice Interaction: Instructions in native language; voice input/output.
- Offline Mode: Daily practice even without internet.
- Therapist Portal (Optional): Professionals can monitor progress remotely.
- **Compulsory Functionality: Each child is paired with a personalized learning agent that adapts cognitive exercises to ability and progress**



SOCIAL CAUSE

5. Employment & Skill Development Platform for the Disadvantaged

Problem Statement:

Millions in India—especially from tribal, rural, minority, and marginalized urban groups face barriers to employment due to digital illiteracy, lack of skills, mobility issues, and discrimination. Existing schemes often fail due to poor execution and lack of coordinated support.

Participants must create an inclusive employment platform for disadvantaged users. It should assess skills, provide local or remote learning, connect users with mentors, and help secure jobs or internships. The platform must also address transport, childcare, and language challenges—offering humane, localized support for skill-building and placement.

Key Functionalities:

- Skills Assessment Tool: Quick aptitude + interest profiler to suggest learning paths.
- Modular Learning Hub: Short courses in digital literacy, communication, trade skills.
- Mentorship Matchmaking: Local/online mentor directory by sector.
- Job Board with Filters: Verified employers hiring locally; gig work, apprenticeships.
- Barrier Identification and Support: Childcare, transport, digital access needs tagged.
- Social Service Referrals: Link to nearby shelters, legal aid, nutrition schemes.
- Multilingual Interface: With accessibility features (text-to-speech, keyboard nav).
- Community Mobilization Toolkit: For NGOs to onboard new users in bulk.
- **Compulsory Functionality: Integrate career advisor agents that recommend skilling paths, mentors, and jobs based on aptitude and goals**



SOCIAL CAUSE

6. Grievance Reporting Platform for Minimum Wage Workers

Problem Statement:

Workers in unorganized sectors—including daily wage laborers, domestic workers, factory staff, and sanitation workers—often face exploitation, withheld wages, unsafe work conditions, and harassment. However, fear of retaliation, job loss, or intimidation by employers prevents them from filing complaints or seeking redress. Further, language, literacy, and lack of digital access make formal grievance portals inaccessible. Participants are tasked with creating a secure, anonymous, and user-friendly platform that enables workers to submit complaints without revealing their identity, and ensures that these complaints are routed to relevant support organizations or grievance redressal authorities. The platform must protect the complainant's identity and still allow resolution tracking. The expected outcome is a scalable digital grievance redressal solution that gives voice to the voiceless, strengthens worker protections, and builds trust in digital justice mechanisms.

Key Functionalities:

- Anonymous Complaint Submission: No login; voice/text input.
- Grievance Routing Engine: Send to NGO, labor officer, company's internal committee.
- Tracking Code System: Workers can check status using unique reference ID.
- Voice-to-Text Support: For illiterate workers; dialect transcription.
- Evidence Upload: Optional images, recordings (blurred/masked metadata).
- Data Protection & Encryption: End-to-end encryption for all complaints.
- Multilingual Interface: Hindi, Marathi, Bengali, etc.
- NGO/Admin Panel: For triaging, assigning, and resolving complaints.
- **Compulsory Functionality: Use agentic AI to ensure safe, anonymous complaint handling with escalation agents activated based on severity**



SOCIAL CAUSE

7. Secure Workplace Harassment Reporting System for Women

Problem Statement:

Despite the existence of PoSH (Prevention of Sexual Harassment) laws, many women in both formal and informal workplaces refrain from reporting harassment due to lack of privacy, fear of retaliation, stigma, or absence of safe reporting mechanisms. Often, when incidents do occur, the victim lacks evidence or documentation, and is unaware of how to escalate the issue legally or emotionally. Develop a digital tool that empowers women to privately log harassment incidents, safely store evidence (text, audio, screenshots), and either report anonymously or delay the submission until they feel secure. The solution must offer pathways to NGOs, legal professionals, and workplace redressal bodies. The expected outcome is a privacy-first app or web system that fosters early reporting, reduces emotional burden, and strengthens organizational accountability toward gender safety.

Key Functionalities:

- Incident Logger: Audio recordings, screenshots, time-stamped notes with auto-encryption.
- Delayed Submission Option: Choose to send after X days.
- Anonymous/Identified Toggle: Report with or without name.
- Legal Aid & NGO Linkages: Connect to local counselors, PoSH committees, or legal services.
- Multilingual Support: Interface and legal documents in major Indian languages.
- Dashboard for HR/NGOs: Case intake and secure access controls.
- Evidence Vault: Encrypted digital locker with limited-time access sharing.
- SOS Chatbot: Support chat for emotional or legal queries.
- **Compulsory Functionality: Incorporate generative AI to help users draft narratives, and agentic AI to manage evidence securely and escalate when needed**



BLOCKCHAIN

1. Blockchain for a Better Academic Credential Ecosystem

Problem Statement:

Academic credentialing today is plagued by inefficiencies, lack of transparency, and risks of fraud. Verifying transcripts and degrees is often manual, slow, and reliant on intermediaries, reducing trust. Students rarely have full control over their records, while institutions and employers struggle to confirm authenticity.

Blockchain offers a chance to transform how academic records are issued, stored, and verified. Yet, a secure, scalable system designed for academics is still missing.

This project proposes a blockchain-based solution for secure, verifiable, and student-owned credentials. It will digitize records and build a decentralized system for seamless verification among students, institutions, and employers.

Key Functionalities:

- Digitize academic certificates, transcripts, and achievements by authorized stakeholders and store them securely on the blockchain.
- Use cryptographic hashing and time-stamping to ensure all credentials are authentic, immutable, and tamper-proof.
- Grant students full ownership and control over their records, allowing them to manage access permissions.
- Enable secure, selective credential sharing through cryptographically signed links or smart contract-based access.
- Maintain end-to-end transparency by recording issuance, verification, and updates on-chain for full auditability.
- Utilize decentralized ledger infrastructure to eliminate single points of failure and enhance data resilience.
- Ensure interoperability among students, institutions, and employers for smooth, standardized credential exchange.
- Prevent fraud and reduce verification time by allowing instant on-chain validation of academic records.
- Automate issuance, expiration, and revocation of credentials using smart contracts to reduce manual tasks.
- **Compulsory Functionality: Integrate agentic AI to autonomously verify, manage access to, and revoke academic records via smart contracts.**



BLOCKCHAIN

2. Blockchain in transforming the FinTech Sector.

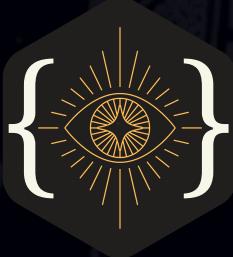
Problem Statement:

The rapid advancement of technologies such as Artificial Intelligence (AI) and Blockchain is reshaping the financial services sector. Traditional systems often struggle with manual processes, limited personalization, and security concerns. There is a growing need for intelligent, secure, and automated solutions that can enhance customer engagement and streamline financial decision-making.

This project aims to design and implement a web/mobile-driven intelligent backend system that leverages AI for smart automation and Blockchain for secure, transparent operations within the fintech ecosystem. The focus is on developing the core functional logic rather than user interface elements, ensuring scalability, auditability, and real-time responsiveness.

Key Functionalities:

- Automate credit scoring, loan approvals, fraud detection, and investment advice using AI, machine learning, and predictive analytics.
- Use blockchain for immutable transaction records, smart contracts for automation, and tamper-proof audit trails.
- Enable AI-powered chatbots, personalized product suggestions, and NLP-based customer query handling.
- Integrate backend APIs with web/mobile apps, support real-time performance, and use blockchain for secure digital identity.
- Process live financial data streams with event-driven logic and real-time fraud and risk analytics.
- Monitor regulatory compliance via AI, maintain blockchain-based audit trails, and support global financial standards.
- Design with modular microservices, plug-and-play AI tools, and scalability for future fintech expansions.
- Ensure privacy and security using permissioned blockchain, federated learning, and end-to-end encryption.
- **Compulsory Functionality: Integrate multi-agent AI systems for fraud detection, credit scoring, customer support, and compliance automation.**



BLOCKCHAIN

3. Real Estate Chain

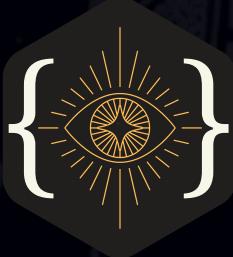
Problem Statement:

The real estate industry, a fundamental pillar of the global economy, continues to rely heavily on outdated, paper-based processes for property transactions and ownership transfers. These traditional methods are often inefficient, lack transparency, and contribute to significant delays, high transaction costs, and accessibility issues for all stakeholders involved. The absence of a unified, secure, and verifiable system has further exacerbated risks associated with fraud, data manipulation, and regulatory non-compliance.

To address these challenges, there is a pressing need to adopt blockchain technology to revolutionize the way real estate transactions are conducted. By leveraging the capabilities of decentralized systems, smart contracts, and immutable ledgers, the aim is to create a more secure, efficient, and transparent framework for managing property transactions and records.

Key Functionalities:

- Enable seamless, privacy-preserving digital representation of property ownership for secure access and control.
- Use smart contracts to automate property transactions, reduce intermediaries, and minimize fraud risk.
- Build a tamper-proof, decentralized property ledger accessible to authorized parties like buyers, sellers, and regulators.
- Maintain an immutable, transparent history of property transactions to ensure accountability and trust.
- Enforce compliance with real estate laws through automated regulatory checks embedded in transactions.
- Improve stakeholder access to verified property data for better decision-making and a more efficient market.
- **Compulsory Functionality: Integrate agentic AI to automate and validate transactions, ownership transfers, and fraud detection.**



BLOCKCHAIN

4. Transforming Cross Border Commerce

Problem Statement:

Indian businesses engaged in import-export activities face significant challenges in achieving fast, cost-effective, and compliant cross-border transactions that align with WTO regulations and Environmental, Social, and Governance (ESG) standards. Existing trade systems often lack the necessary transparency, traceability, and automation, leading to delays, increased operational costs, and compliance issues with international trade laws and sustainability requirements.

To overcome these inefficiencies, there is an urgent need for a Consortium Blockchain-based solution that can streamline global trade processes by enabling secure, transparent, and efficient cross-border transactions while ensuring compliance with global trade and ESG norms.

Key Functionalities:

- Automate and enforce trade agreements via smart contracts aligned with WTO rules to reduce disputes and ensure compliance.
- Secure transactions using a consortium blockchain escrow system with multi-signature approval for enhanced trust.
- Implement decentralized identity management to verify participants, prevent fraud, and meet global standards.
- Integrate ESG metric tracking to monitor and improve the sustainability of import-export operations.
- Enable transparent cross-border trade through real-time tracking, auditability, and blockchain consensus.
- **Compulsory Functionality: Deploy an AI agent to manage trade flows, enforce compliance, and monitor ESG metrics securely and transparently.**