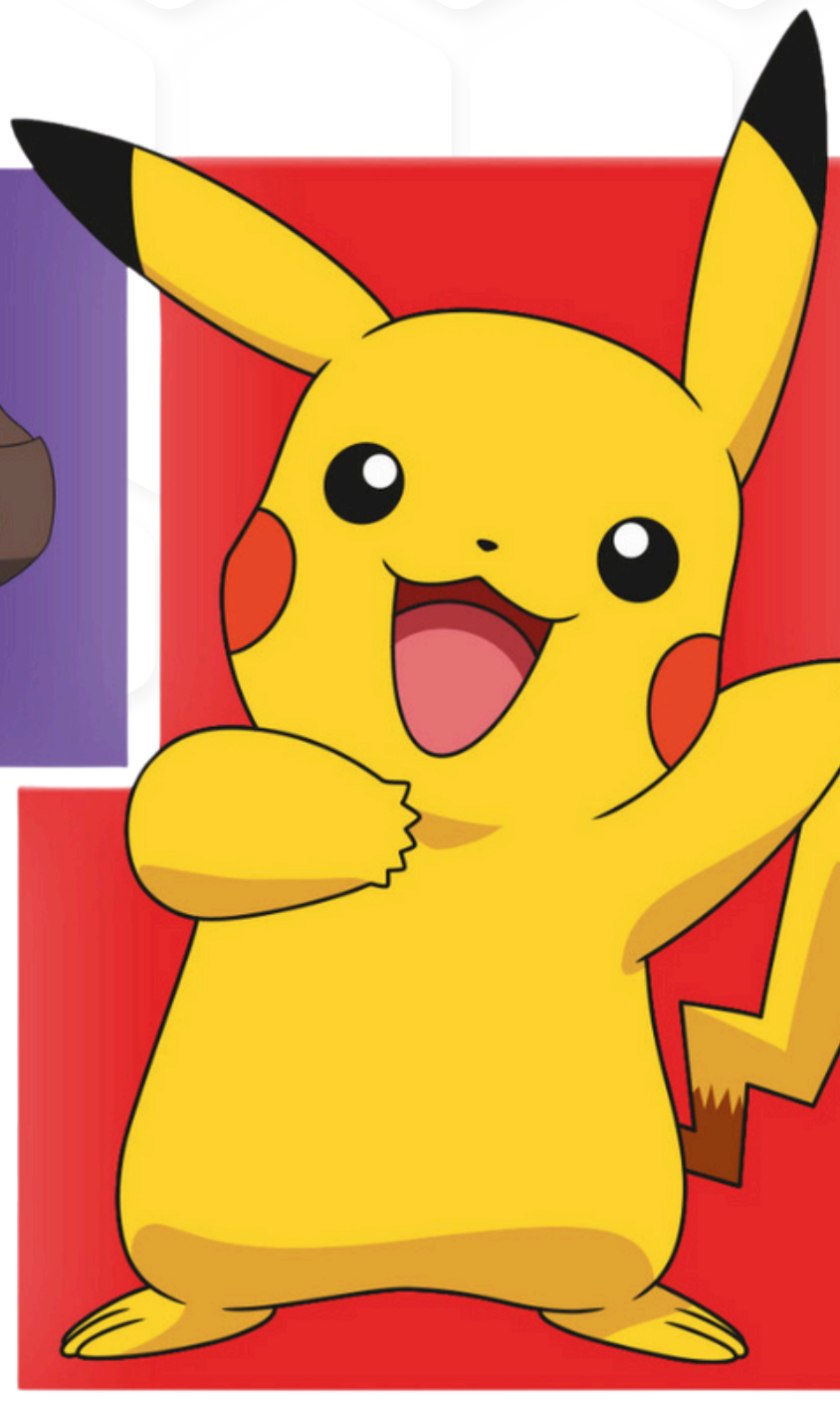
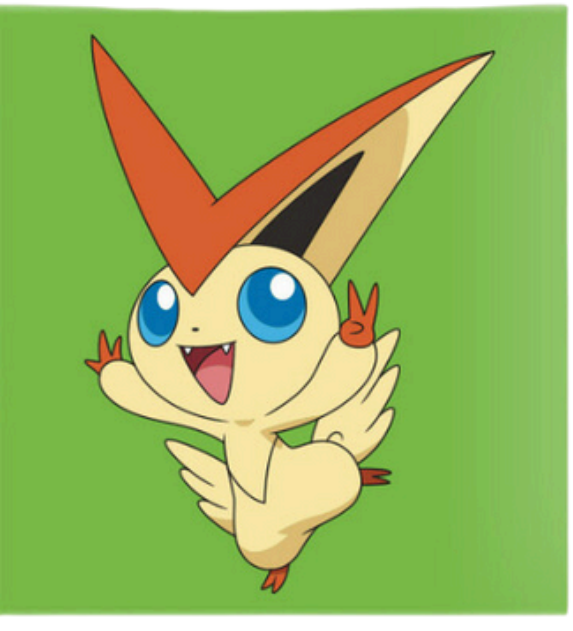
SPIT HACKATHON

PROBLEM STATEMENTS





WEB DEVELOPMENT

PROBLEM STATEMENT 1

Mind Link IDE

Background

Everyone who uses an online code editor knows that code editors struggle with real-time synchronization, collaboration, and debugging. Teams face challenges like conflicting edits, lack of built-in version control, and limited shared execution environments. These issues hinder remote development, making it inefficient and error-prone. A high-performance, real-time collaborative IDE is essential for modern development workflows.

Objective

This project aims to build Mind Link, a web-based IDE that ensures seamless real-time collaboration, intelligent conflict resolution, structured project management, and offline editing. It will use Operational Transformations (OT) or Conflict-Free Replicated Data Types (CRDTs) to merge edits efficiently, preventing data loss and improving teamwork. The system will also feature integrated version control, role-based collaboration, and auto-syncing capabilities.

Key Features

Real-Time Multi-User Editing

Developers should be able to work on the same file simultaneously, with live updates, synchronized cursors, and instant code changes. The system must ensure minimal latency, allowing smooth collaboration even under low-bandwidth conditions. Implementing WebSockets or WebRTC will enable real-time bidirectional communication. Additionally, the IDE should track active contributors, highlight recent changes, and prevent overwrites or desynchronization by intelligently handling concurrent edits. A clear change history and visual markers will enhance usability, ensuring developers can efficiently collaborate without disrupting each other's workflow.

Conflict-Free Synchronization

To handle concurrent edits, the editor should implement Operational Transformations (OT) or CRDTs, ensuring seamless merging of changes from multiple users. The system must maintain consistent document states, prevent race conditions, and provide a structured undo/redo mechanism across all users. A real-time conflict resolution panel should display merge conflicts, allowing developers to review and resolve discrepancies efficiently. Additionally, an AI-assisted suggestion engine could guide users in making optimal merge decisions. Ensuring that synchronization remains efficient under high user loads will be a key development challenge.

WEB DEVELOPMENT

Built-In Version Control & History

Mind Link will feature an integrated version control system, eliminating the need for external Git repositories. Every change will be logged as a structured commit, allowing users to track modifications, compare versions, and revert changes if needed. A visual commit history panel will provide an intuitive timeline of edits, helping teams understand code evolution. Users should be able to label commits, leave change notes, and restore previous versions easily. Additionally, automated checkpoints can save snapshots at key moments, ensuring critical work is never lost due to accidental modifications.

Project-Based Collaboration & Role Management

To facilitate structured teamwork, the IDE should allow users to create shared workspaces, manage roles (Owner, Editor, Viewer), and set specific permissions. The system will support task assignments, real-time commenting, and shared documentation for better organization. A team activity dashboard will track contributions, displaying who edited what and when, improving transparency. Users should be able to lock specific files for exclusive edits, create collaborative coding sessions, and integrate real-time chat or discussion threads. These features will ensure an efficient, well-managed, and secure collaborative development environment.

Offline Editing & Auto-Sync

Developers should be able to continue coding offline, with all changes stored locally and automatically synchronized when reconnected. The system must ensure efficient merging of offline edits without conflicts, using a structured sync mechanism. A background sync indicator should show pending updates and highlight discrepancies before merging. Developers will receive smart notifications for potential merge conflicts, ensuring they review critical changes before final synchronization. The IDE should cache frequently used files, enabling developers to work without interruptions, even in environments with unstable internet connectivity.

WEB DEVELOPMENT

PROBLEM STATEMENT 2

PokéFlow

Background

As things are these days, people juggle a lot of stuff at once. From managing emails to collaborating on tasks and files, the number of platforms can quickly overwhelm even the most organized individuals. While existing tools like Zapier, Make (Integromat), and Power Automate can help automate tasks, they often come with steep learning curves, complexity, and high costs, making them inaccessible for those without technical expertise. This creates a clear gap in the market for a no-code solution that allows anyone - from entrepreneurs to small business owners - to automate their workflows effortlessly, saving valuable time and resources.

Objective

The goal is to build a simple, intuitive no-code platform that enables users to automate their workflows between various apps with just a drag-and-drop interface. By removing the need for coding, users can streamline repetitive tasks, improve productivity, and integrate their favorite tools without needing deep technical knowledge. The platform should cater to both individuals and small businesses, making automation accessible to a wider audience.

Key Features

Drag & Drop Workflow Builder

The heart of the platform is its intuitive drag-and-drop interface, allowing users to easily create automated workflows. With a visual editor, users can drag pre-built action blocks (like sending emails, uploading files, or reading data from spreadsheets) and trigger blocks (such as receiving a new email or clicking a button) into place. This interface ensures that even users with no technical background can set up complex workflows. Additionally, the platform supports conditional logic, enabling the use of if-else conditions, loops, and branching paths to build more sophisticated automations

Multi-App Integrations

To cater to the diverse needs of users, the platform supports integrations with a wide range of popular apps, including Google Suite (Gmail, Google Drive, Calendar), communication tools like Slack and Microsoft Teams, project management platforms such as Trello and Notion, and databases like Airtable and Firebase. By connecting multiple apps, users can automate workflows between them. Furthermore, the platform allows custom API integrations, meaning users can extend its functionality by linking with additional services or internal tools.

WEB DEVELOPMENT

Multi-Step Triggers & Actions

Workflows aren't limited to a single action. The platform supports multi-step triggers and actions, enabling users to design intricate workflows that execute sequentially or in parallel. For instance, a user can set up a trigger like "When a new email arrives," followed by a sequence of actions like "Download attachment," "Upload to Google Drive," and "Notify via Slack." These workflows execute in real-time, ensuring immediate actions when conditions are met, increasing efficiency and responsiveness.

Offline Workflow Execution

An essential feature for users who need to work in areas with unstable or no internet connectivity, offline workflow execution ensures that some tasks - like note-taking, reminders, and basic file management - continue to function even when offline. Once the device reconnects to the internet, all actions are synced back to the cloud. This feature makes the platform reliable and accessible, even when users are on the go or in remote locations.

Pre-Made Templates & Marketplace

The platform offers ready-made templates that allow users to automate common tasks with a single click. Examples include automating the saving of Gmail attachments to Google Drive, syncing Notion pages with Google Calendar, or scheduling social media posts. Users can also explore the template marketplace, where they can share, buy, or sell custom workflows, fostering a community-driven ecosystem. This marketplace empowers users to create, share, and benefit from the work of others, ensuring that everyone can find workflows that suit their needs.

AI ML

SARDAR PATEL TECHNOLOGY BUSINESS INCUBATOR

PROBLEM STATEMENT 1

Organisation Agents

Background

The SP-TBI (Sardar Patel Technology Business Incubator) plays a crucial role in fostering innovation and entrepreneurship. To support its mission of nurturing startups and innovative projects, the organization needs to optimize its internal operations and resource management. As operations grow in complexity, maintaining efficiency and accountability becomes increasingly challenging. In this context, an AI-powered organizational agent system offers an advanced solution to augment SP-TBI's workforce by introducing virtual employees capable of handling a variety of tasks across departments such as finance, operations, marketing, and community engagement.

Objective

The primary objective of this AI-powered organizational agent system is to seamlessly integrate AI agents into SP-TBI's daily operations, enabling enhanced collaboration between human employees and AI counterparts. The system aims to improve operational efficiency, streamline task management, and maintain high standards of accountability. By leveraging AI capabilities, SP-TBI can automate repetitive tasks, facilitate data-driven decision-making, and foster a more productive work environment.

Key Features

This multi-agent system focuses on enhancing organizational operations through intelligent and coordinated agent activities. It features the following agents and workflows:

Executive Assistant Agent

This primary agent demonstrates multi-agent coordination by managing communication and administrative tasks. It creates tasks based on email content, schedules meetings, sends calendar invites, generates meeting summaries, and sets reminders for follow-ups.

Task Management Agent

Responsible for task creation, assignment, and tracking, this agent integrates with Notion to manage tasks effectively. It creates and assigns tasks, tracks their status and deadlines, sends reminder notifications, and generates daily progress reports.

AI ML

SARDAR PATEL TECHNOLOGY BUSINESS INCUBATOR

Calendar Agent

This agent optimizes scheduling by managing calendar events. It finds optimal meeting times, schedules and updates events, handles meeting conflicts, and sends meeting confirmations.

Brownie points for below features

Advanced Natural Language Processing

The system can leverage NLP for sentiment analysis to prioritize emails and messages, generate context-aware responses, and support multiple languages.

Automation Enhancements

Automated document generation, smart meeting transcription, and summary generation, along with an automated follow-up system, can further streamline operations.

AI Learning and Adaptation

The agents can adapt to user preferences through personalized behavior, recognize task patterns for optimization, and continuously learn from user feedback.

AI ML

DIMENSION SIX TECHNOLOGIES

PROBLEM STATEMENT 2

Cyclist Safety & Road Hazard Detection

Background

Cyclists often navigate through unpredictable traffic, unsafe road conditions, and lack of safety technology, making them vulnerable to accidents. Traditional safety measures rely on manual alerts and physical road signs, which are insufficient in real-time hazardous situations. With advancements in AI and Computer Vision,an ML-based system can provide automated safety alerts, obstacle detection, and ride analytics to improve cycling safety and decision-making.

Objective

Develop an AI-powered system that enhances cyclist safety by utilizing computer vision and machine learning to detect potholes, obstacles, speed variations, proximity of vehicles, and road conditions. The model should process real-world cycling scenarios and provide real-time insights, risk assessment, and adaptive recommendations to ensure a safer riding experience.

Key Features

AI-Powered Road Hazard Detection

Train a computer vision model to detect and classify:

- Nearby vehicles, type of vehicle (eg car, auto, bus etc.) & their speed to assess risk level fluctuations
- Risk and overtake behavior based on infrastructure
- Potholes, rough terrain, sudden elevation changes
- Obstacles like fallen objects, construction barriers, or road closures

Proximity-Based Collision Prediction

- Use object detection models to recognize nearby vehicles, number plate and their approach speed
- Predict potential collisions based on distance, cyclist speed, and external factors
- Provide risk scores for different ride scenarios

AI-Driven Ride Insights & Risk Scoring

- Analyze past rides and generate personalized risk scores based on terrain, cyclist/2 wheeler behavior, and environmental conditions
- Suggest AI-optimized safe routes by analyzing historical accident-prone areas
- Provide adaptive ride strategies to enhance cyclist/ 2 wheeler safety

AI ML

DIMENSION SIX TECHNOLOGIES

Emergency Event Prediction & Classification

- Train an AI model to classify emergency situations like:
- Abrupt stops due to obstacles
- Loss of control due to uneven roads
- High-risk areas with frequent hazardous events
- SOS calls in case of emergencies

Impact & Benefits

- Autonomous safety assessment with AI-powered hazard detection
- Proactive collision prevention through real-time proximity analysis
- Adaptive safety recommendations based on past ride data
- Smart route optimization for safer cycling experiences

Brownie points for below features

Voice-Assisted Safety Alerts

To keep cyclists focused on the road, real-time voice alerts will notify them about nearby hazards, proximity risks, and emergency situations. These alerts will come in customizable tones based on the type of warning, such as distinct sounds for potholes, vehicles, or obstacles, enabling a hands-free safety experience.

Rider Fatigue Detection

By analyzing facial expressions through a camera, this feature will detect signs of fatigue or distraction in cyclists. Upon detection, the system will recommend taking breaks or suggest safe stopping points along the route to reduce accident risks caused by rider fatigue.

Predictive Maintenance Alerts

By monitoring ride patterns, the system will provide predictive maintenance alerts. It can predict brake issues or tire degradation, and notify cyclists to service their bicycles before potential failures occur, ensuring smoother and safer rides.

APP DEVELOPMENT

PROBLEM STATEMENT 1

ARceus Plan

Background

Interior design and architectural planning often involve complex processes requiring accurate measurements, multiple iterations, and physical remodelling. To simplify this, teams are challenged to create an innovative mobile application that transforms any room into an interactive digital workspace. The app should enable users to quickly scan spaces, generate accurate floor plans, experiment with furniture arrangements, simulate wall finishes under realistic lighting, and receive actionable insights on spatial efficiency. This tool will serve architects, interior designers, and homeowners, fostering creative freedom, collaborative design, and data-driven decision-making to elevate the atmosphere and functionality of any room.

Key Features

Room Scanning & Auto Floorplan Generation

Utilize advanced scanning technologies and computer vision algorithms to convert a physical room into a detailed digital floor plan. Capture accurate dimensions, wall placements, and structural elements that form the basis for design modifications. Allow users to edit and refine the layout, ensuring that the digital model faithfully represents the actual space for precise planning and execution.

AR-Based Furniture Placement

Integrate augmented reality to let users interactively place and rearrange furniture within their digital floorplan. Offer a dynamic catalog of items that can be resized, rotated, and repositioned using AR overlays. This immersive experience enables users to experiment with various layouts, visualizing potential arrangements in real time and making informed design decisions.

Real-Time Wall Color & Lighting Simulation

Implement a module that simulates how different wall colors, finishes, and textures interact with both natural and artificial lighting. Provide real-time visual feedback so users can experiment with diverse palettes and observe ambience changes. This simulation helps in selecting optimal color schemes and materials, ensuring the final design enhances the room’s mood and aesthetic appeal.

APP DEVELOPMENT

Space Optimization Insights

Offer data-driven insights by analyzing room dimensions, furniture configurations, and user edits. Calculate metrics such as legroom, circulation space, and ergonomic balance. Present actionable recommendations to maximize functionality and comfort, enabling users to refine their layouts for practical, efficient, and aesthetically pleasing spaces that meet everyday needs.

Collaboration & Export Options

Facilitate seamless collaboration by allowing users to save, share, and export their floor plans and design iterations. Support real-time co-editing and feedback among architects, designers, and clients, with integration options for popular design tools and cloud storage. This ensures that all stakeholders can review, modify, and approve design choices effortlessly throughout the project lifecycle.

APP DEVELOPMENT

PROBLEM STATEMENT 2

PokemonGo

Background

In a world where collective action drives real change, PokemonGo harnesses the power of crowdsourcing to identify and resolve everyday community issues. From potholes to power outages, lost items to transit delays, this platform transforms problem-solving into a collaborative effort. By allowing users to report, verify, and discuss issues in real-time, PokemonGo creates an engaged network of individuals, businesses, and local authorities working towards a more responsive and connected society. With smart notifications, gamified contributions, and API integrations, this app ensures that urban challenges are tackled efficiently - because together, we can “catch ’em all” and solve them too!

Key Features

Live Issue Reporting & Verification

Users can report real-world issues like damaged roads, water leaks, or public transport delays. Each report includes location data, timestamps, and optional images. To prevent false alarms, PokemonGo cross-verifies multiple reports before marking them as “verified.” Users earn contribution points for accurate submissions, creating a system of accountability and engagement. The more reports a user makes that get verified, the higher their credibility rank, encouraging meaningful participation.

Community Discussion & Solutions Hub

A problem doesn’t always need to wait for authorities - sometimes, the community can solve it themselves. PokemonGo includes discussion threads where users can brainstorm solutions, organize community cleanups, or request help from local businesses. Users vote on the best course of action, and verified experts (engineers, city planners, volunteers) can weigh in. This feature fosters grassroots-level problem-solving while also notifying authorities when larger interventions are needed.

Smart Alerts & Proximity-Based Notifications

When users report an issue, others in the area receive a notification - whether it’s a blocked road, a power cut, or a safety concern. Smart filters ensure only relevant alerts reach users based on their preferences. Critical alerts like emergencies are prioritized, while minor issues can be viewed in a community feed. Once an issue is resolved, the app sends an automatic closure update, ensuring users don’t receive redundant reports.

APP DEVELOPMENT

Collaborative Lost & Found Network

Lost something valuable? PokemonGo makes it easier to reunite people with their missing belongings. Users can report lost or found items with location details and photos. Others in the community can mark items as “spotted,” increasing the chances of recovery. Public places like cafes, train stations, and malls can register lost-and-found logs directly, creating a reliable network that minimizes losses and helps items find their way back to their owners.

Collaborative Adventure Planning

Pokémon Go isn’t just about catching Pokémon - it’s about exploring the world with friends. With the Collaborative Adventure Planning feature, players can create, share, and customize travel routes within the app. Whether planning a city-wide PokéStop tour or a scenic countryside expedition, friends can collaborate in real-time, suggest detours, and track each other’s progress. Interactive waypoints can highlight Gyms, rare spawn locations, and local attractions, making every trip more engaging. By turning exploration into a shared experience, Pokémon Go encourages group adventures, strategic route planning, and unforgettable journeys, ensuring that every trainer’s expedition is both fun and rewarding.

BLOCKCHAIN

PROBLEM STATEMENT 1

EspeonX

Background

The current esports ecosystem limits player ownership of digital assets, with centralized entities controlling in-game economies. Players contribute time and skill but rarely receive fair rewards or long-term security for their assets. EspeonX introduces a decentralized approach, giving players true ownership, economic participation, and the ability to shape the future of esports. By integrating innovative technology, EspeonX fosters a transparent, player-driven ecosystem where in-game achievements hold real-world value and digital assets remain unrestricted across platforms.

Key Features

Empowered Digital Assets

Players have complete ownership of their in-game assets, allowing them to freely trade, transfer, or retain value beyond a single game. This removes the limitations of traditional game ecosystems, ensuring that digital items hold real significance. By enabling secure transactions and true asset portability, players gain financial and strategic freedom over their gaming inventory. This open and sustainable economy fosters deeper engagement, as assets maintain long-term worth, even as gaming trends and platforms evolve.

Fair & Transparent Player Rewards

A performance-driven reward system ensures that gamers earn based on skill, engagement, and achievements, rather than random or pay-to-win mechanics. This fair model benefits both casual and competitive players, offering lasting value for their time and effort. By maintaining transparency in reward distribution, players can trust the system while enjoying an incentive-driven gaming experience. This structure promotes sustained participation, ensuring that progression and dedication lead to tangible, meaningful in-game and real-world benefits.

Seamless Asset Interactions

A unified marketplace allows for digital assets to be exchanged across multiple gaming environments, enhancing flexibility and usability. Secure transactions ensure fairness, while dynamic valuation systems reflect real-time market trends. Players can buy, sell, or trade assets with confidence, knowing that their items hold consistent worth. This cross-platform integration creates a more interconnected gaming ecosystem, where assets are not confined to a single title but can be utilized across different games, fostering a richer, more dynamic experience.

BLOCKCHAIN

Integrity-Driven Esports Competitions

Competitive gaming is strengthened through a structured, verifiable tournament ecosystem where fairness is prioritized. Secure anti-cheat mechanisms and transparent reward distribution ensure that only legitimate players benefit from competitive events. Players can trust that their skills, rather than external manipulations, determine outcomes. This approach promotes inclusivity, making esports accessible to a wider audience while maintaining a professional standard. By fostering integrity, the system enhances credibility, ensuring that tournaments remain fair, rewarding, and respected in the gaming community.

Decentralized Esports Economy

A decentralized governance model empowers players, teams, and developers to participate in decision-making, shaping the esports landscape collectively. This inclusivity fosters fairness, ensuring that competitive gaming remains player-centric rather than dictated by centralized entities. Revenue sharing, voting mechanisms, and transparent policies contribute to long-term sustainability. By aligning incentives across all stakeholders, esports evolves in a way that supports both professional players and grassroots communities, creating an ecosystem where growth, fairness, and long-term engagement are the top priorities.

BLOCKCHAIN

PROBLEM STATEMENT 2

Tor-Rent

Background

Rental fraud, delayed payments, and disputes between tenants and landlords are frequent issues that lead to financial losses and legal conflicts. Traditional rental agreements are often prone to forgery, difficult to enforce, and lack transparency, making the process inefficient. Tor-Rent is a blockchain-based rental agreement system designed to ensure secure, tamper-proof, and automated contracts. By leveraging smart contracts, this system enables transparent agreements, automated payments, built-in dispute resolution, identity verification, and self-executing enforcement, reducing conflicts and improving trust in rental transactions. Tor-Rent provides a decentralized, efficient, and fraud-resistant ecosystem for both landlords and tenants.

Key Features

Transparent and Immutable Agreements

Rental agreements should be stored securely on blockchain ledgers, preventing any unauthorized modifications or tampering. Once recorded, the contract remains permanent, verifiable, and legally binding, ensuring clarity and trust between tenants and landlords. This eliminates forged agreements and false claims, as both parties can access a transparent, unalterable contract at any time. By utilizing decentralized storage, rental terms remain accessible and immutable, enhancing credibility and security within the rental ecosystem.

Automated Payments and Deposits

Rent payments and security deposits should be automated through smart contracts, executing transactions based on predefined conditions. Payments are processed instantly and securely, eliminating delays, missed payments, and disputes over deposit refunds. This system removes third-party intermediaries, ensuring a trustless financial interaction where tenants and landlords can rely on blockchain automation. Additionally, scheduled and recurring payments can be enabled, reducing the burden of manual transactions and ensuring financial security for both parties.

Dispute Resolution Mechanism

A decentralized dispute resolution system should be integrated to handle rental conflicts efficiently. Whether dealing with payment delays, contract violations, or maintenance issues, an on-chain arbitration mechanism allows disputes to be resolved transparently and fairly. The system may utilize community-driven governance or pre-assigned mediators to review cases and enforce rental agreements. This reduces the need for expensive legal proceedings while ensuring quick, unbiased conflict resolution, fostering a more reliable rental framework.

BLOCKCHAIN

Identity Verification and Trust

To prevent fraud, the system should implement decentralized identity verification for both landlords and tenants. Verified user profiles ensure that only legitimate individuals engage in rental transactions, reducing the risk of fake listings and identity fraud. The verification process can integrate government-issued IDs, blockchain-based identity credentials, and rental history tracking, providing a secure and trustworthy rental ecosystem where both parties can engage with confidence.

Smart Contract Enforcement

Rental agreements should be self-enforcing, ensuring compliance with contract terms. If a tenant fails to pay rent, damages the property, or breaches the lease, smart contracts can automatically trigger predefined actions such as deducting deposits, issuing penalty fees, or terminating the lease. This eliminates manual enforcement delays, ensuring both parties adhere to the agreement. By leveraging programmable contract logic, Tor-Rent ensures accountability, security, and efficiency in rental management without requiring constant supervision.