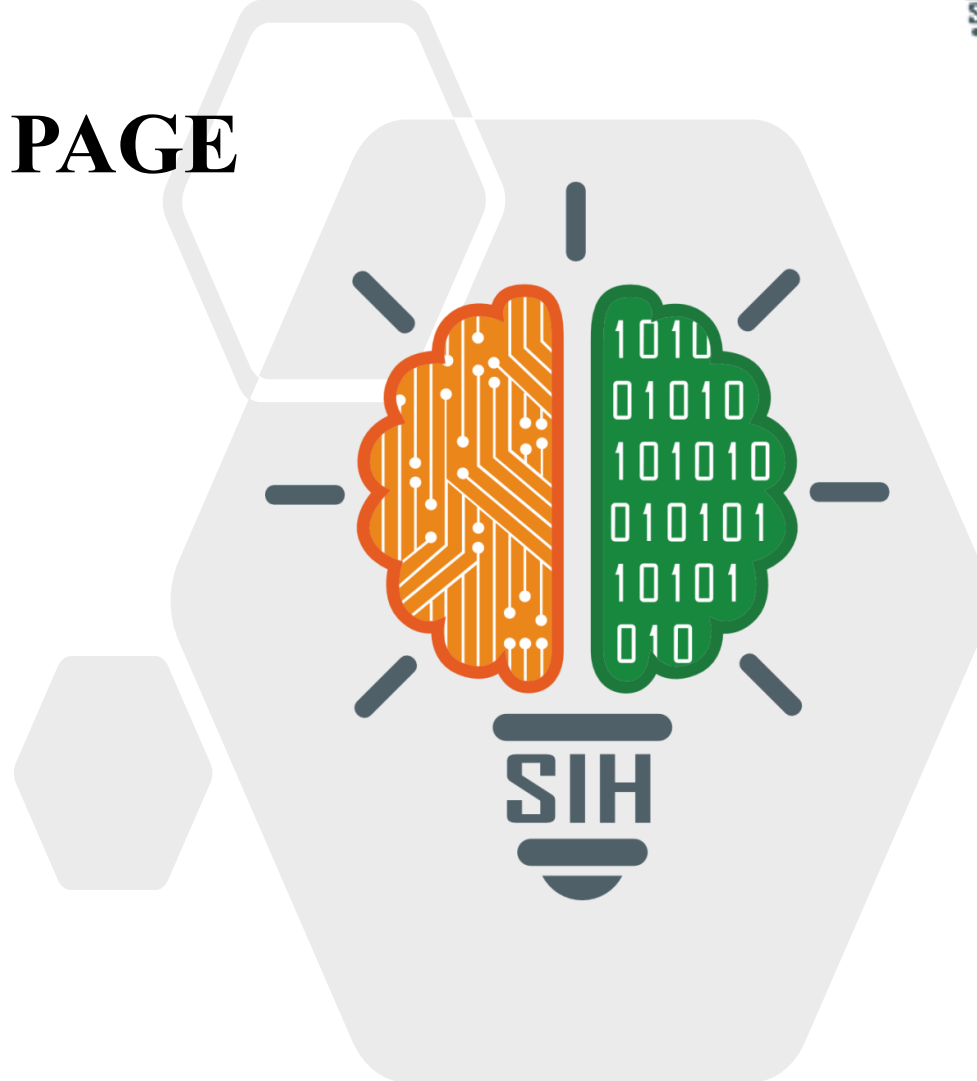


SMART INDIA HACKATHON 2025




TITLE PAGE

- Problem Statement ID – SIH25128
- Problem Statement Title- Student Innovation
- Theme- Clean and Green Technology
- PS Category- Software
- Team ID-
- Team Name – The CodeFather




Clean and Green Technology – Smart Waste Management System

Proposed Solution:

-  Smart Waste Reporting & Segregation System
- Photo-Based Verification & Accountability
- Geotagged Waste Reporting System
- Reports sent to authorities (MCD)
- Awareness & Educational Content
- Gamified rewards for participation

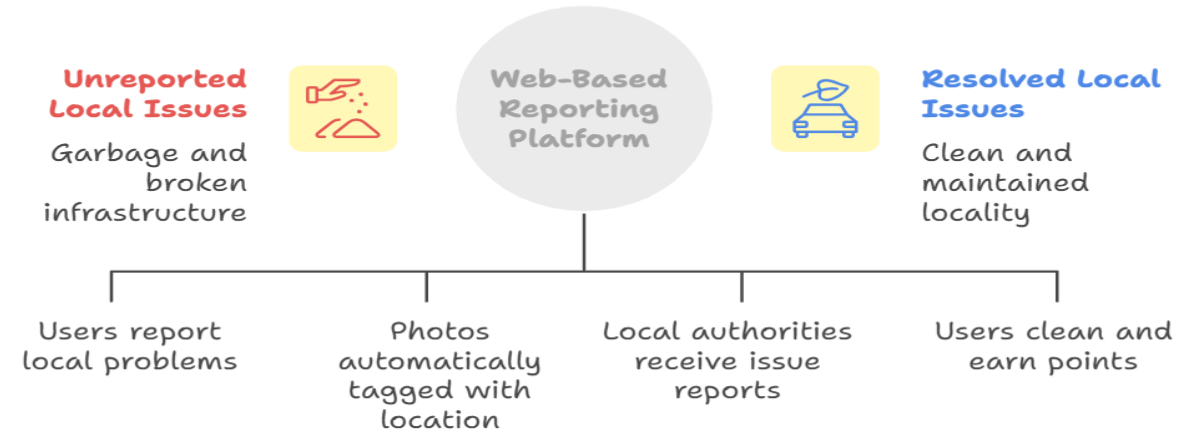
How It Addresses the Problem:

-  Ensures Faster Waste Resolution
- Promotes Waste Segregation & Awareness
- Direct data pipeline to authorities and other users
- Gamified rewards system to boost engagement and transparency

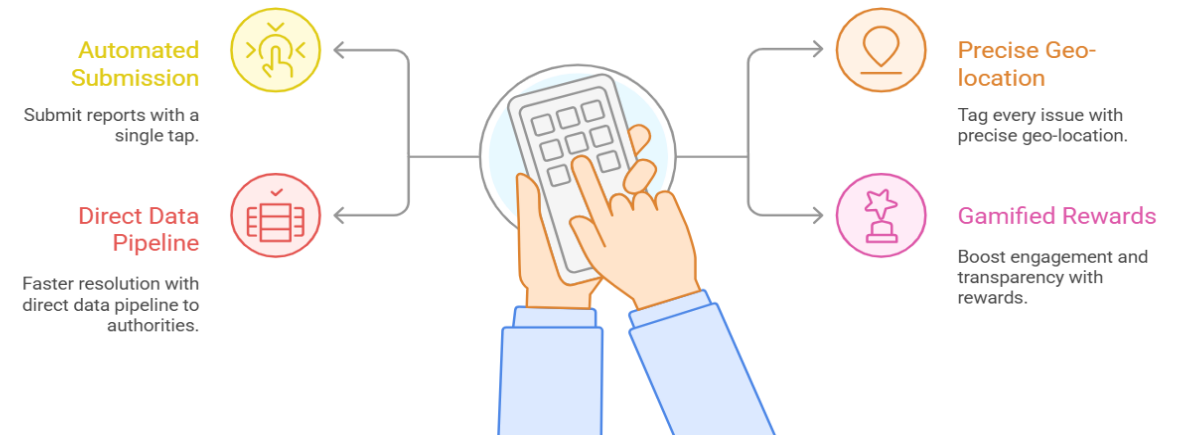
Innovation and Uniqueness of the Solution:

- Instant geotagged, timestamped issue reporting
- Before-and-after photo verification
- Points-based gamification for cleanup
- NGO-driven volunteer event postings

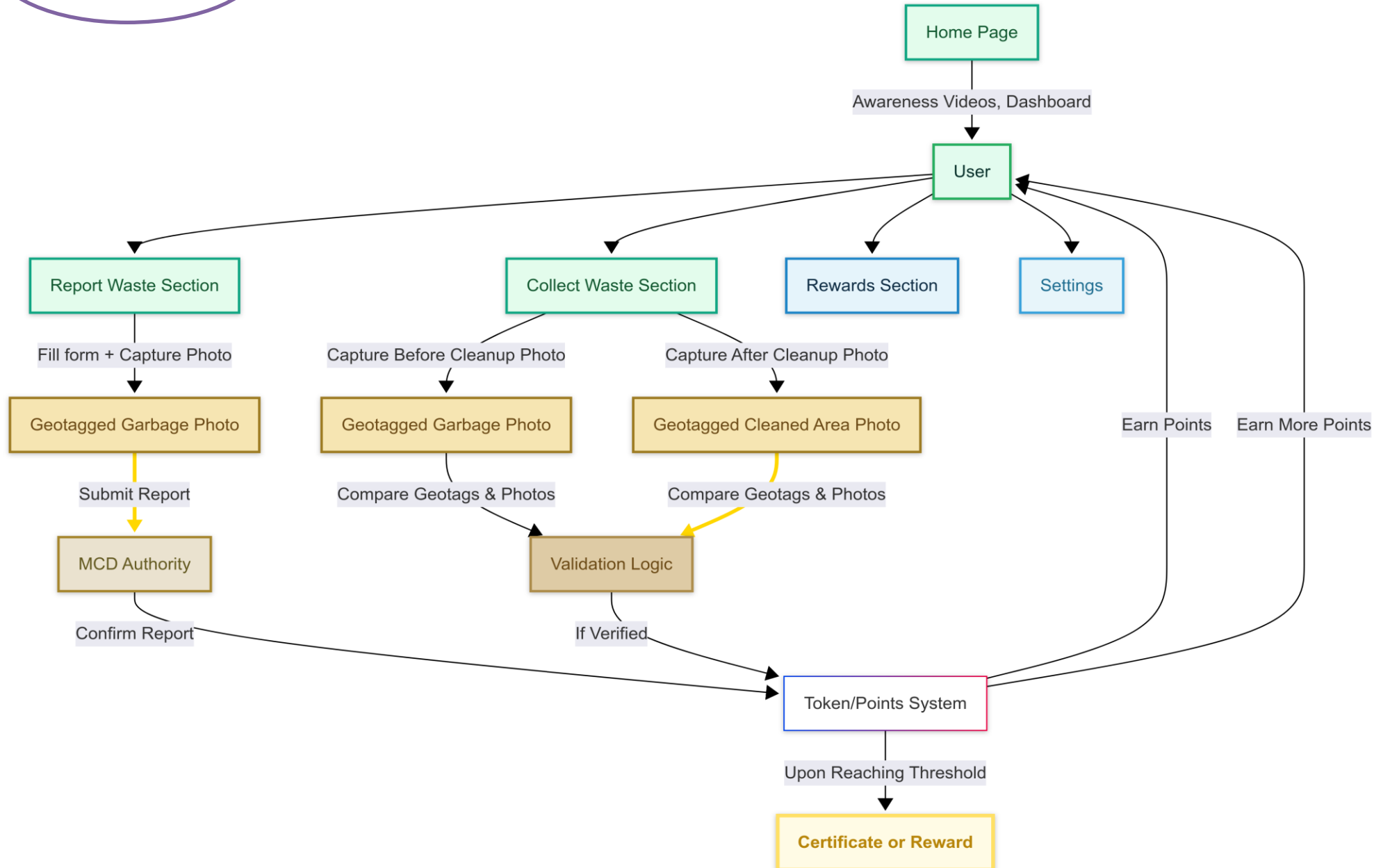
Community-Driven Local Issue Resolution



Solution Features



TECH STACK





Feasibility:

- **Widely available tech** → Web frameworks, **cloud** services, **geo** APIs.
- **Simple architecture** → Frontend + backend + DB + API integration.
- **No extra hardware** → Citizens use personal devices for reporting.
- **Scalable & deployable** → Cloud-native (AWS, Firebase, etc.).
- **Govt. integration ready** → Existing **MCD** infra supports reporting.
- **AI based image validation** → Uses **AI-ML** to validate before and after photos.



Risk vs Solution:

- **Low Adoption** → Gamified rewards + minimal UI to drive participation.
- **Govt. Coordination** → Partnerships with civic bodies for direct integration.
- **Infra/Storage Bottlenecks** → Cloud storage + CDN for fast image access.
- **Data Security Concerns** → HTTPS + secure transmission + JWT auth.
- **Fake/Spam Reports** → ML-powered **image validation** + strong user authentication

Govt. Integration

Existing infrastructure supports citizen reporting.

Available Tech

Common web frameworks, cloud, and geo APIs.

Scalable and Deployable

Cloud-native, for example AWS or Firebase.

Simple Architecture

Frontend, backend, database, and API integration.



No Hardware

Citizens use personal devices for reporting issues.

Risk Mitigation Strategies

ML validation + strong authentication

Filters spam reports and ensures genuine users



Cloud infra + scalable DB

Addresses high risk with complex cloud infrastructure solutions.



Gamified rewards + simple UI

Boosts user engagement and participation.



Govt. partnerships + APIs

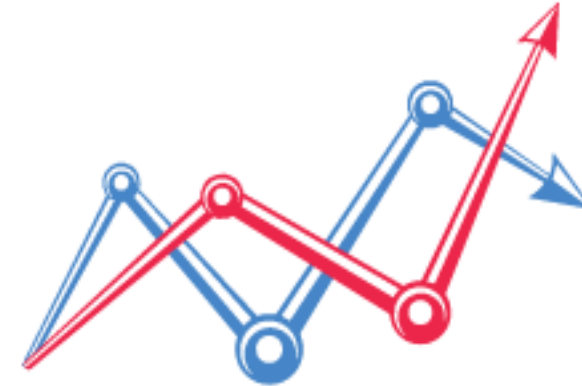
Enables smooth integration with municipal systems





Impact on users :

- **Empowers Citizens** : Provides an easy platform for people to report and act on waste problems, giving them a sense of responsibility.
- **Raises Awareness** : Spreads knowledge about proper waste segregation and disposal methods, encouraging eco-friendly habits.
- **Encourages Active Participation** : Rewards and recognition motivate individuals to contribute regularly to cleanliness efforts.
- **Strengthens Community Collaboration** : Connects citizens, NGOs, and volunteers, creating a united community movement for a cleaner environment.
- **Builds Trust & Accountability** : Transparent reporting and proof-based cleaning builds trust between citizens and authorities.



Benefits:

- **Social Benefit:** Empowers citizens and communities to take active responsibility for cleanliness.
- **Environmental Benefit:** Promotes sustainable waste management for a cleaner and greener ecosystem.
- **Educational Benefit:** Spreads awareness and knowledge about sanitation, recycling, and eco-friendly practices.

- **The New Indian Express report** : The Dark side of city: Chronic neglect fuels garbage woes in India's capital. ([link](#))
- **Article by Down to Earth** : Why it matters: Rethinking litter & responsibility in Indian cities. ([link](#))
- **Existing platforms studied** : Swachhata App (Govt. of India), Clean India App (NGO-based), MCD-311 (Delhi Government) , Litterrati.
- **Research Papers** :
 - Digitalization and Digital Applications in Waste Recycling: An Integrative Review. <https://doi.org/10.3390/su16177379>
 - Digital Transformation in Waste Management: Disruptive Innovation and Digital Governance for Zero-Waste Cities in the Global South as Keys to Future Sustainable Development. <https://doi.org/10.3390/su17041608>

