SMART INDIA HACKATHON 2025

TITLE PAGE

- **Problem Statement ID – SIH25060**
- **Problem Statement Title- Real life solutions for Waste Management.**
- **Theme- Clean & Green Technology**
- **PS Category- Software**
- **Team ID-**
- **Team Name : Turing.Tosh**

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EcoSankalan

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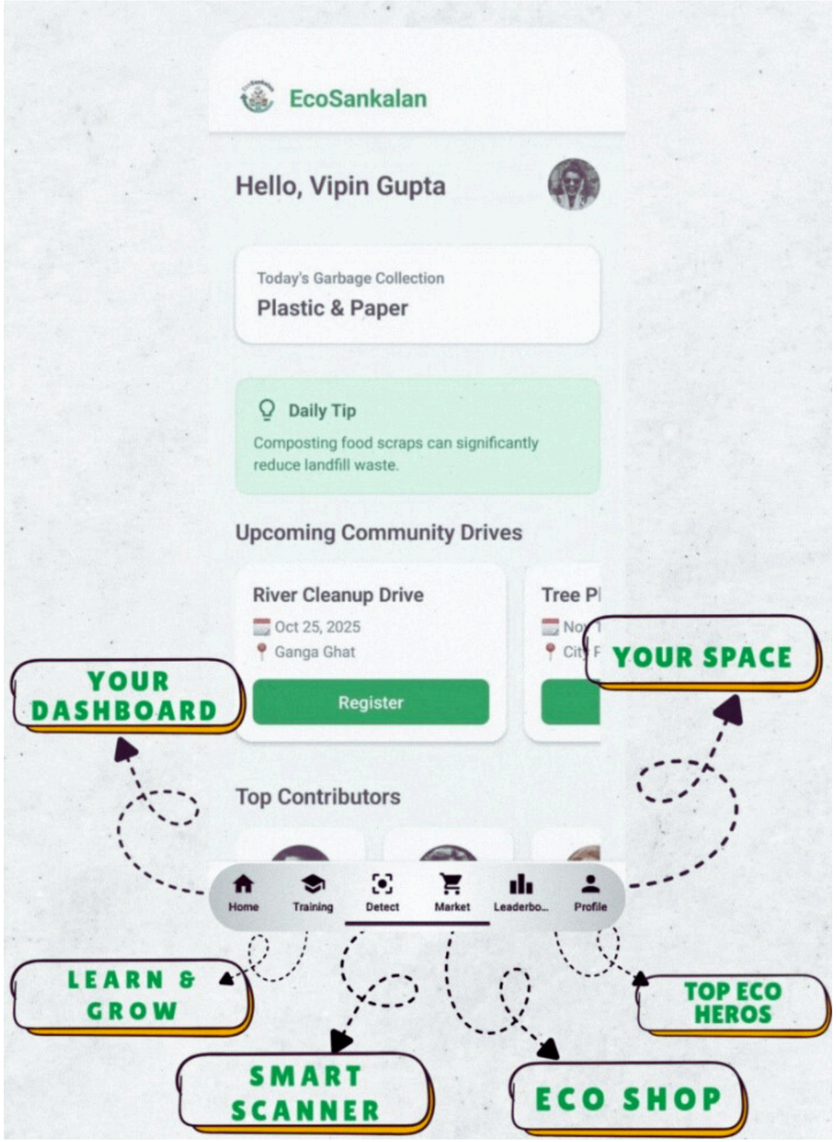
Proposed Solution

- **Training**: In-app micro-learning + quizzes for awareness → earn points.
- **Incentives**: Points, leaderboards, redeemable rewards to drive participation.
- **Citizen App**: Snap & report waste → AI auto-classifies → escalates if unresolved.
- **Marketplace**: Citizens sell recyclable waste → recyclers/workers buy directly.
- **Smart Scheduling**: Citizens & workers notified of today's waste type collection.

Innovation & Uniqueness:

- Combines **reporting + incentives + education + marketplace** in one ecosystem.
- Ensures **accountability** (before/after proof + auto-escalation).
- **Gamification + Transparency** = sustained citizen participation.



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TECHNICAL APPROACH

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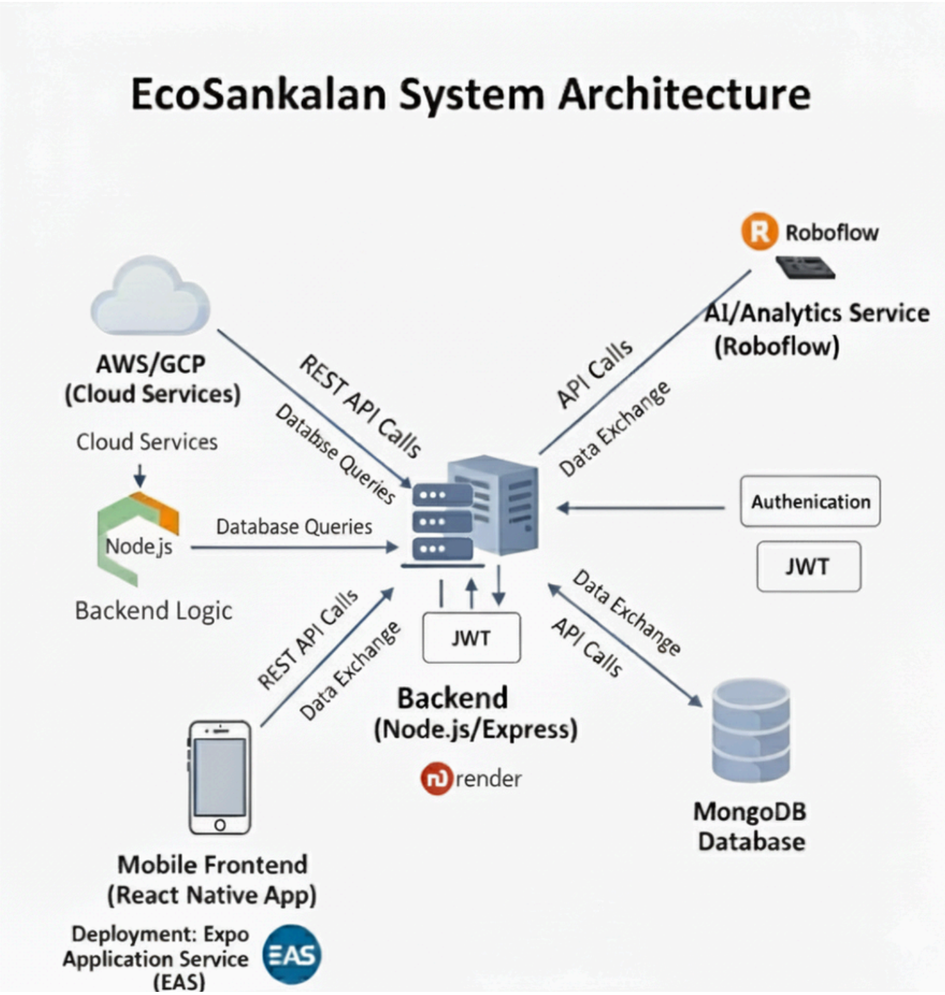
- Technology Stack

- **Frontend :** React Native , JavaScript , TypeScript , Tailwind CSS
- **Backend :** NodeJS , ExpressJS , MongoDB
- **AI and ML :** Roboflow
- **API Services :** Roboflow API
- **Cloud and Deployment :** EAS , Render , GitHub
- **Add-Ons :** JWT



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FEASIBILITY AND VIABILITY

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Feasibility

1. Mobile-first → lightweight React Native app (cross-platform) works on low-cost Android phones.
2. Cloud-based Node.js + MongoDB → low infra, quick scale to multiple ULBs.
3. Easy training → in-app micro-learning content.

Challenges

4. **Citizen-side**: Low awareness, digital illiteracy, app fatigue.
5. **Technology-side**: Spam reports, server downtime, photo misclassification.
6. **Operational-side**: Marketplace trust issues, logistic gaps, unverified buyers/sellers.

Use Cases

7. **Citizen Participation** – Snap waste → AI verifies → task auto-assigned to worker.
8. **Training Adoption** – Students, SHGs & citizens earn points after completing training.
9. **Marketplace** – Households sell recyclables, recyclers/NGOs buy → direct income.

Solutions

1. Awareness campaigns, gamification & rewards → drive citizen adoption.
2. AI-based spam filtering + citizen reputation scores → improve trust.
3. Verified recycler/worker onboarding + escrow system for marketplace.
4. Cloud backup & monitoring → minimize downtime, ensure reliability.

Supporting Facts

- Yadgir “See Waste, Send Photo” success shows citizens *will* participate if easy & accountable.
- Smart city pilots with AI/RFID showed 20–30% reduction in missed pickups.
- Recycling market projected to cross ₹6,000 crore by 2030 → marketplace viability.

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IMPACT AND BENEFITS

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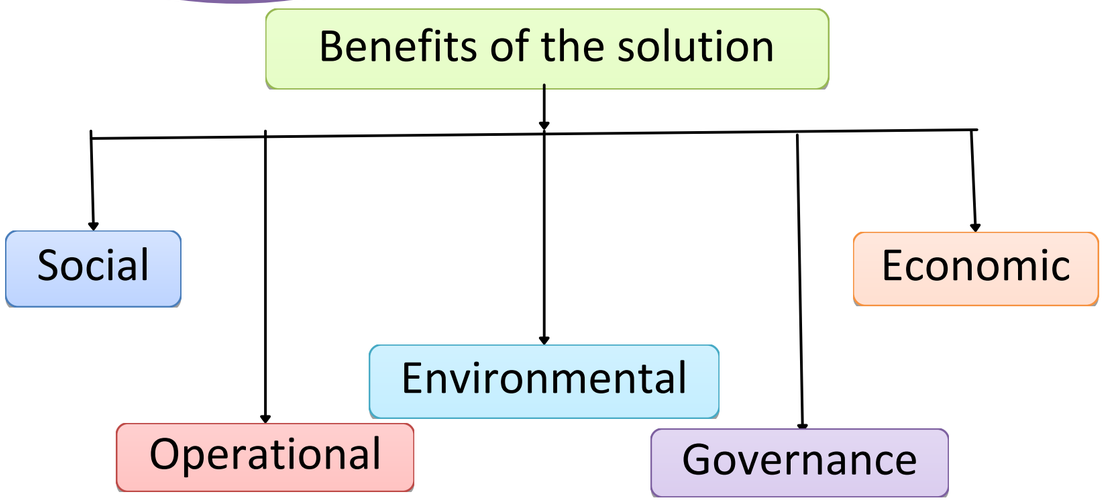

- Potential impact on target audience:

- **Citizens :** Easy reporting, rewards (points, leaderboards), awareness training in local language.
- **Workers & Staff :** Daily waste-type instructions, optimized routes, reduced confusion.
- **Recyclers/NGOs :** Direct access to sell/buy waste items, better material sourcing.
- **Youth/Students :** Incentivized participation through gamified learning modules.

- Benefits of the solution

Social :

- Community-driven participation through incentives & gamification.
- Awareness campaigns & in-app training → long-term change in waste habits.
- Builds trust between citizens & municipal authorities via public dashboards.

Environmental:

- Increase in waste segregation → more recycling, less landfill.
- Reduced open dumping → improved sanitation & air quality.
- Marketplace ensures recyclables are reused efficiently.

Economic :

- Fuel & operational cost savings for ULBs (15–20%).
- New business opportunities for recyclers/startups in circular economy.

Operational :

- Complaint resolution time reduced ~40%.
- Real-time dashboards improve accountability & performance tracking.

Policy & Governance :

- Strengthens Swachh Bharat Mission & Smart City programs.
- Improves Swachh Survekshan rankings with measurable results.

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RESEARCH AND REFERENCES

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Problem Validation

- The Problem: The core issue of waste management in India is a behavioral one: a lack of consistent segregation at the household level.
- Reference: Official reports from the Government of India's Swachh Bharat Mission and the CPCB.(Link:*https://sbmurban.org/swachh-survekshan*)

Strategic Learnings

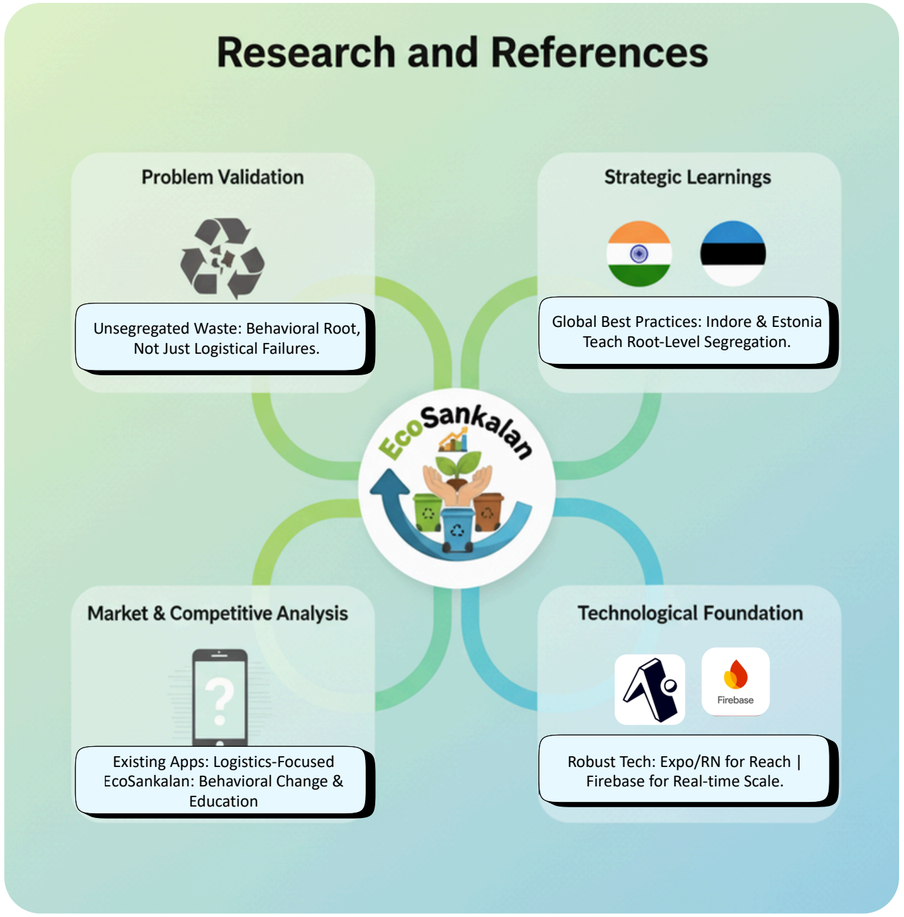
- The Indore Model: Learned that scheduled, segregated collection and continuous citizen education are critical for urban waste management success.
- Reference: Data and reports from the Indore Municipal Corporation's solid waste management program.(Link:https://sbmurban.org/indore-clean-green) (Link:*https://documents.worldbank.org/en/publication/documents-reports/documentdetail/145111637051108755/waste-management-in-estonia-survey-on-behaviors-perceptions-and-motivations*)

Market & Competitive Analysis

- The Gap: Existing apps focus on logistics and collection. We identified the need for a solution that addresses the fundamental issue of behavior change and education at the source.
- Reference: Analysis of top waste management apps and market research reports.

Technological Foundation

- Our Stack: We chose Expo/React Native for rapid, cross-platform development and Firebase for a scalable, real-time backend.
- Reference: Expo and Firebase official documentation, highlighting the benefits of their ecosystems.
(Link:*https://docs.expo.dev/workflow/overview/*)
(Link:*https://firebase.google.com/docs*)



Deployment Link :*https://expo.dev/accounts/krjha/projects/ecosankalan/builds/3926cf10-29f9-412c-b183-6ea67af0a313*