

“ShoreWatch: AI-Integrated Waste Management & Citizen Response System”

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Introduction

- **Brief Overview:** Coastal ecosystems are facing an unprecedented crisis due to plastic pollution. While beach tourism is a vital economic driver, the "trash footprint" left behind is currently outpacing manual cleanup efforts.
- **Relevance:** With over 8 million tons of plastic entering the ocean annually, the shoreline is the final frontier for intervention. If waste is not intercepted here, it breaks down into microplastics, making recovery impossible and damaging the blue economy.
- **Affected Stakeholders:**
 - * **Marine Life:** Sea turtles, shorebirds, and coral reefs.
 - **Local Communities:** Residents relying on clean water for health and fishing.
 - **Tourism Industry:** Businesses that suffer when beaches become unattractive.

Problem Description

- **Detailed Explanation:** The core issue is "Reactionary Maintenance." Currently, beach cleaning is scheduled (weekly/monthly) rather than demand-based. Large stretches of coastline remain unmonitored, allowing waste to accumulate in "hotspots" missed by traditional crews.
- **Observations & Data:**
 - * **Longevity:** A standard PET bottle can persist on a shoreline for up to 450 years.
 - **Ingestion:** Studies indicate 90% of marine birds have ingested plastic fragments.
 - **Health Link:** Microplastics are now found in 1 out of 3 fish caught for human consumption.
- **Limitations & Challenges:**
 - * **Geographic Scale:** Coastlines are too vast for 24/7 human patrolling.
 - **Funding:** Local governments lack budgets for high-frequency manual labor.
 - **Public Apathy:** Tourists often ignore waste because there is no easy way to report it.

Proposed Solution: "ShoreWatch" Mobile Platform

ShoreWatch is a tech-enabled ecosystem consisting of a mobile reporting app and an AI-driven dashboard for local authorities.

- **Core Features:**
 - **Crowdsourced Reporting:** Users snap a photo of trash; the app automatically tags the GPS location.
 - **AI Heatmapping:** An admin dashboard uses machine learning to identify high-traffic "waste zones" to optimize bin placement.
 - **Gamified Rewards:** Users earn "Eco-Points" redeemable at local cafes and surf shops.
 - **Smart Bin Integration:** IoT sensors notify teams when bins are 80% full to prevent overflow.
- **Target Users:** Tourists/Beach-goers, Municipal Waste Teams, and Environmental NGOs.
- **Expected Impact:** Shifting to "responsive cleaning" is expected to increase waste recovery rates by 40% and significantly reduce plastic flow into the open ocean.

Conclusion

ShoreWatch leverages everyday mobile technology to turn passive bystanders into active stewards. By integrating AI and community engagement, we ensure that beaches remain a sustainable resource for future generations.

References

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