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Capstone Project
REPORT
Advanced AI & Data Monetization

TrashDash

France's Roadmap to
Innovative Waste Management

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Introduction

Problem:

Inaccurate waste sorting at source is a major challenge within the recycling process, leading to substantial financial and environmental impacts. Mixed waste often requires significant intervention or becomes non-recyclable due to contamination, leading to higher waste management costs and failure to meet recycling targets. In fact, France is failing to meet its recycling rate target of 65% by 2025, achieving only 42% by 2022.

Solution:

TrashDash offers an AI-powered waste management system to provide real-time waste segregation guidance. Using computer vision and interactive displays, TrashDash guides users where to dispose of the waste in real-time. The monitoring product collects detailed data on waste generation and provides actionable insights to improve waste management practices.

Project Development Process

1. **Product Ideation:**
   The idea for TrashDash stemmed from the need to address improper waste sorting and enhance recycling rates in companies and schools. By leveraging AI and interactive technology, TrashDash aims to simplify waste segregation and promote sustainable behaviors.
2. **Market Research and Validation:**
   Extensive market research identified a strong demand for efficient waste management solutions in high-traffic areas such as corporate offices and educational institutions. Insights from this research highlighted the financial burden of improper waste management and the potential savings from improved recycling practices.
3. **Value Proposition:** TrashDash differentiates itself by offering:
   - Real-time user feedback on waste disposal
   - Comprehensive data analytics on waste generation and segregation accuracy
   - Ease of integration with existing waste management systems
   - Gamification elements and rewards to enhance user engagement

4. **Product Development:**
   The development process involved creating a YOLO vision model trained on a large and diverse dataset, able to detect waste with 90% accuracy. Waste objects detected are passed to the LLM model, which classifies and segments the waste based on the company's color-coded dustbins (highly customizable). With the help of interactive displays and gamification elements, users can throw waste responsibly. The data collected on the waste generation is utilized by management for tracking and improving purposes using an AI-powered interactive dashboard, along with an LLM chatbot for more in-depth knowledge.

5. **Cost and Revenue Model:**

   TrashDash offers tiered subscription plans:

- **Basic Plan (€10/month):** AI powered waste detector + Data Analytics +Limited LLM powered Analytics
- **Plus Plan (€20/month):** Basic Plan + Customizable Dashboard + Limited Software customization
- **Premium Plan (€40/month):** Plus Plan + Unlimited LLM powered Analytics + Fully customizable for gamification

Key Learnings

User Engagement: Real-time feedback and gamification significantly enhance user participation and proper waste sorting.
Data-Driven Insights: Detailed analytics provide actionable insights that help organizations optimize waste management and achieve sustainability goals.
Ease of Integration: A seamless integration process is crucial for adoption, ensuring minimal disruption to existing waste management practices.

Future Work

1. Expansion into High-Traffic Commercial Places:
Future efforts will focus on expanding TrashDash into high-traffic commercial areas such as shopping malls, airports, and large corporate campuses. These settings present significant opportunities to reduce waste management costs and improve recycling rates through enhanced user engagement and real-time feedback.

2. Collaborations:
Strategic partnerships with bin providers and waste management companies will be pursued to broaden the reach of TrashDash. Collaborations will help integrate TrashDash as a complementary solution, leveraging existing client networks and infrastructure.

3. Continuous Improvement:
Ongoing development will focus on enhancing AI capabilities, expanding the range of detectable waste items, and further refining user interaction features. Regular updates and user feedback will drive continuous improvement in system performance and user experience.

Conclusion:

TrashDash is poised to revolutionize waste management by integrating advanced AI and interactive technologies. By addressing the critical issues of improper waste sorting and promoting sustainable practices, TrashDash offers a compelling solution for companies and educational institutions committed to environmental stewardship and cost efficiency. As the system expands into new markets and collaborates with industry partners, TrashDash aims to lead the way in creating a cleaner, more sustainable future.