

MICHIGAN STATE

UNIVERSITY

Project Plan Presentation

Global Waste Management System

The Capstone Experience

Team GM

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*From Students...
...to Professionals*

Project Sponsor Overview

- Founded in 1908 and headquartered in Detroit, MI
- Designs, Manufactures and Sells vehicles under brands such as GMC, Chevrolet, Cadillac, and Buick
- Part of the “Big Three” automakers in the USA
- Contributes to nearly a quarter of all the GDP generated by US Car Manufacturers



Project Functional Specifications

- GM is focused on decreasing waste/emissions
- Waste currently documented by using excel file input
 - No error checking for any categories
 - Crude system vulnerable to human data entry errors
 - No trend analysis or visualization of data
- User friendly web app for:
 - Easy waste data entry and editing
 - Comprehensive error checking
 - Data filtering and historical error tracking for reviewers
 - Waste trend predicting

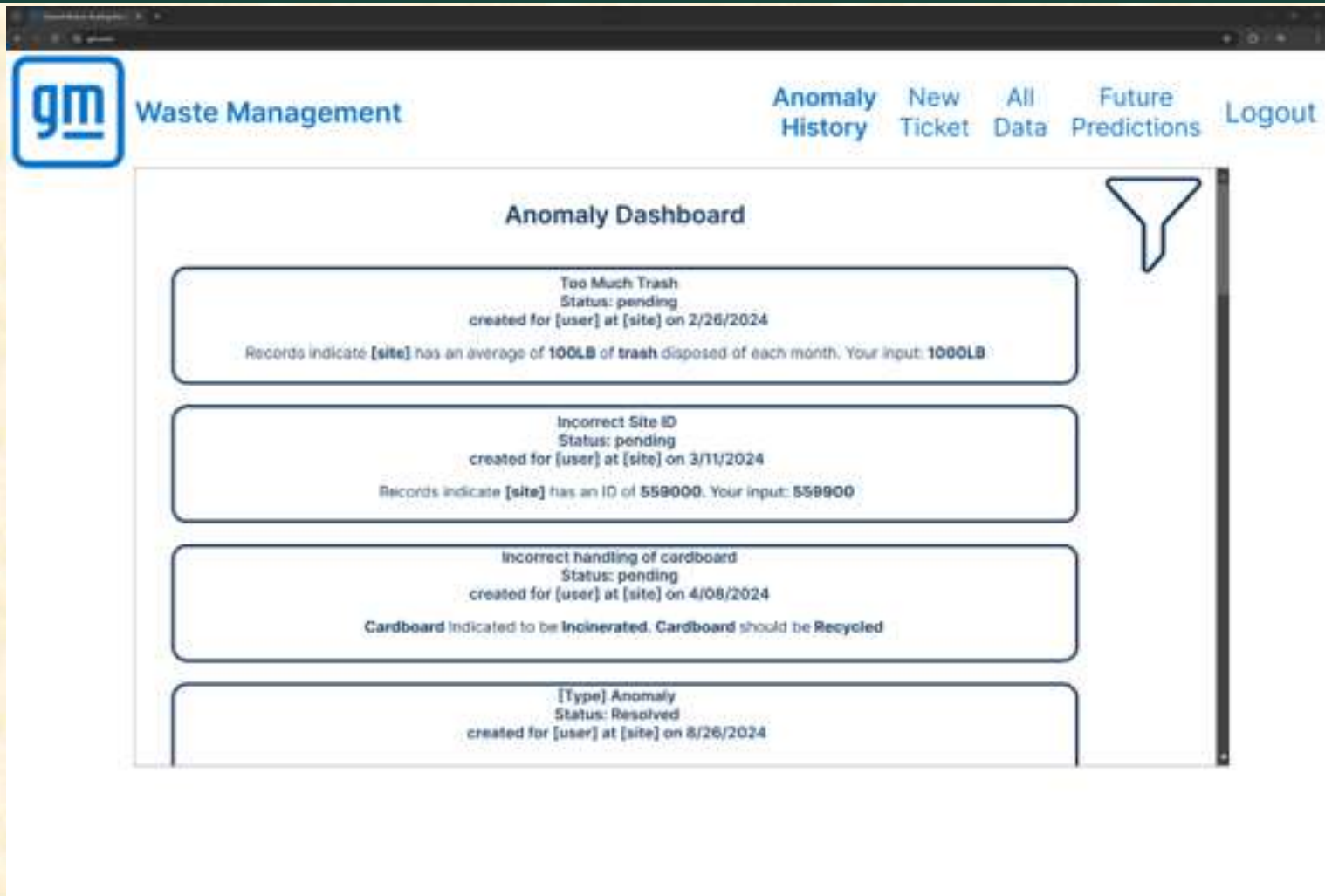


Project Design Specifications

- Easy waste data entry using an online form
- Comprehensive error checking using statistical analysis
- Access to historic data with the ability for new reports to be generated based on search criteria
- Future predictions report using mix of historical data and future production estimations



Screen Mockup: Anomaly Dashboard



Screen Mockup: Ticket Input

The screenshot displays a web application interface for 'Waste Management'. The top navigation bar includes the 'gm' logo, the text 'Waste Management', and several menu items: 'Anomaly History', 'New Ticket', 'All Data', 'Future Predictions', and 'Logout'. The main content area is titled 'Add New Shipment Ticket' and contains a form with the following fields:

- SiteID
- Source
- Name
- Management Method
- Disposal Location Code
- Ship Date
- Waste Stream/Approval ID
- Quantity (with a dropdown menu currently showing 'LB')
- Final Disposition
- Tri Waste Code

At the bottom of the form, there is an 'Attach Image' button with a link icon and a dark blue 'Submit' button.



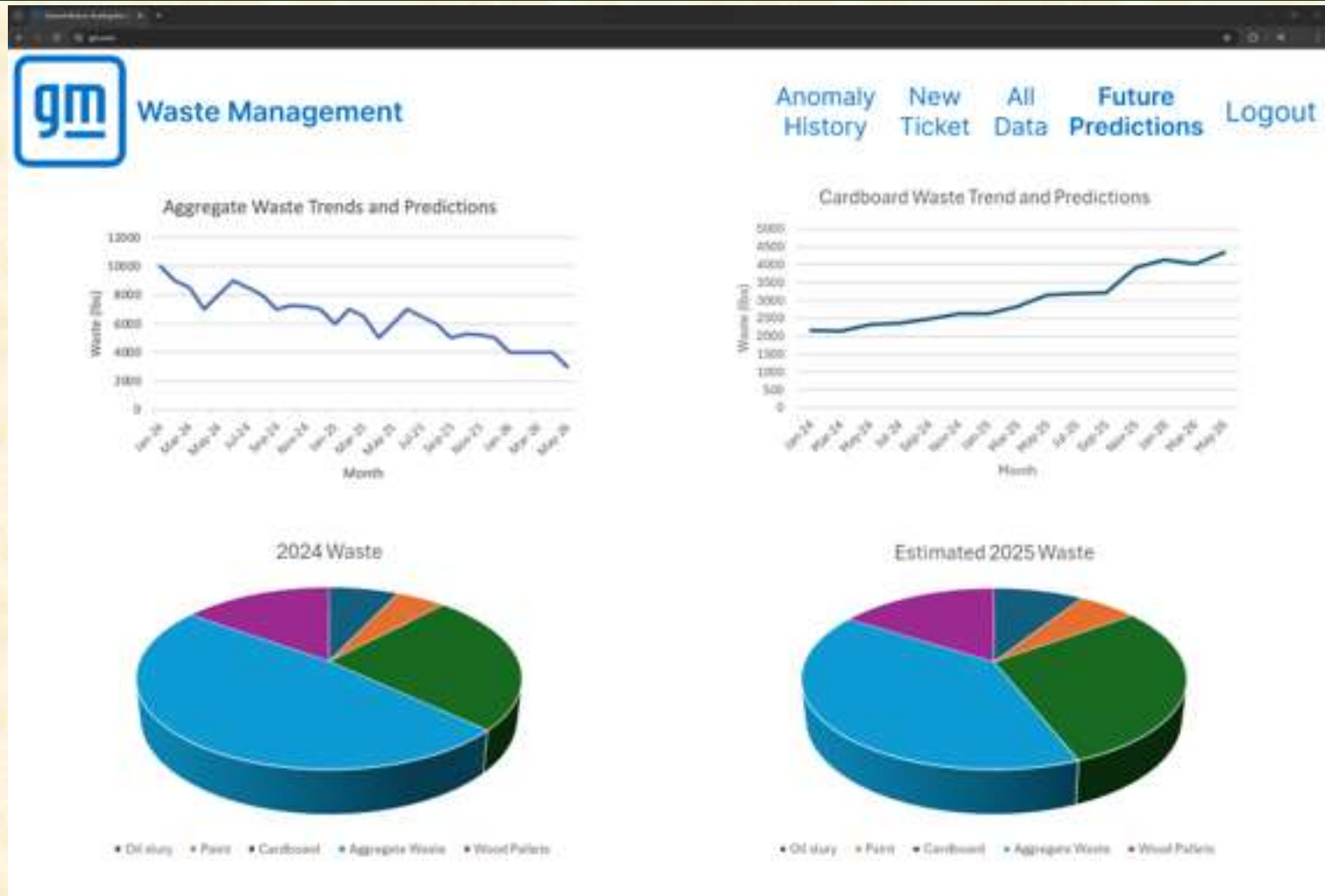
Screen Mockup: All Data

The screen mockup displays a web interface for 'Waste Management'. At the top left is the GM logo. The main navigation bar includes links for 'Anomaly History', 'New Ticket', 'All Data' (which is highlighted), 'Future Predictions', and 'Logout'. Below the navigation is a data table with the following columns: Ship Date, Waste Stream Approval ID, Name, Quantity, Management Method, Final Disposition, Disposal Location Code, and Tri-Waste Code. A funnel icon is positioned to the right of the table. At the bottom of the interface are two buttons: 'Download All Data' and 'Generate Monthly Report'.

Ship Date	Waste Stream Approval ID	Name	Quantity	Management Method	Final Disposition	Disposal Location Code	Tri-Waste Code



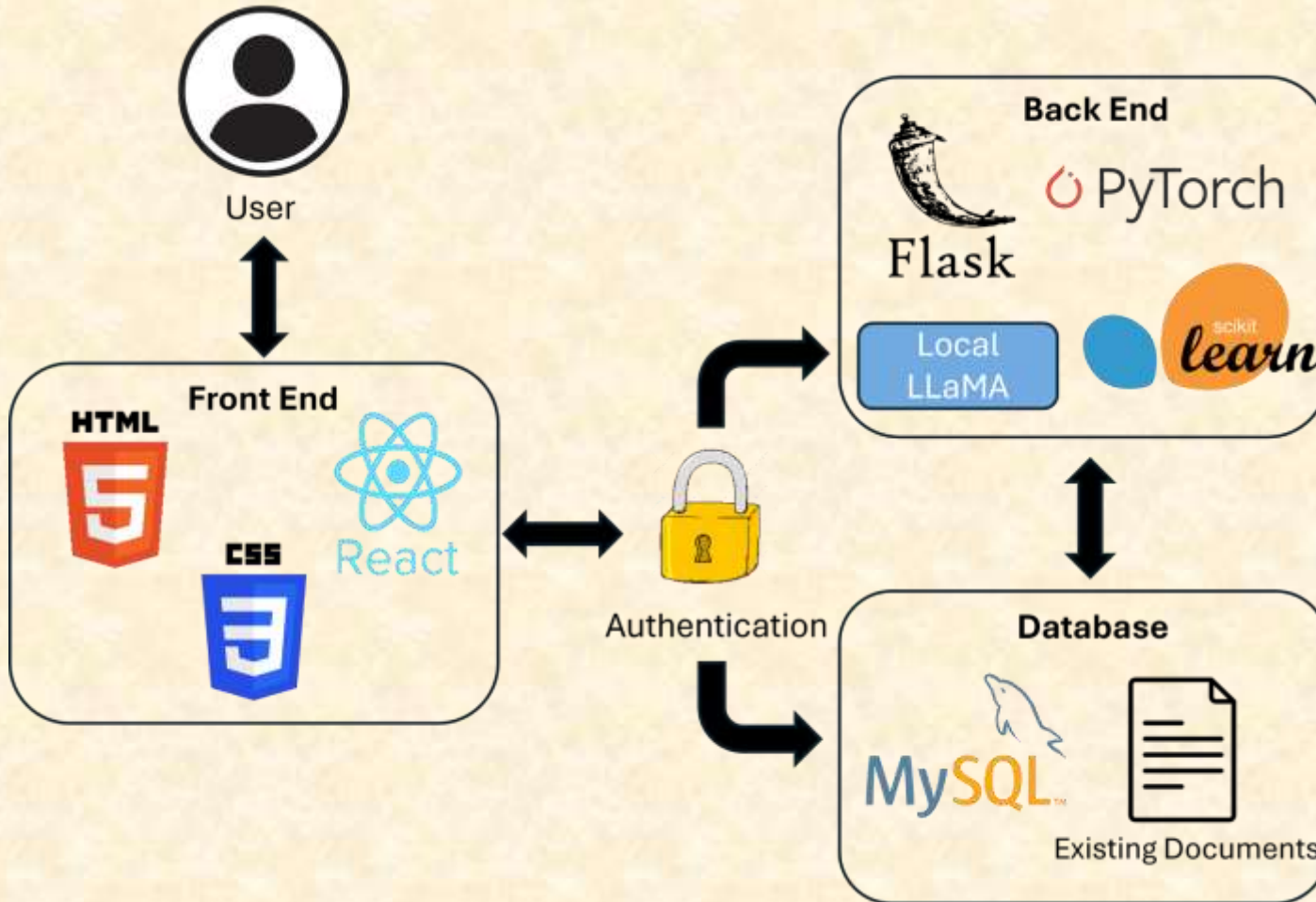
Screen Mockup: Future Predictions



Project Technical Specifications

- Frontend: Handles user interaction and display data
- Backend: Processes requests, handles authentication and algorithms
- Database: Stores and manage system data
- Analytics: Machine learning for anomaly detection and future trend prediction

Project System Architecture



Project System Components

- Hardware Platforms
 - Web Server
 - Database
- Software Platforms / Technologies
 - Docker
 - MYSQL
 - Flask
 - React
 - Python Libraries (PyTorch/SciKitLearn/Pandas)
 - Local LLaMA



Project Risks

- Data Preprocessing
 - Data from GM is not formatted to easily find anomalies.
 - Convert data to more useful numeric values and filter out less useful categories.
- Dashboard Filtering
 - Allow the users to view all anomalies and filter through them.
 - Store anomalies in a SQL table and use queries to filter through them.
- Important Waste Predictions
 - Show important predictions for future waste, prioritizing it over less useful information.
 - Use statistical analysis methods such as growth curve analysis to determine if there is significant change in a dataset.
- Intuitive User Interface
 - Display all anomalies to the user in an easy to use and meaningful way, while allowing users to change data based off anomalies.
 - Create and present iterations of user interfaces using feedback from GM sponsors who will use the application day to day.



Questions?

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