MICHIGAN STATE UNIVERSITY

Project Plan Presentation

Optimizing OEM Parts Sales Through AI Analytics

The Capstone Experience

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From Students…
…to Professionals

Project Sponsor Overview

- Analytics Consulting Firm
- Focused on OEMs and dealer operations
- Based in Detroit, MI with offices worldwide







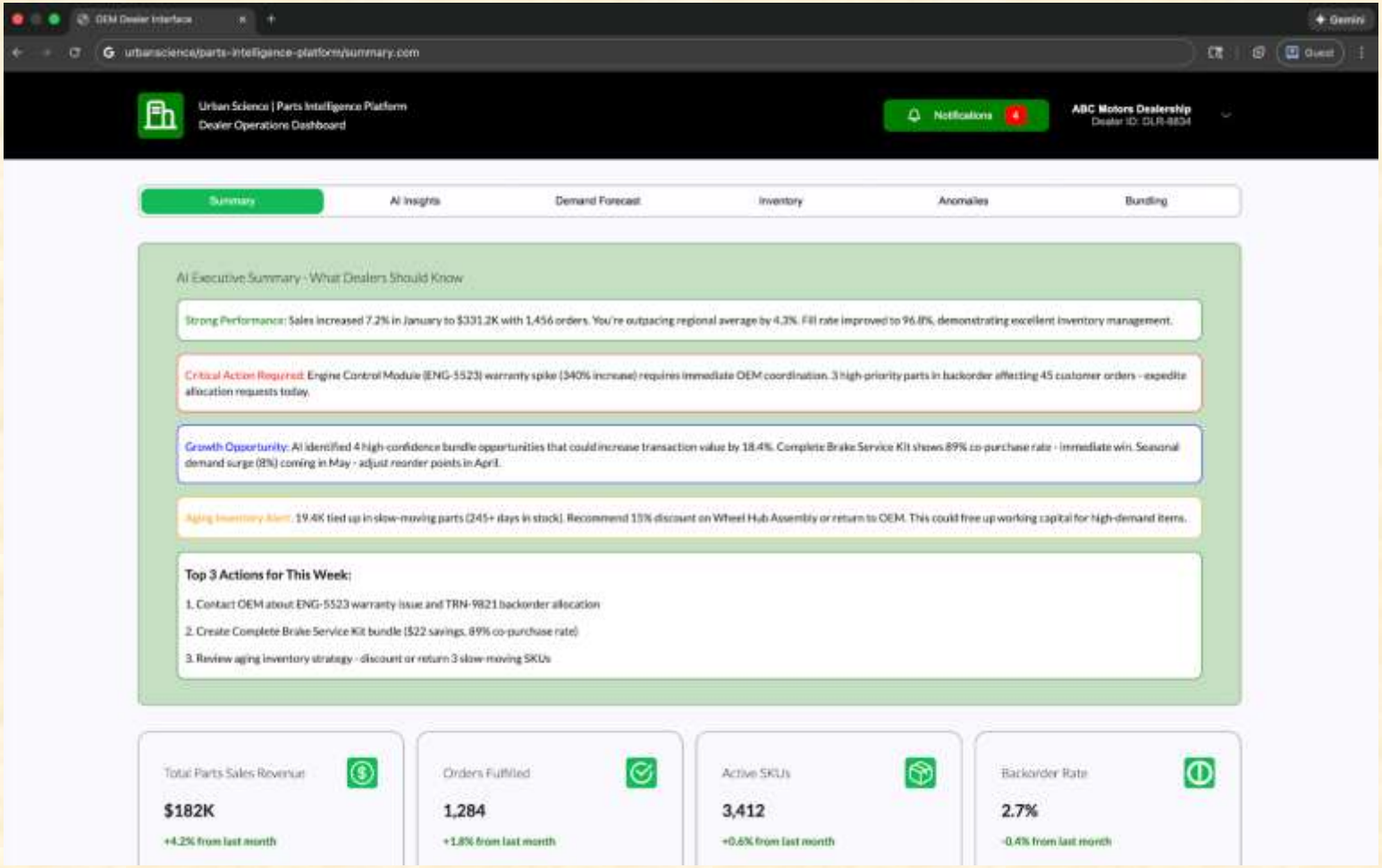
Project Functional Specifications

- Brings automotive parts sales, inventory, and pricing data together in one place
- Organizes data so OEMs and dealers can easily see patterns over time
- Checks data quality before using it for analysis
- Highlights demand changes, stockouts, and excess inventory
- Flags unusual pricing or warranty behavior
- Uses past data to estimate future parts demand
- Displays AI-driven insights through a clear, easy-to-use web interface

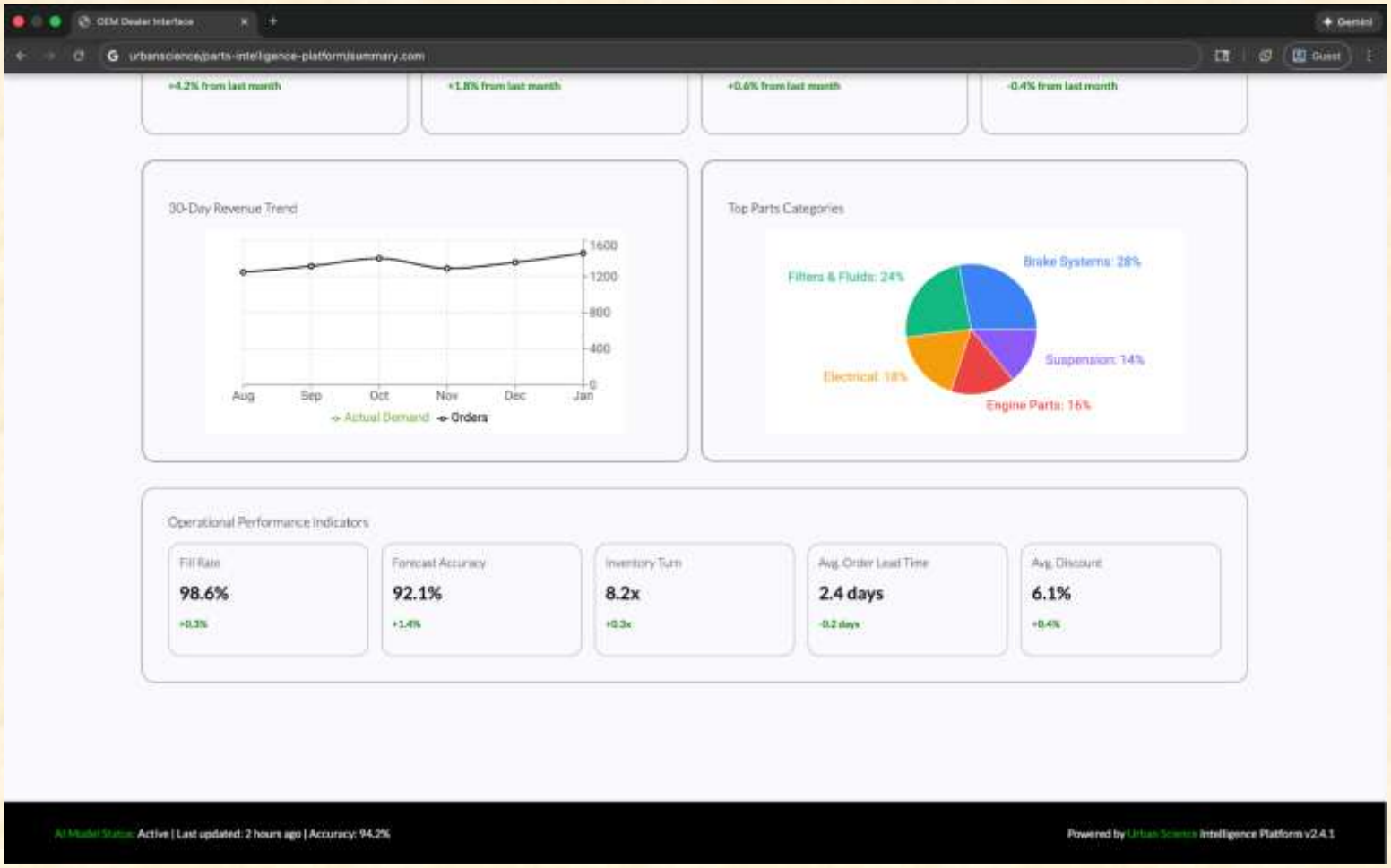
Project Design Specifications

- Web-based dashboard designed for OEM and dealer parts teams
- Consistent layout and navigation across all pages
- Six core views: Summary, AI Insights, Demand Forecast, Inventory, Anomalies, and Bundling
- Visual indicators to highlight priority and severity
- Clickable views and filters to explore data by parts, dealer, and timer period
- Clear explanations shown alongside insights

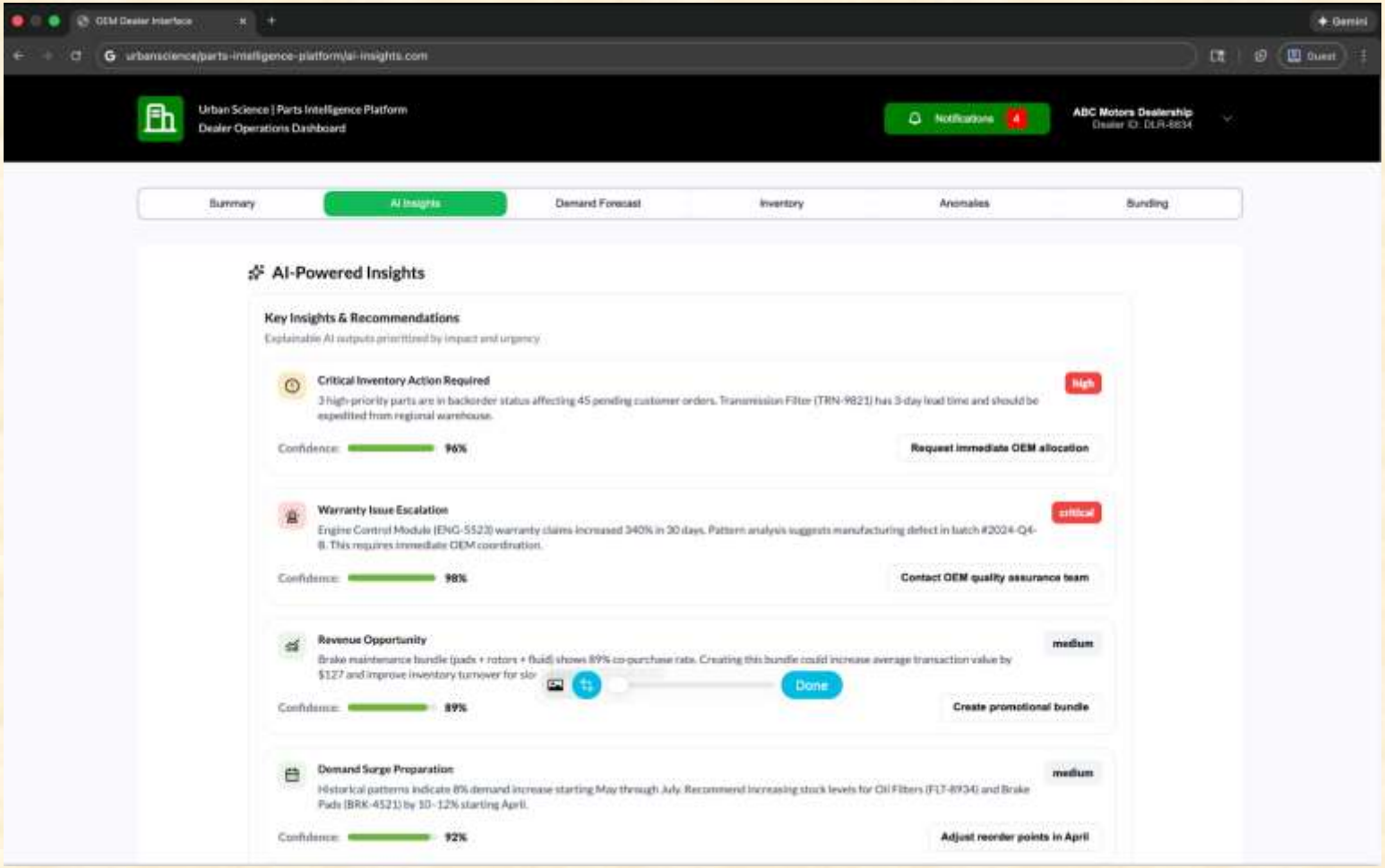
Screen Mockup: Summary/ Home



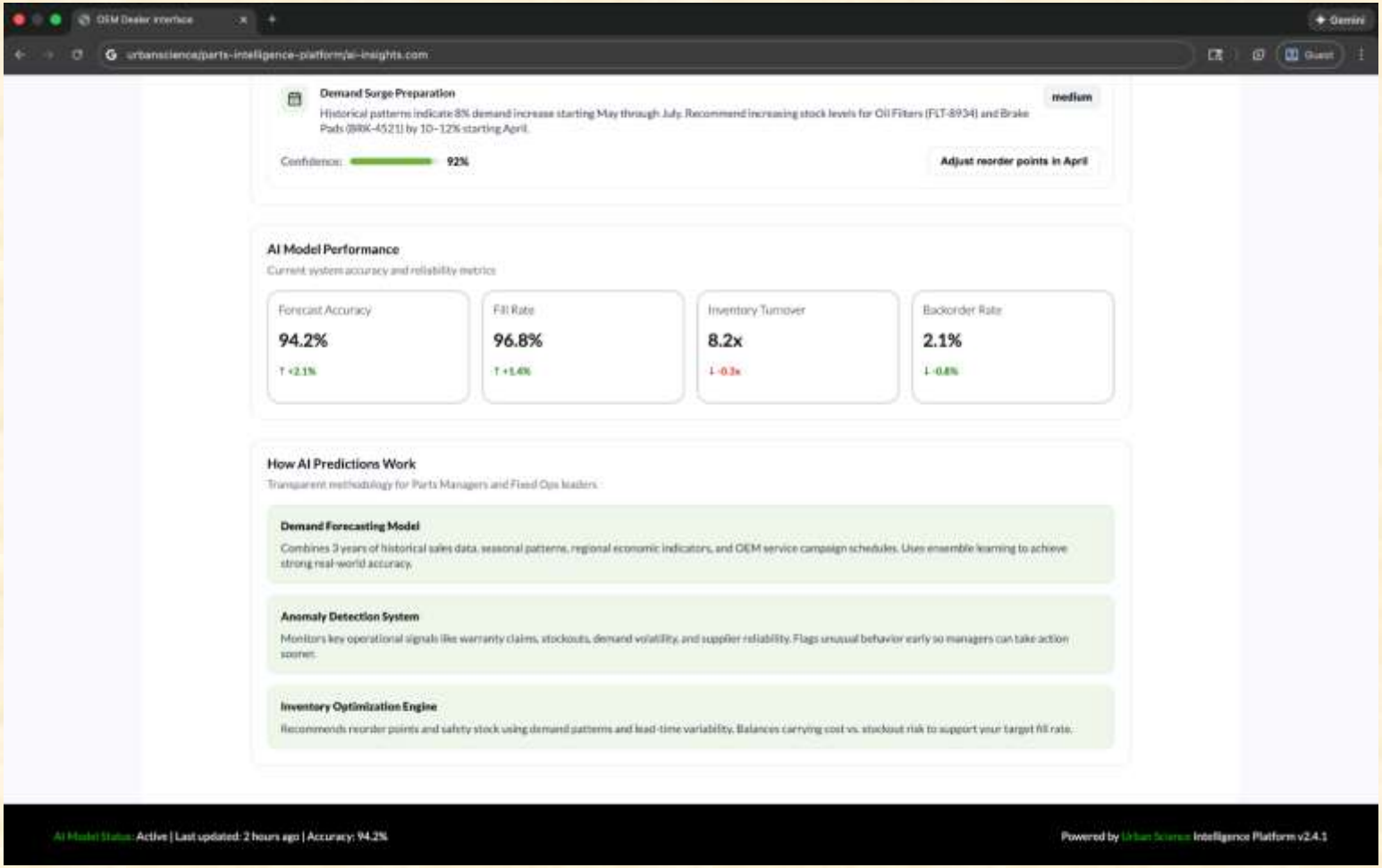
Screen Mockup: Summary/ Home



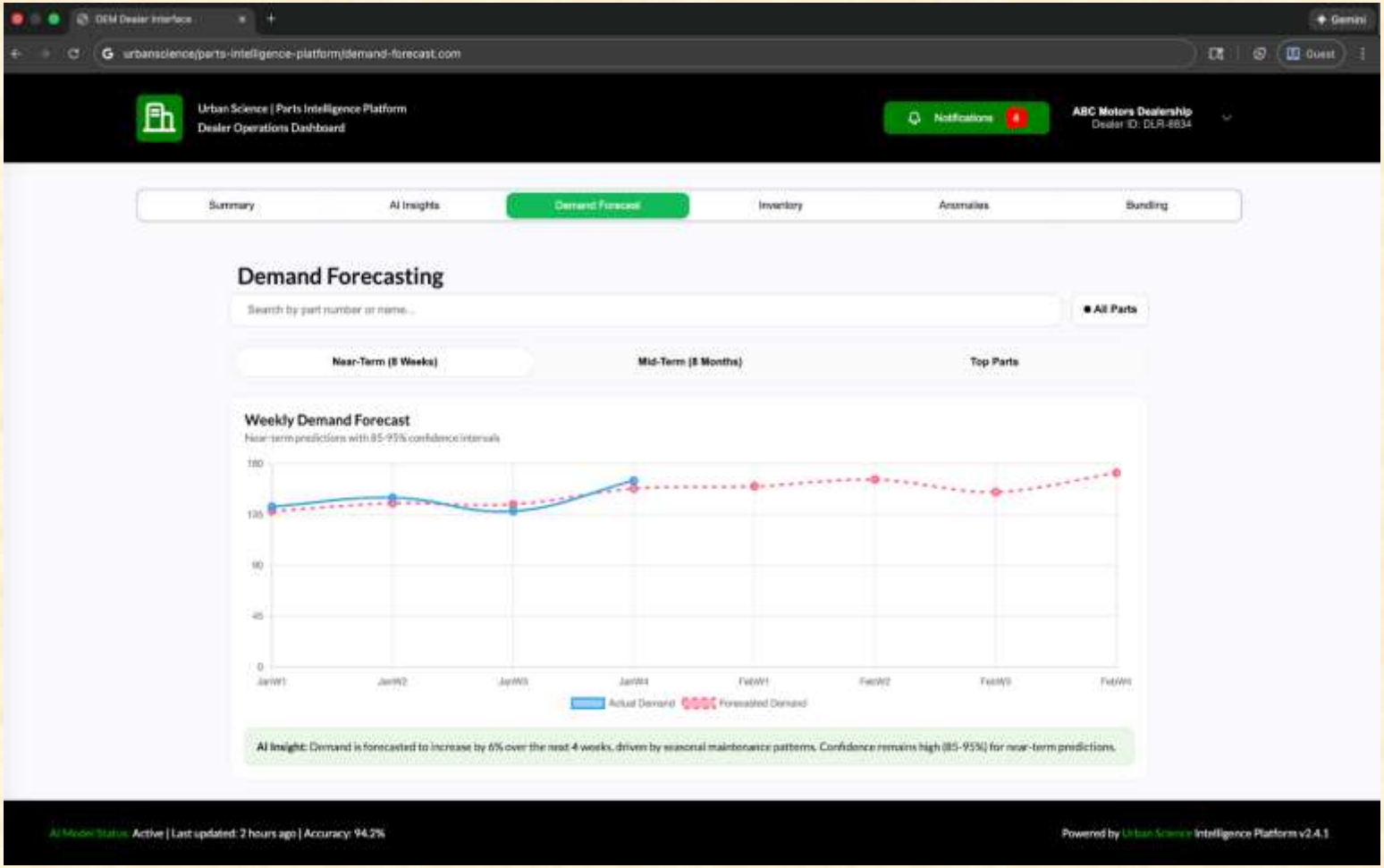
Screen Mockup: AI Insights



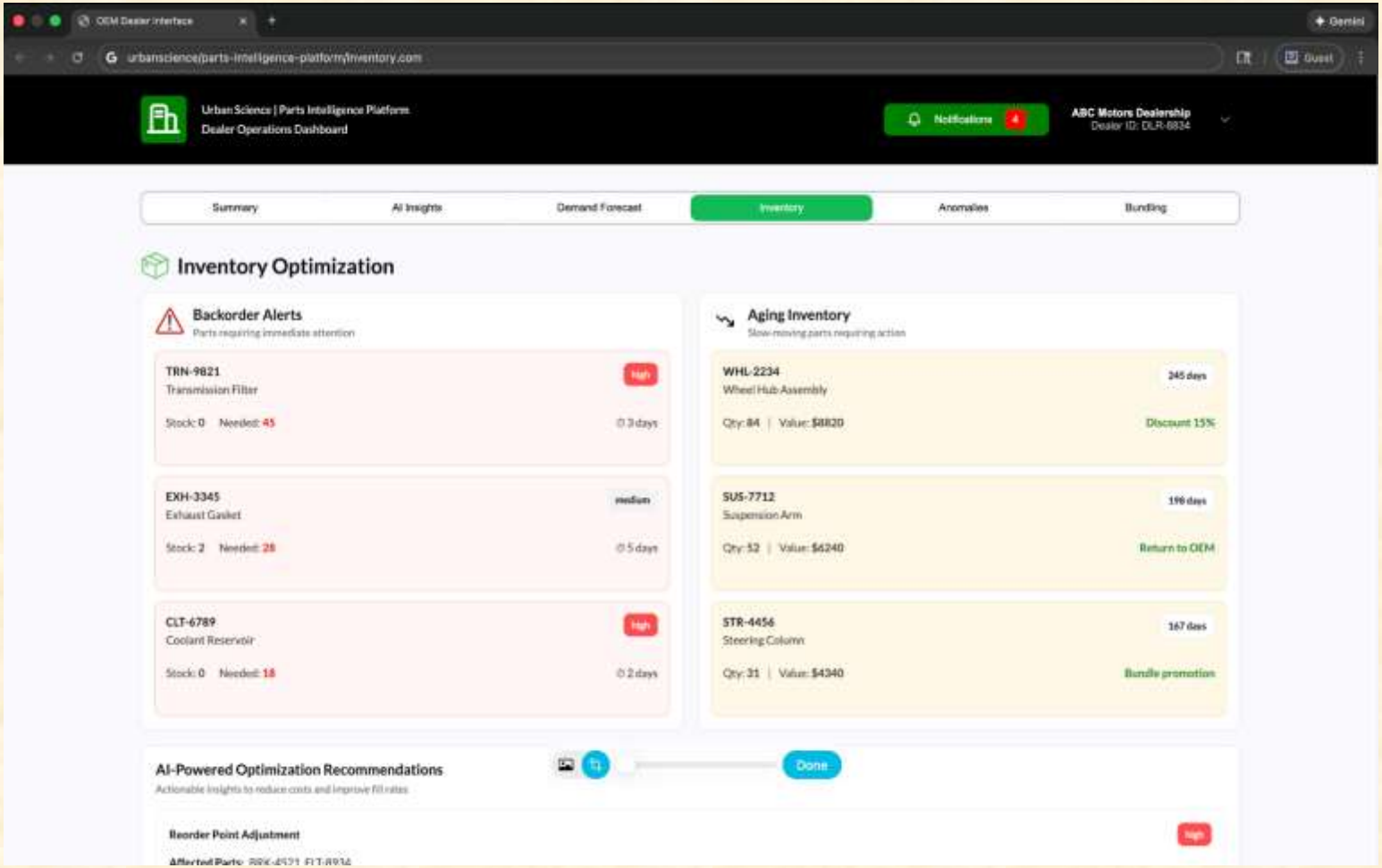
Screen Mockup: AI Insights



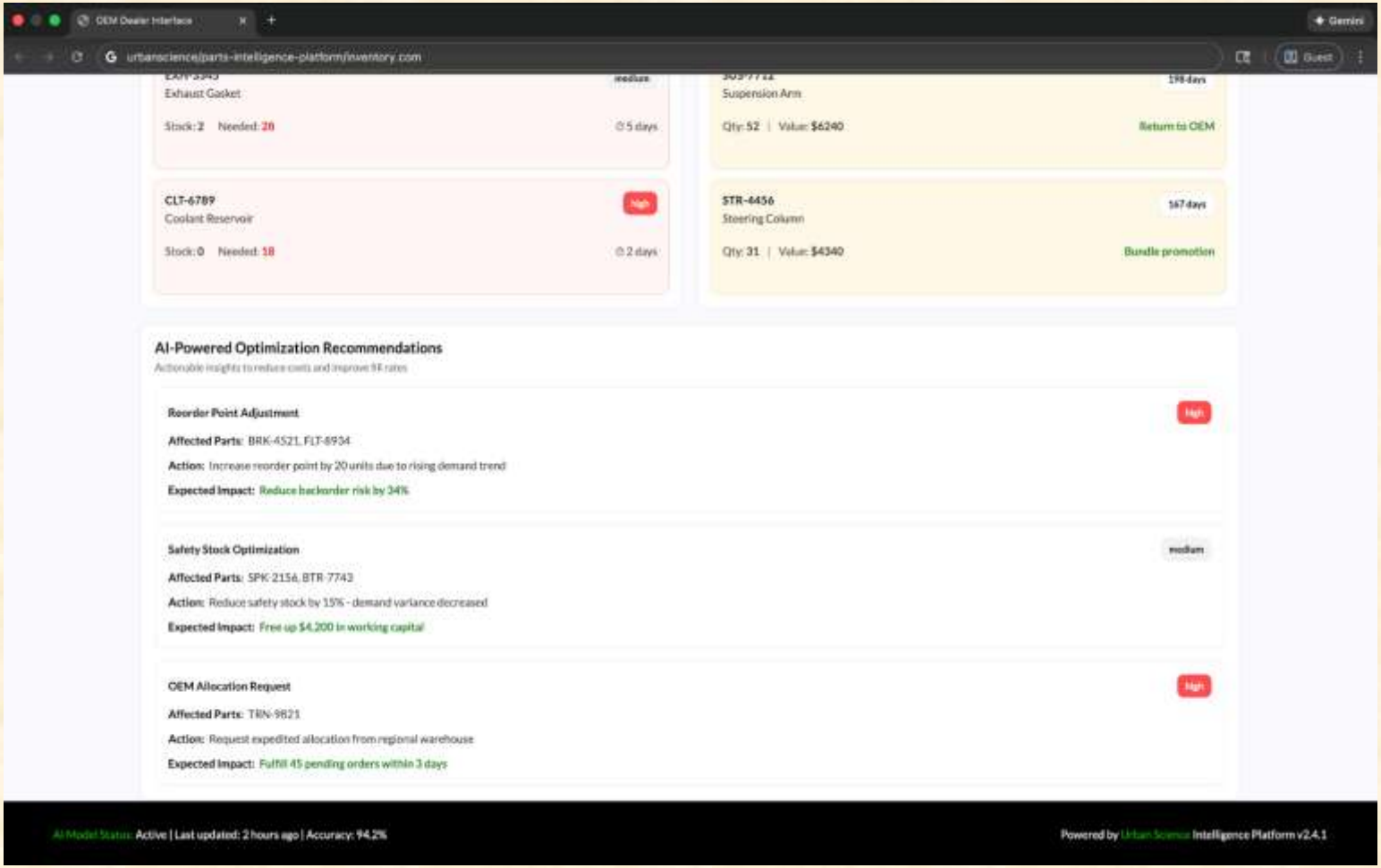
Screen Mockup: Demand Forecast



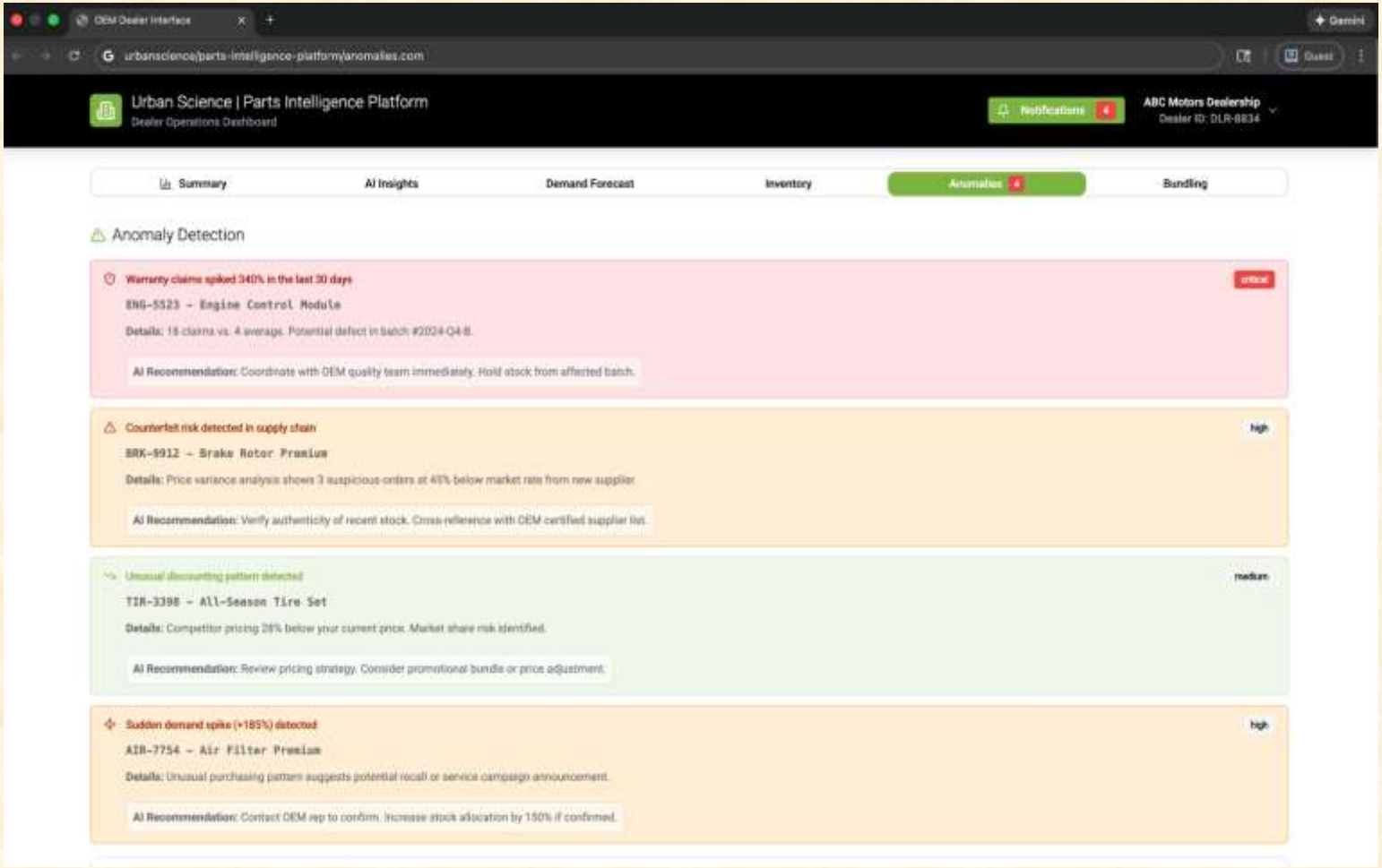
Screen Mockup: Inventory



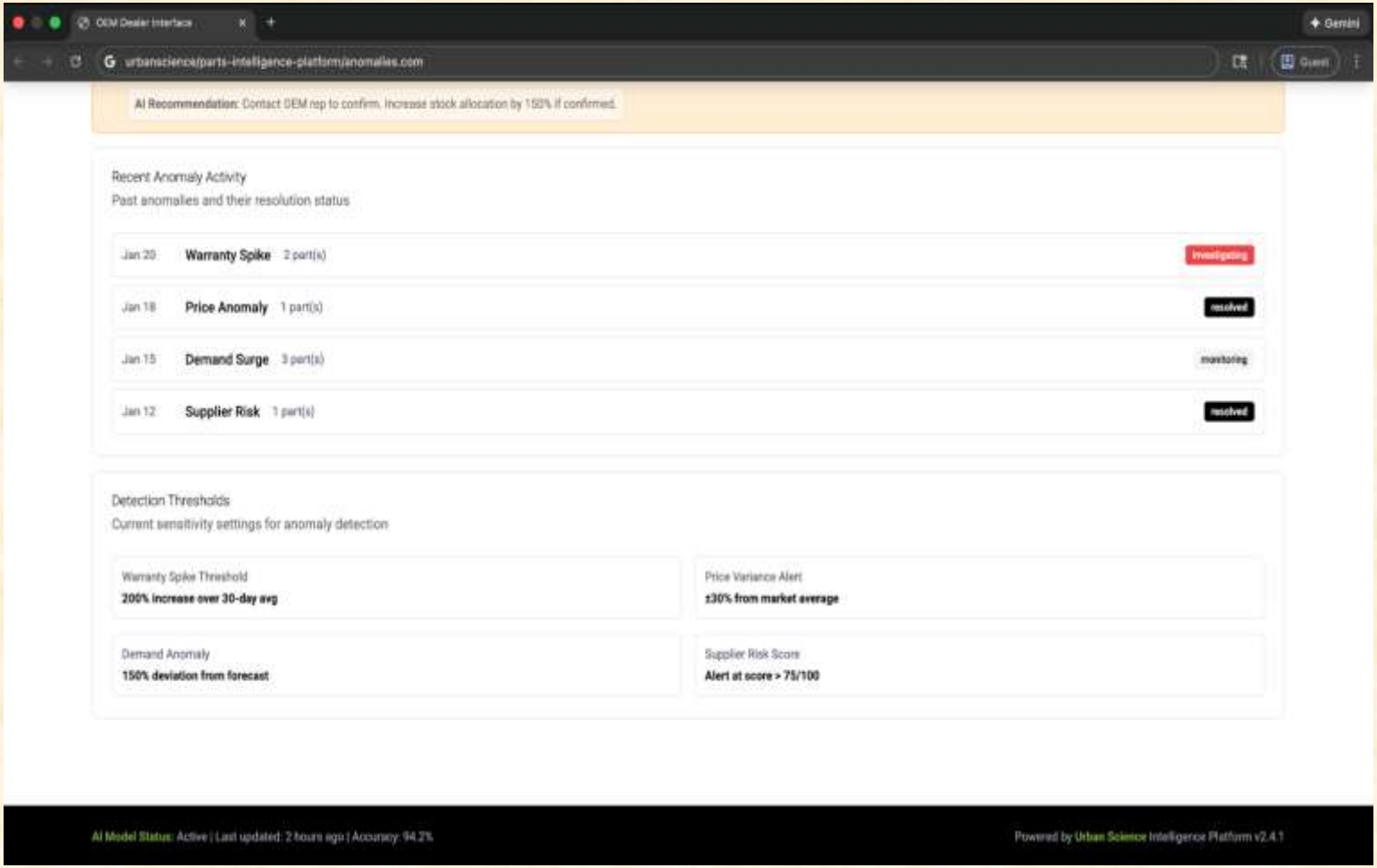
Screen Mockup: Inventory Insights



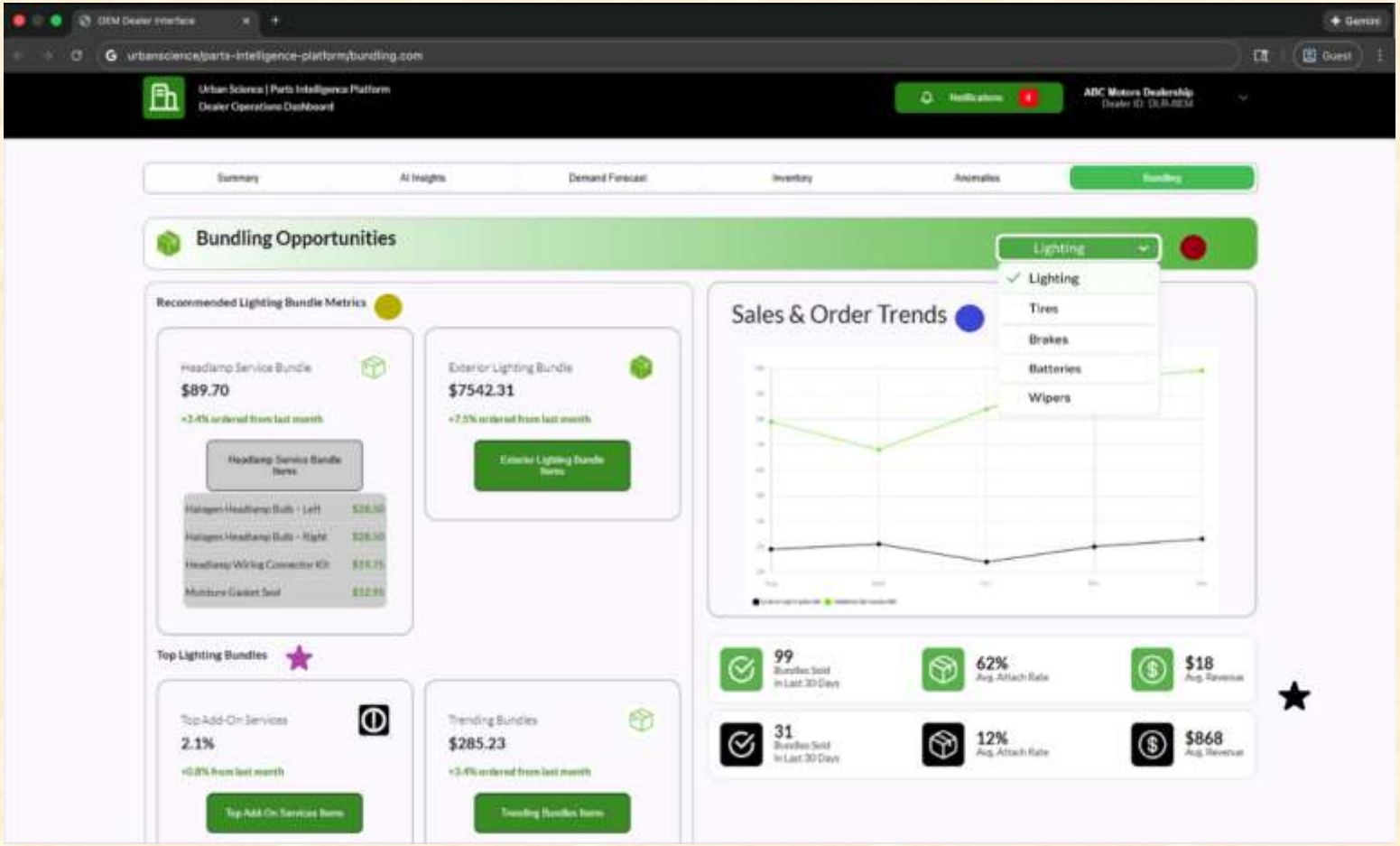
Screen Mockup: Anomaly Alerts



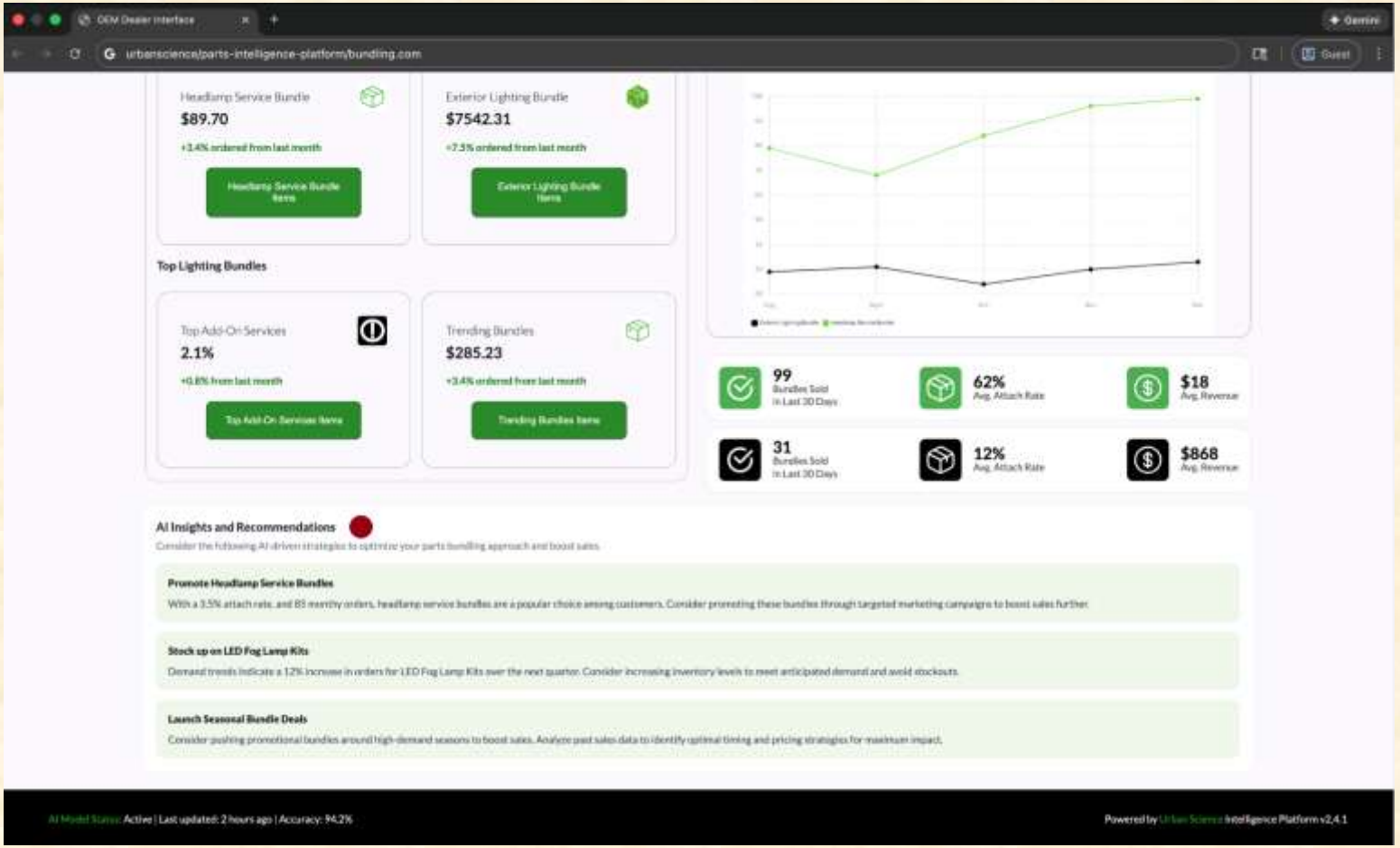
Screen Mockup: Anomaly Alerts



Screen Mockup: Bundling Metrics



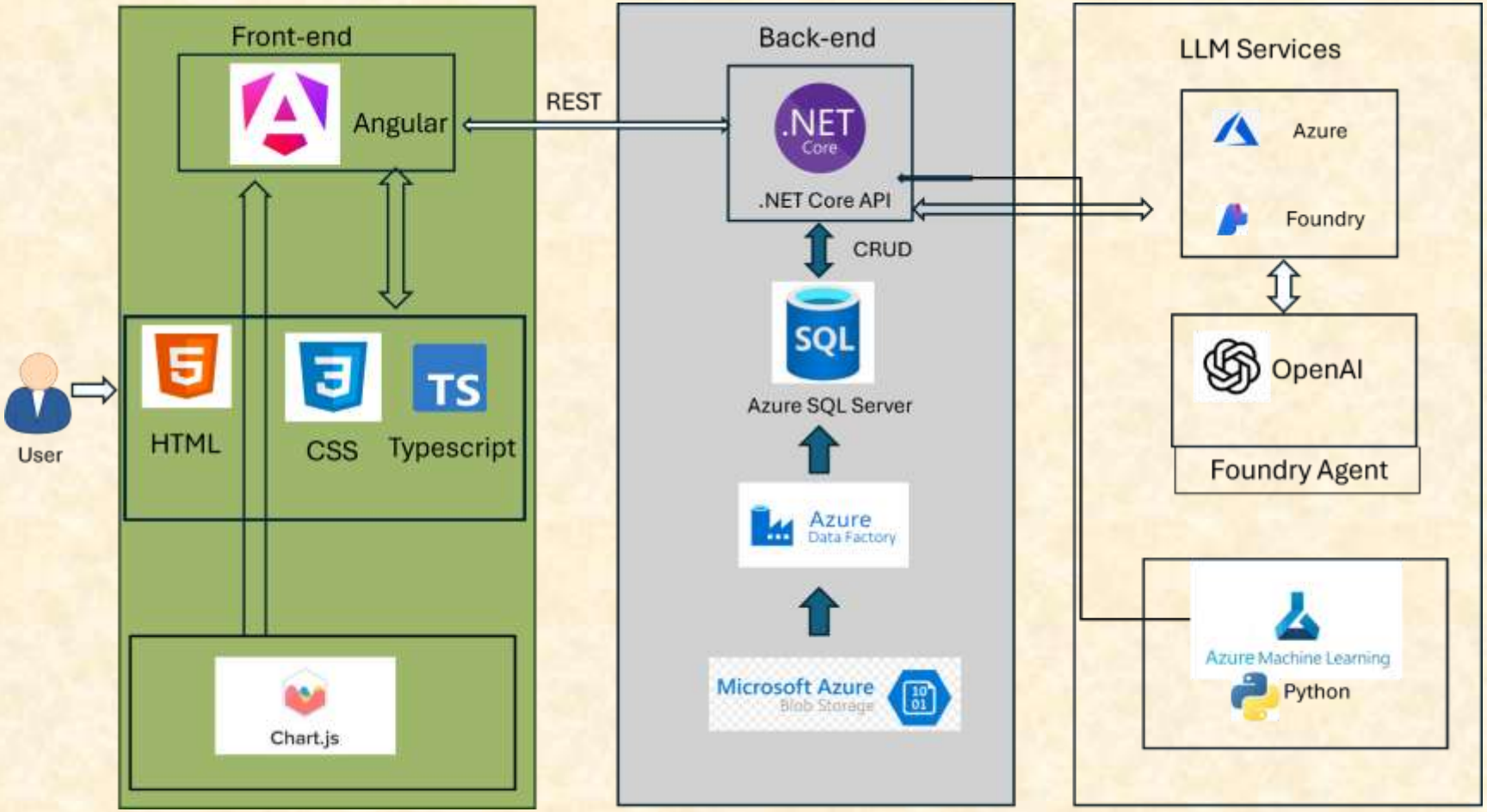
Screen Mockup: Bundling Summary



Project Technical Specifications

- User friendly frontend using Angular
- Data stored on an Azure SQL server
- Azure AI services used to gain analytical insights
- .NET Web APIs used to connect frontend, backend, and Azure services

Project System Architecture



Project System Components

- Software Platforms / Technologies
  - Azure SQL Database
  - Azure OpenAI Service
  - Azure AI Foundry Agent Service
  - .NET Web APIs
  - Angular
  - Python
  - C#

Project Risks

- Risk 1: **Incorrect AI Summaries**
  - Inaccurate AI summaries could lead dealers to make bad inventory decisions, damaging trust in both the product and the company.
  - Enforce strict quality controls, confidence scoring, and guardrails to prevent low-accuracy recommendations from reaching users.
- Risk 2: **Live Training and Merge Patterns of Data**
  - New parts, pricing, and dealership data must merge cleanly into the SQL schema or the dashboard will show outdated or incorrect insights.
  - Use an incremental ETL process with consistent keys and upfront validation checks to ensure only clean, reliable data enters the system.
- Risk 3: **High Latency in SQL Trend Aggregation Queries**
  - Trend calculations on constantly updating high-volume tables may cause slow queries that delay dashboard updates and harm user experience.
  - Improve performance through targeted indexing, precomputed metrics, and caching for fast retrieval.
- Risk 4: **AI Summaries not Incorporating Anomalous Events**
  - When unusual weather events or disruptions to supply chain occur, the system may not account for fluctuations in demand and users could unknowingly rely on incorrect insights
  - Display AI accuracy scores and alert users on the homepage and anomalies page whenever abnormal events are detected that could skew algorithm results.

Questions?

