MICHIGAN STATE UNIVERSITY

# Project Plan Presentation

## Generating Mapping Insights Using AI

### The Capstone Experience


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*From Students…*
*…to Professionals*

# Project Sponsor Overview

- Founded in 1977, headquartered in Detroit, MI
- Global automotive consultancy and technology provider that delivers data-driven solutions
- Leverages data science, analytics, and software to help automotive brands optimize performance

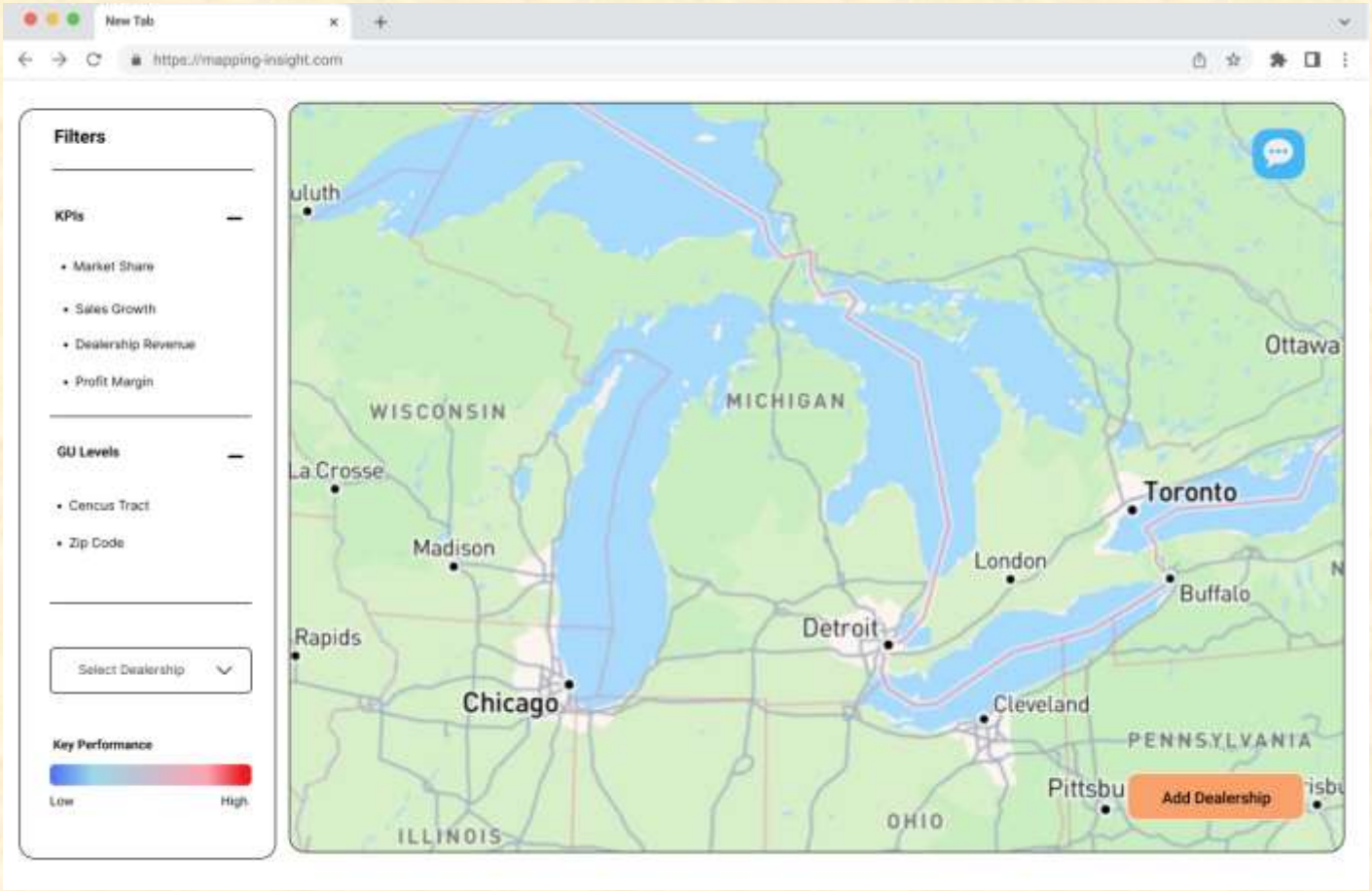
# Project Functional Specifications

- OEM planners and dealers face growing challenges in understanding market performance and legal risks at a detailed level
- To address these challenges, developing an interactive mapping application that displays KPIs
  - Allows users to plot and relocate dealership markets
  - Provides LLM guidance to summarize market dynamics and legal risks
  - Users should be able to make smarter, more confident decisions

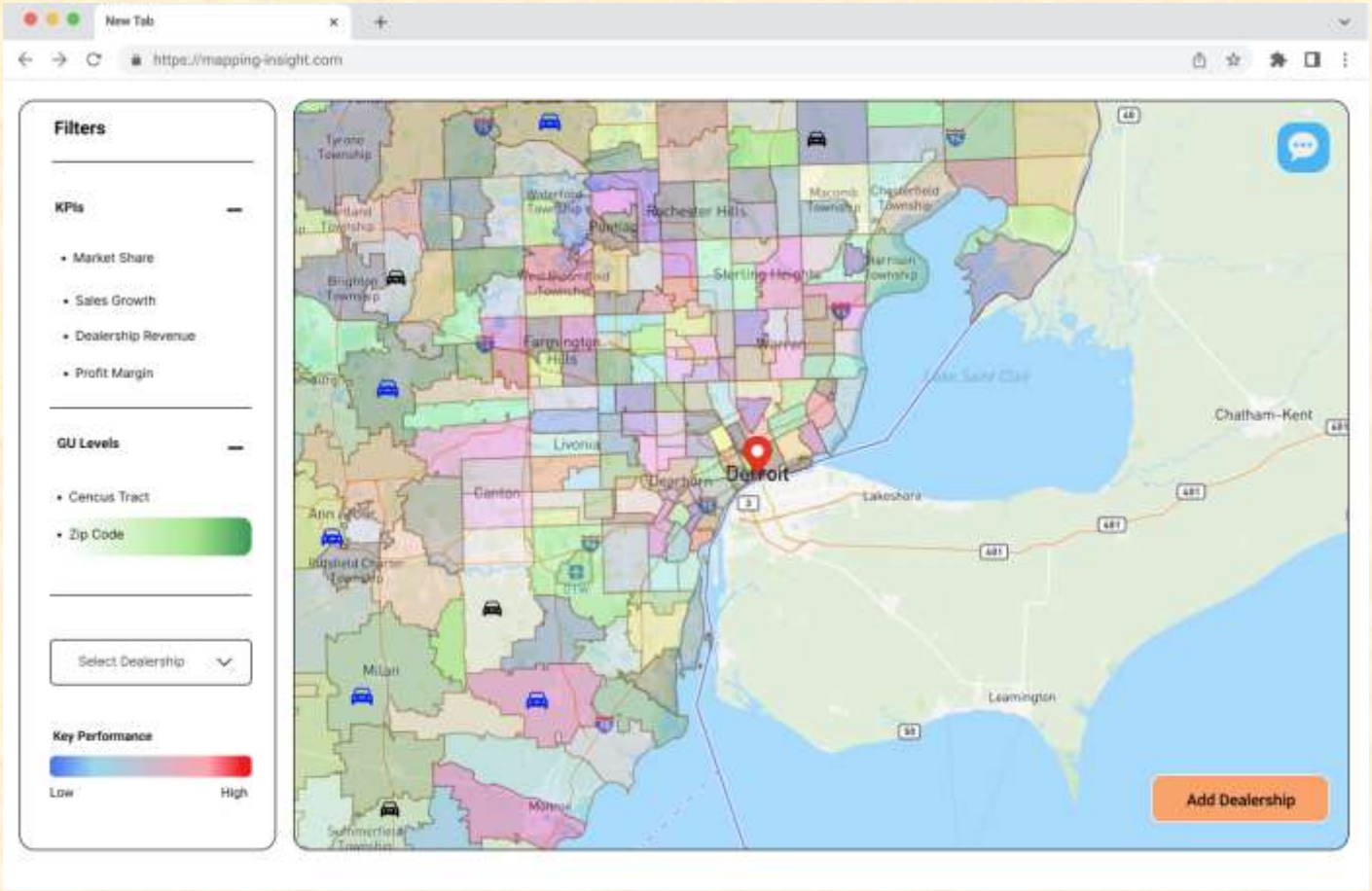
# Project Design Specifications

- An interactive map that displays dealerships in certain zip codes or census tracts
- Filterable KPI dropdown (market shares, sales, revenue) that corresponds with the interactive heatmap
- An AI chatbot that displays legal risk and market analysis when adding or relocating dealership markers
- A legend that displays the relationship between polygon colors and KPI performance

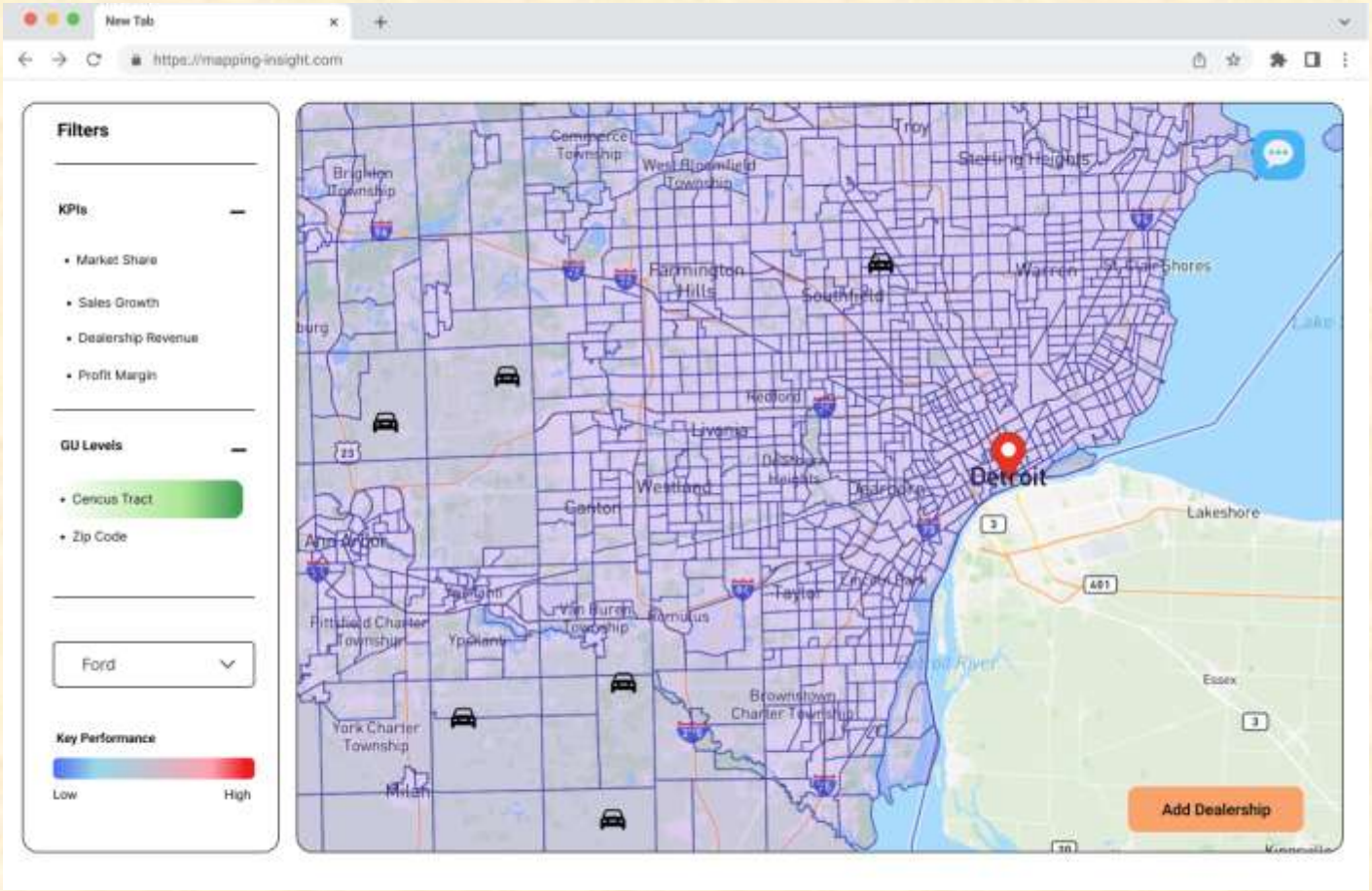
# Screen Mockup: Home Page



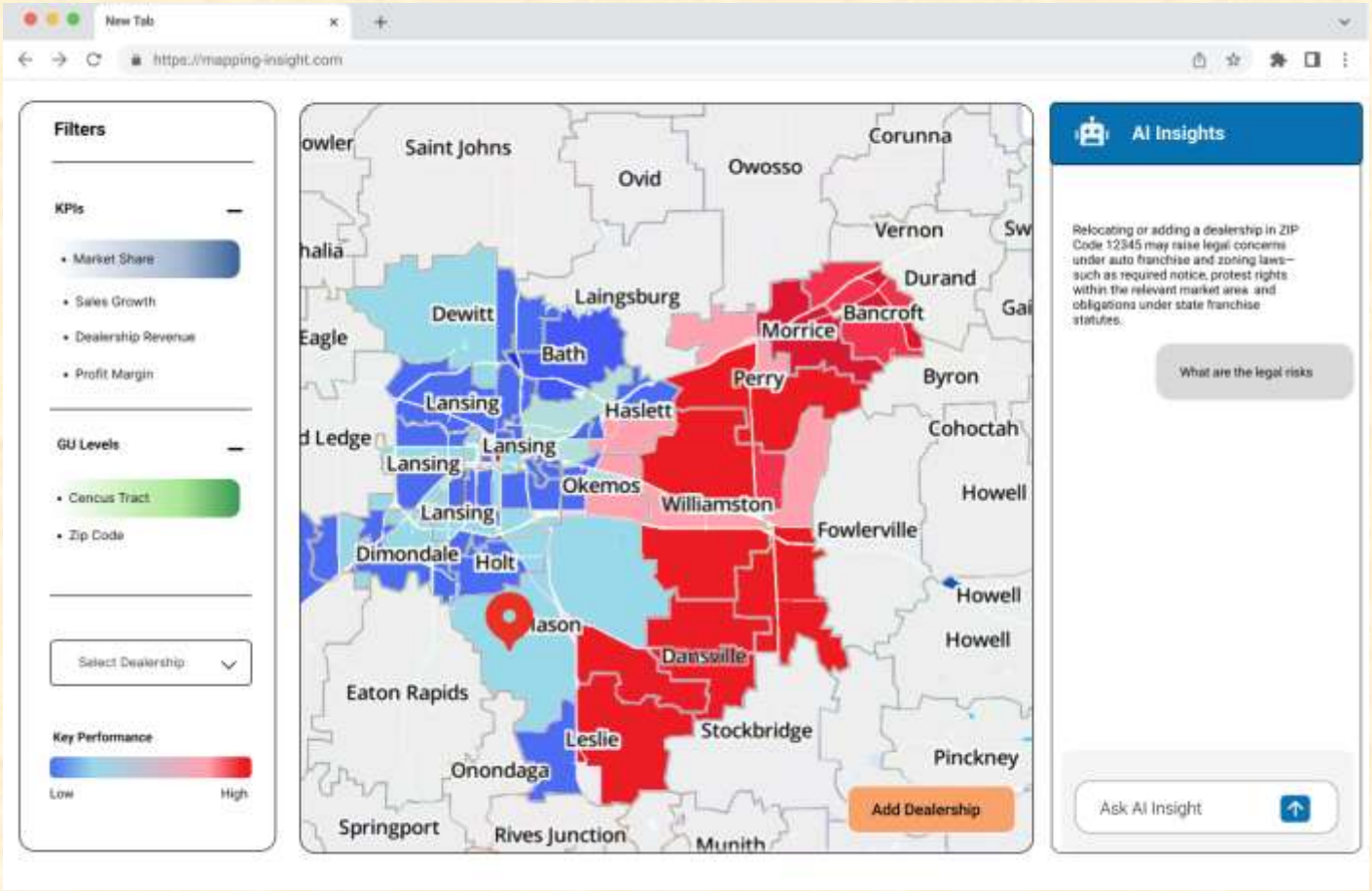
# Screen Mockup: Zip Code Polygons



# Screen Mockup: Dealerships with Census Tract



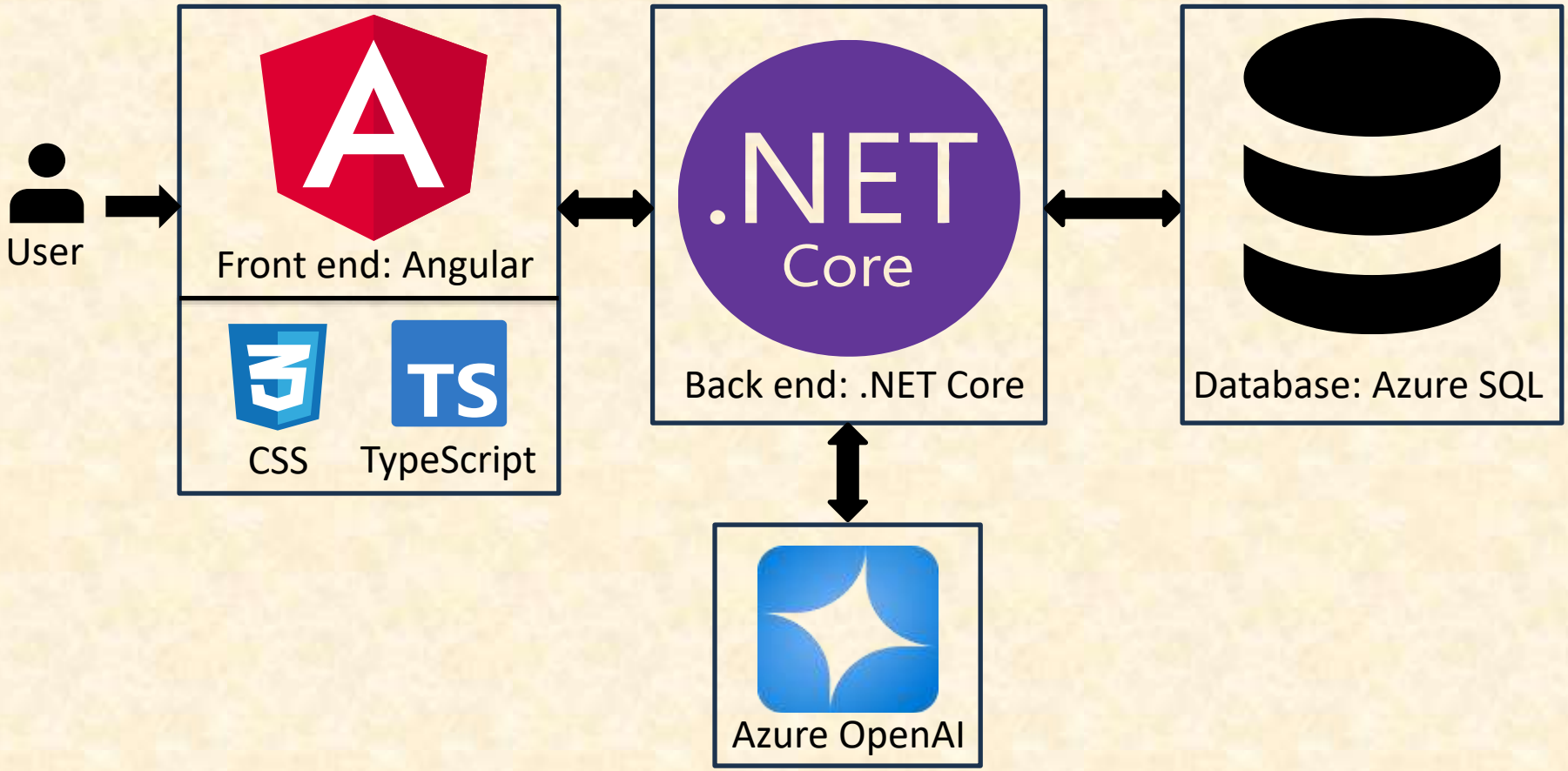
# Screen Mockup: AI Chatbot



# Project Technical Specifications

- Architecture: Built using a client–server model with a .NET Web API backend and Angular frontend.
- Database: Microsoft SQL Server used for storing dealership data, geographical units, and KPIs.
- Mapping: Mapbox integrated into the frontend for rendering GU polygons, heat maps, and dealership markers.
- AI Integration: Azure OpenAI and Azure AI Foundry agents provide natural language guidance on territory changes and legal considerations.

# Project System Architecture



# Project System Components

- Hardware Platforms
  - None
- Software Platforms / Technologies
  - Angular
  - C# .NET Core
  - Azure SQL
  - Azure OpenAI
- Libraries
  - Mapbox
  - PrimeNG

# Project Risks

- LLM Accuracy in Referencing and Utilizing Legal Documents
  - The ability for the LLM to reference relevant local laws
  - Prompting techniques/database of legal documents/RAG
- LLM Contextual Size Limitations
  - LLMs are subject to context size limits
  - LangChain/LangGraph to integrate context management
- Mapping Performance
  - High volumes of map elements may degrade performance
  - Dedicated service for serving the map tiles
- Accurate Air Distance Calculations
  - Air distance reliability and accuracy with population data
  - Ensuring robust datasets and efficient processing and querying

# Questions?