Project Plan Presentation
3D Model for Factory Digital Twin

The Capstone Experience

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Project Sponsor Overview

• Global automotive supplier founded in 1957
• Focus on innovation & sustainability
• Produce parts in Body Exteriors and Structures, Power and Vision, Seating Systems, and Complete Vehicles
Project Functional Specifications

• Visual model showing state of Magna factory in real time
• Keeps track of and displays live data from their factories
• Allows Magna to quickly and easily see relevant aspects of a factory
• Create generalized solution to allow for expansion/scaling
Project Design Specifications

- Create a 3D model representing a factory floor
- Ability for users to dynamically adjust model to their requirements
- Visuals are driven by empirical data
- Integrate the project seamlessly with the processes currently employed by Magna
Screen Mockup: Setup Wizard
Screen Mockup: Tool Menu
Screen Mockup: Outline Menu
Screen Mockup: Alert Pop-up

- Alert: This object has reached the determined safety threshold of 100°F.
- ID: A693312
- Type: Boiler
- Sensor: Thermometer
- Weight: 12,540 lb
- Position: [coordinates]
Project Technical Specifications

• Front End
  ▪ Factory will be viewed in Orillusion JS
  ▪ Website will be structured with Vite & Vue JS Package

• Back End
  ▪ Backend will be used with MongoDB and Mongoose
Project System Architecture
Project System Components

• Hardware Platforms
  ▪ Server running Dockerfile
  ▪ Varying user browsers and platforms

• Software Platforms / Technologies
  ▪ Orillusion (Web GPU)
  ▪ Vue JS
  ▪ Vite JS
  ▪ EQMX MQTT Broker
  ▪ Docker
  ▪ MongoDB
    o JSON
    o .GLTF/.GLB Model files
Project Risks

Risks

• Graphical Elements and User Experience on Lower End Devices
  ▪ Our limited experience to 3D rendering and WebGPU may impact the final look and experience. We also must take into account for minimum specifications to run it
  ▪ We’ve been looking over documentation for all libraries and prototyping ideas

• Unfamiliar with MQTT Protocol and Interactions
  ▪ Our lack of familiarity may pose risk in the development of achieving real-time state changes, which may impact project functionality
  ▪ Have contact with a Front-End Developer that created the MQTT Broker for Magna and we’re also reading documentation

• No Live Data Feed or Current Data Architecture
  ▪ Absence of a live data feed may hinder the development of real-time features
  ▪ Create a mock database and create a simulation of real-time data that will feed to the MQTT Broker

• Previous Project Design Unusable
  ▪ Unable to use due to poor code management and documentation
  ▪ Identify areas that may help speed up our initial design process
Questions?