MICHIGAN STATE UNIVERSITY Project Plan Presentation Car Dealership Auditing Assistant

The Capstone Experience

Team Urban Science

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Department of Computer Science and Engineering Michigan State University Spring 2024

From Students... ...to Professionals

Project Sponsor Overview

- Urban Science develops software and processes for automotive OEMs to evaluate performance across key business operations
- Serves clients from over 70 countries
- Headquartered in Detroit, MI



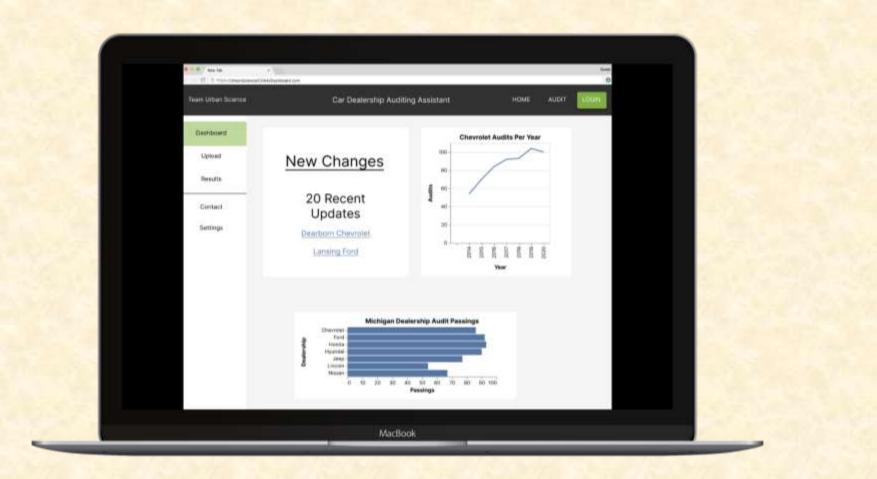
Project Functional Specifications

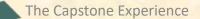
- Determines if a dealership is compliant with given brand standards
- Solves a laborious task that assigns field representatives by utilizing AI to analyze video footage from dealerships
- Will be used by the Urban Science audit team through a web application

Project Design Specifications

- Header -> Home, Audit, Login
- Navigation Bar -> Dashboard, Upload, Results
- Other -> Contact, Settings

Screen Mockup: Dashboard





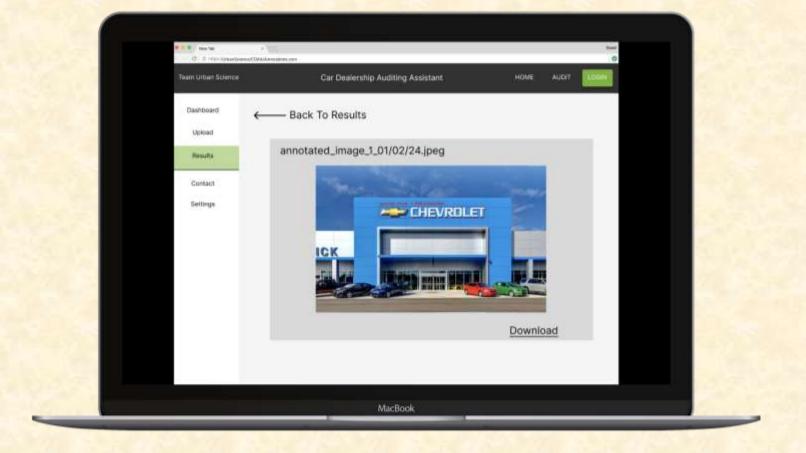
Screen Mockup: Media Upload

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Screen Mockup: Results

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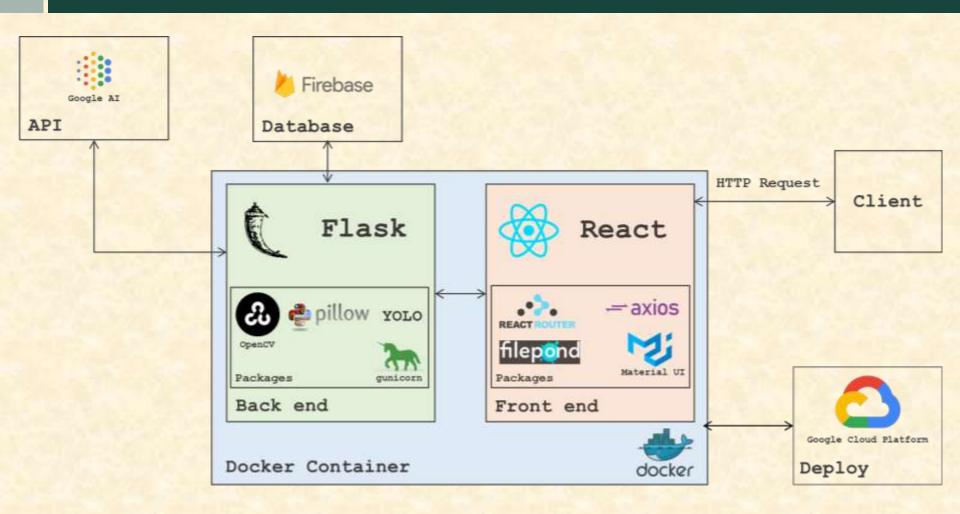
Screen Mockup: Annotated Image



Project Technical Specifications

- Web application front end built using React and Material UI
- Back end is implemented in Python using the Flask framework
- Computer vision tasks achieved using the YOLO model and the Vision API
- Integrated with Python back end using OpenCV and Pillow libraries

Project System Architecture



Project System Components

- Software Platforms / Technologies
 - Flask
 - OpenCV, YOLO, Pillow
 - Firebase
 - Firestore, Auth, Cloud Storage
 - React
 - React Router, FilePond, Material UI, Axios
 - API
 - Cloud Vision API

Project Risks

Computing spatial information

 Research similar projects and use a pre-measured object (a cardboard cutout) in the footage to help with depth perception.

Long video processing times

 Explore ways to synthesize the algorithms, minimize the number of models and tools utilized, and reduce the number of processing cycles.

Evaluation of cleanliness

 Learn how to build and train a custom ML model from scratch. Find research / projects that we can leverage in implementing this feature.

Access limited to a single dealership

- Training and testing on a single dealership may lead to subpar back end models
- Use Open Web media to emulate real dealership footage with different building layouts and shapes, lighting, brands, etc.

Questions?

