

MICHIGAN STATE

UNIVERSITY

Project Plan Presentation

Car Dealership Auditing Assistant

The Capstone Experience

Team Urban Science

Ashley Tran

Aman Todi

Brendan Cleland

Jared Bloch

Matthew Wu

Department of Computer Science and Engineering
Michigan State University

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*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



URBAN SCIENCE™



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

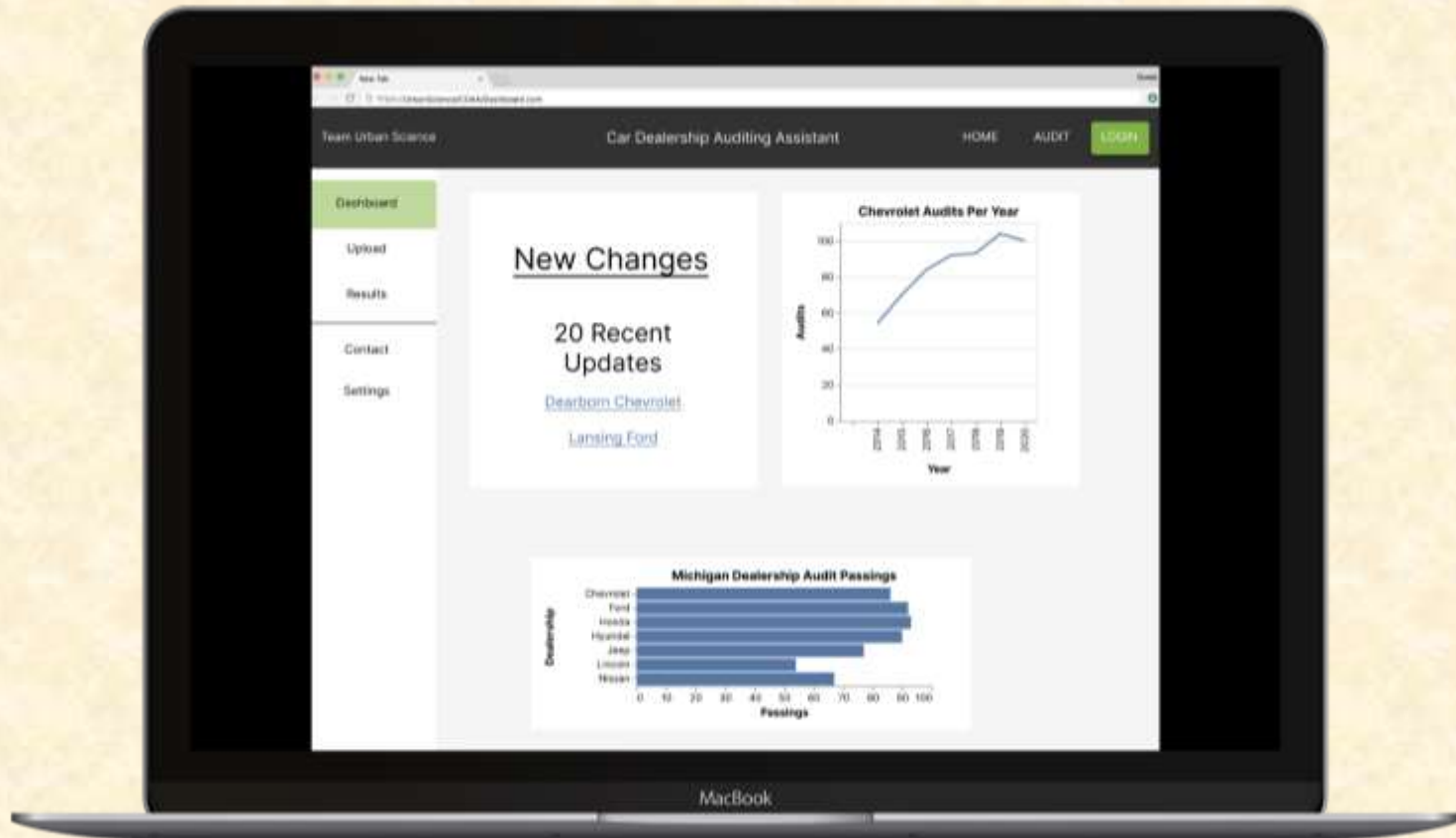


Project Design Specifications

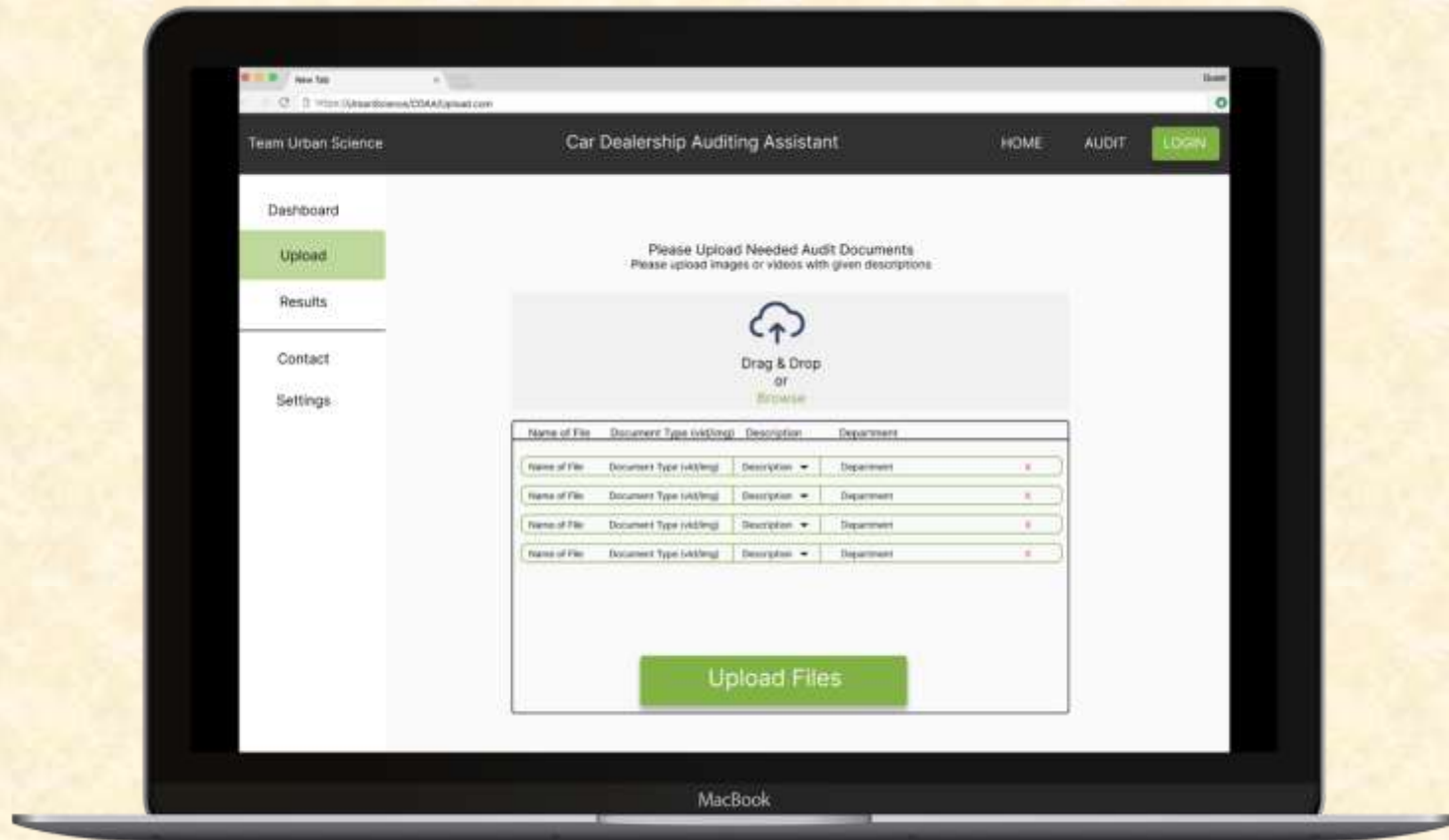
- Header -> Home, Audit, Login
- Navigation Bar -> Dashboard, Upload, Results
- Other -> Contact, Settings



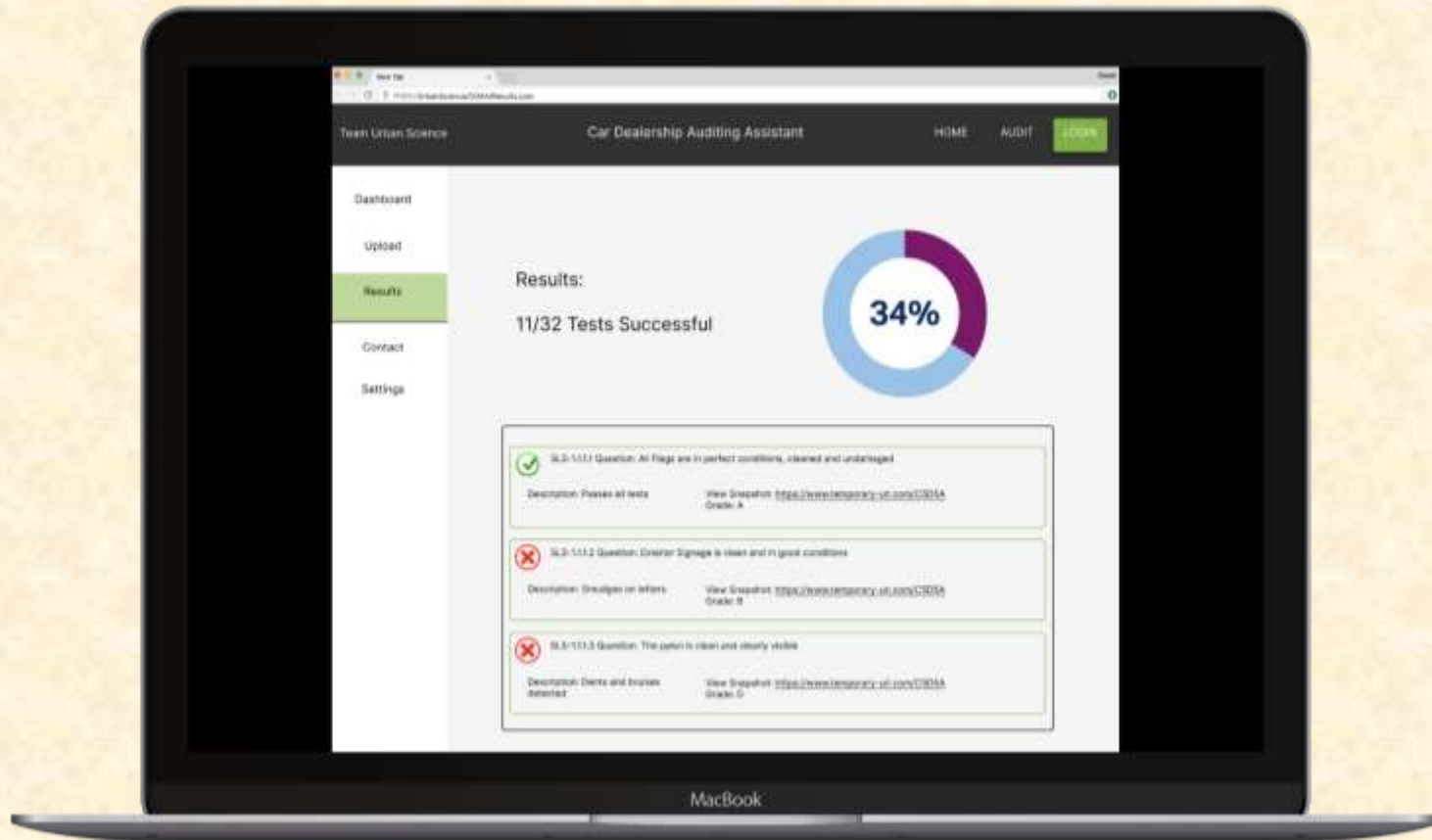
Screen Mockup: Dashboard



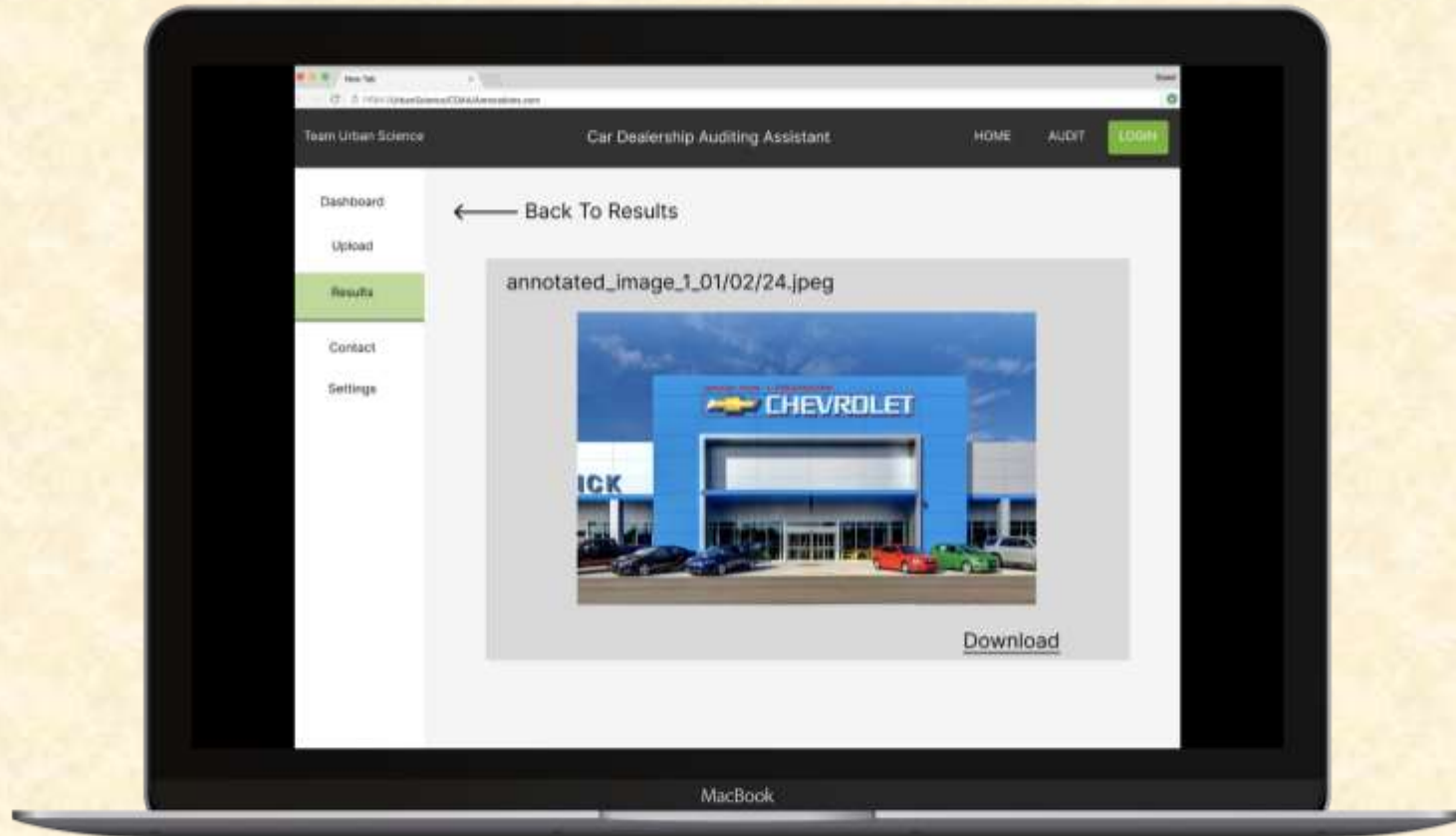
Screen Mockup: Media Upload



Screen Mockup: Results



Screen Mockup: Annotated Image

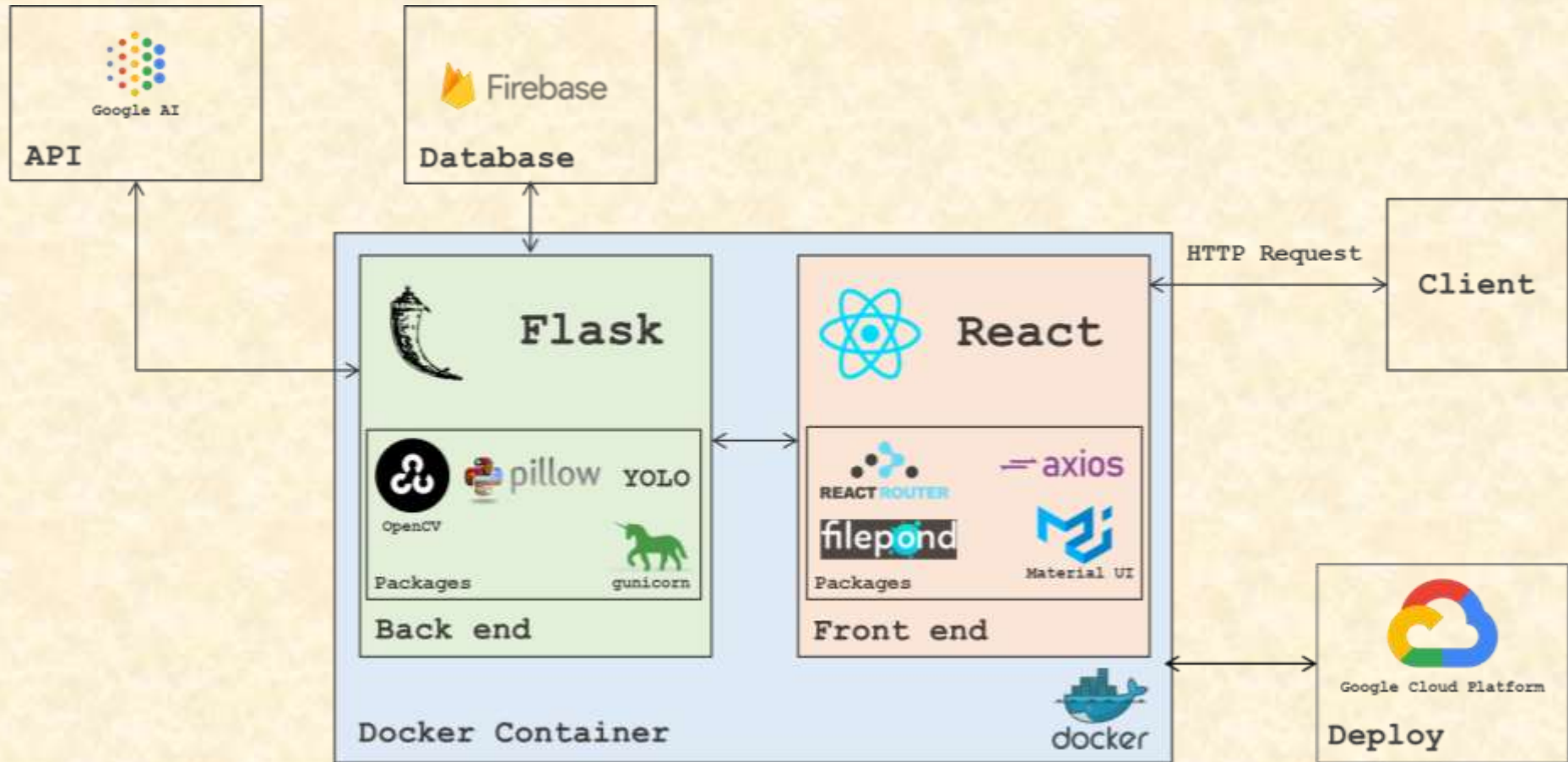


Project Technical Specifications

- 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?

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