MICHIGAN STATE UNIVERSITY

Project Plan

Analysis of Autonomous Vehicle Testing Video

The Capstone Experience

Team Aptiv

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Spring 2019

From Students…
…to Professionals

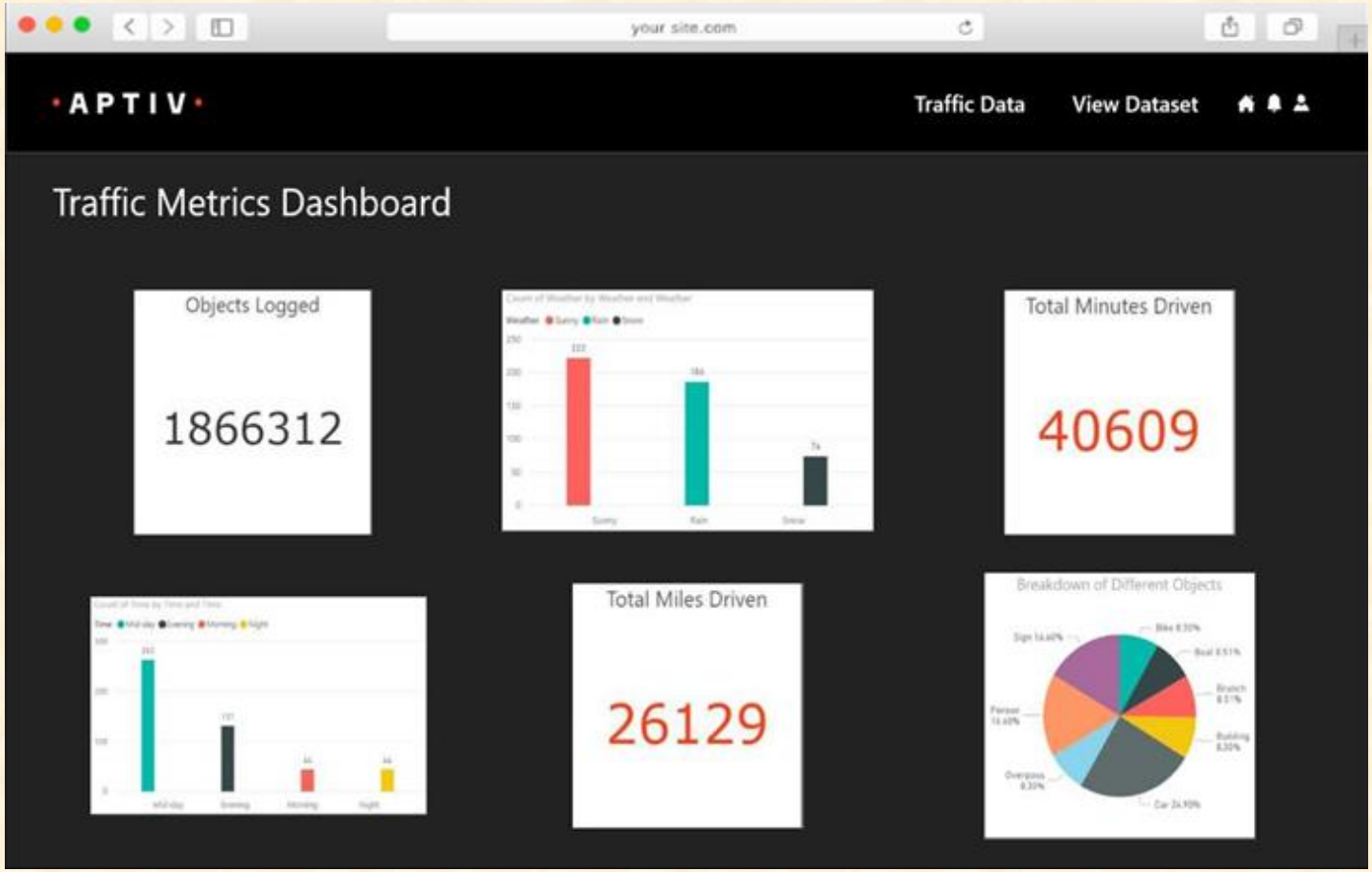
Functional Specifications

- Design schema to house information pulled from images (file name, objects, environment)
- Create an image processing algorithm to identify these pre-determined scenarios
- Stream results from the model into the database so scenarios can be queried
- Develop a web application to utilize database for easy user experience

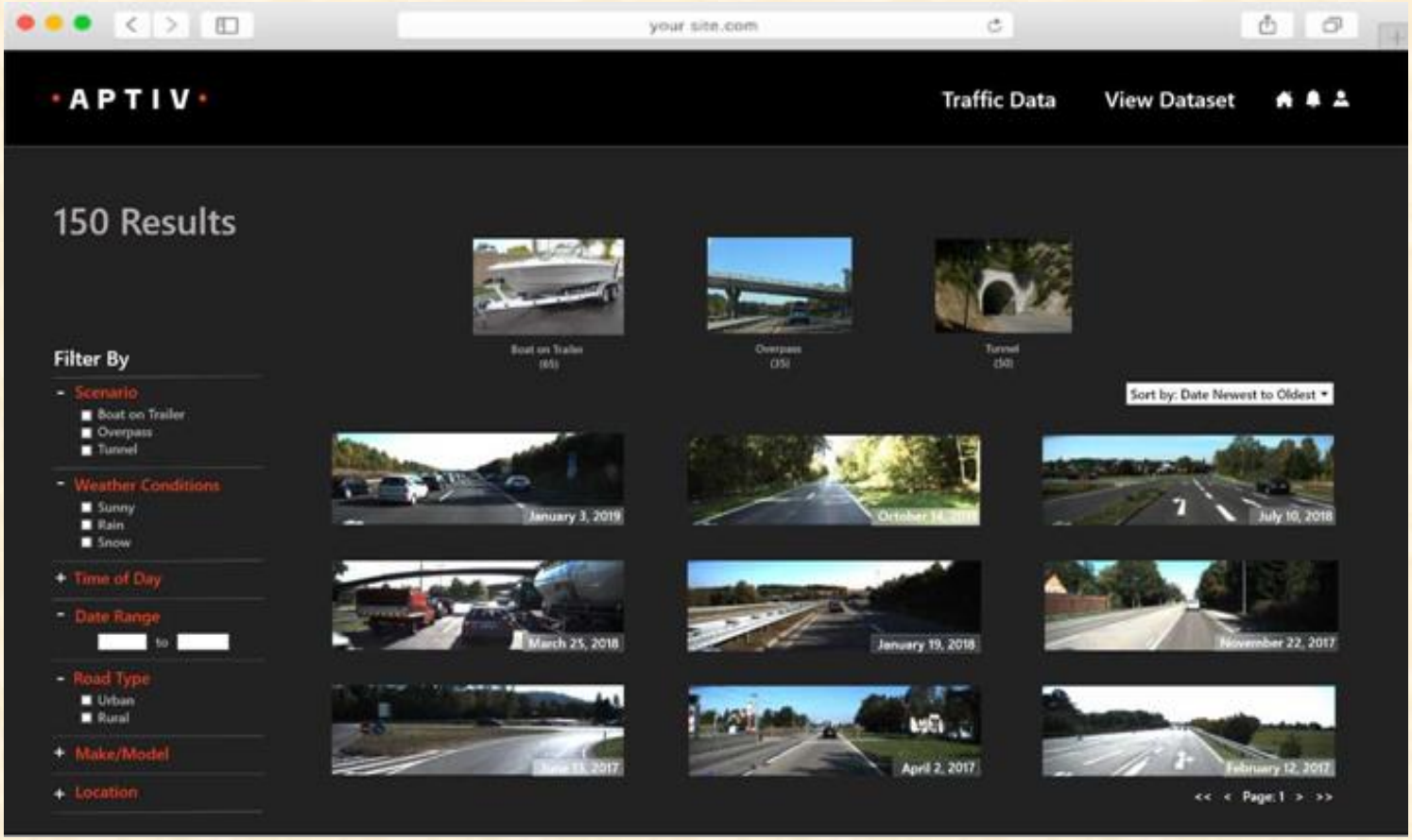
Design Specifications

- Labeling videos
  - Create models for training data, testing data, validating data
  - Annotating videos and images
- PostgreSQL
  - Store data into database
- Prototype Web application
  - Data visualization

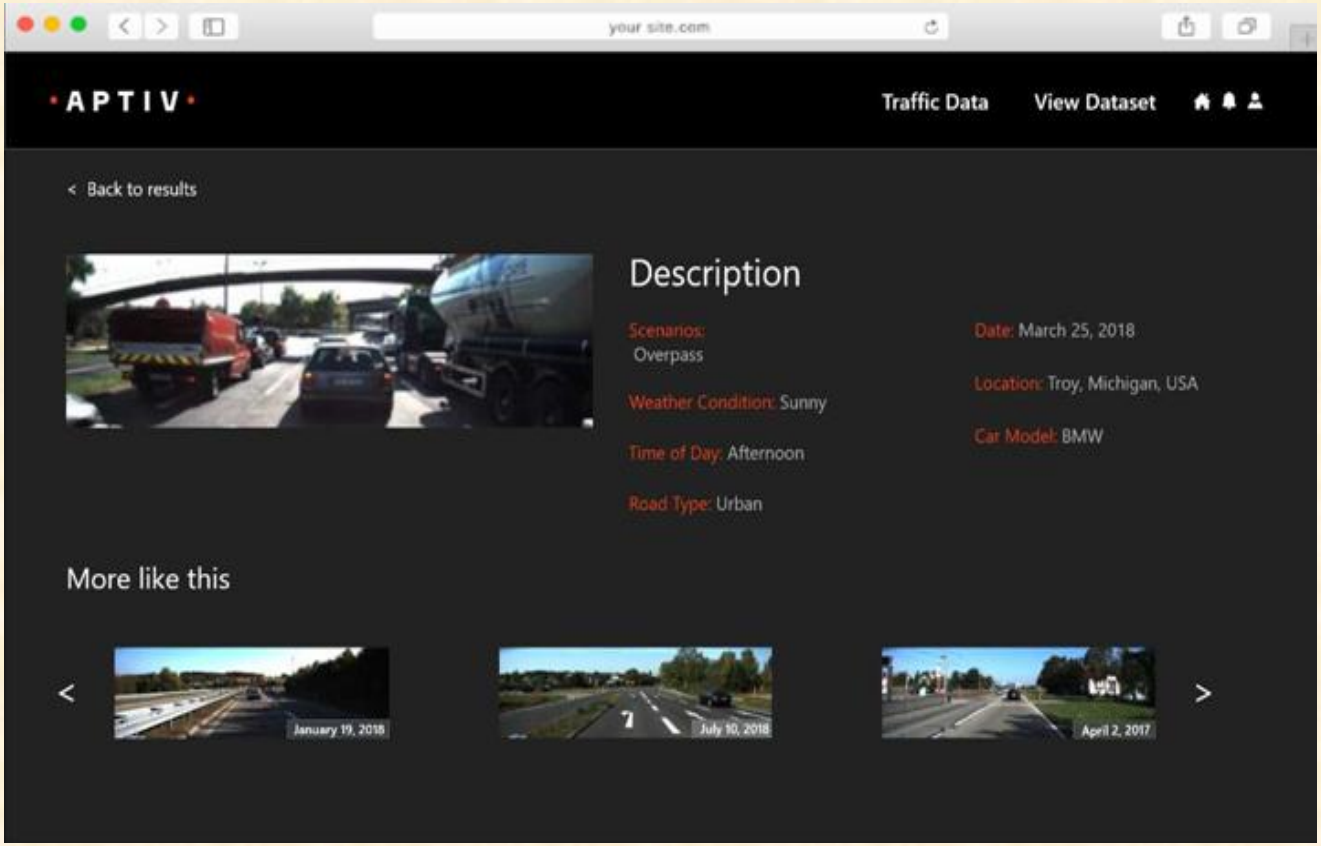
Screen Mockup: Dashboard



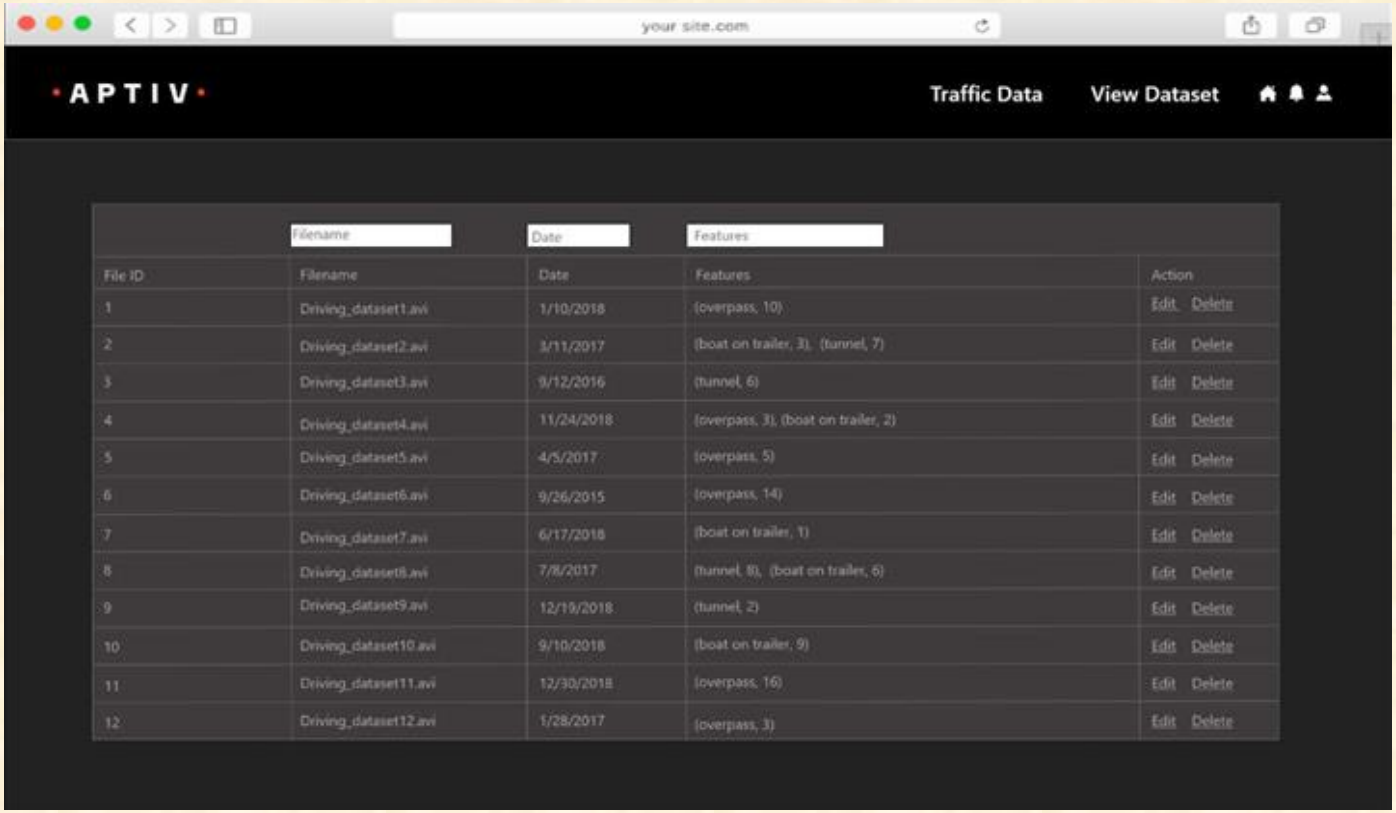
Screen Mockup: Traffic Data Results



Screen Mockup: Single Image Page



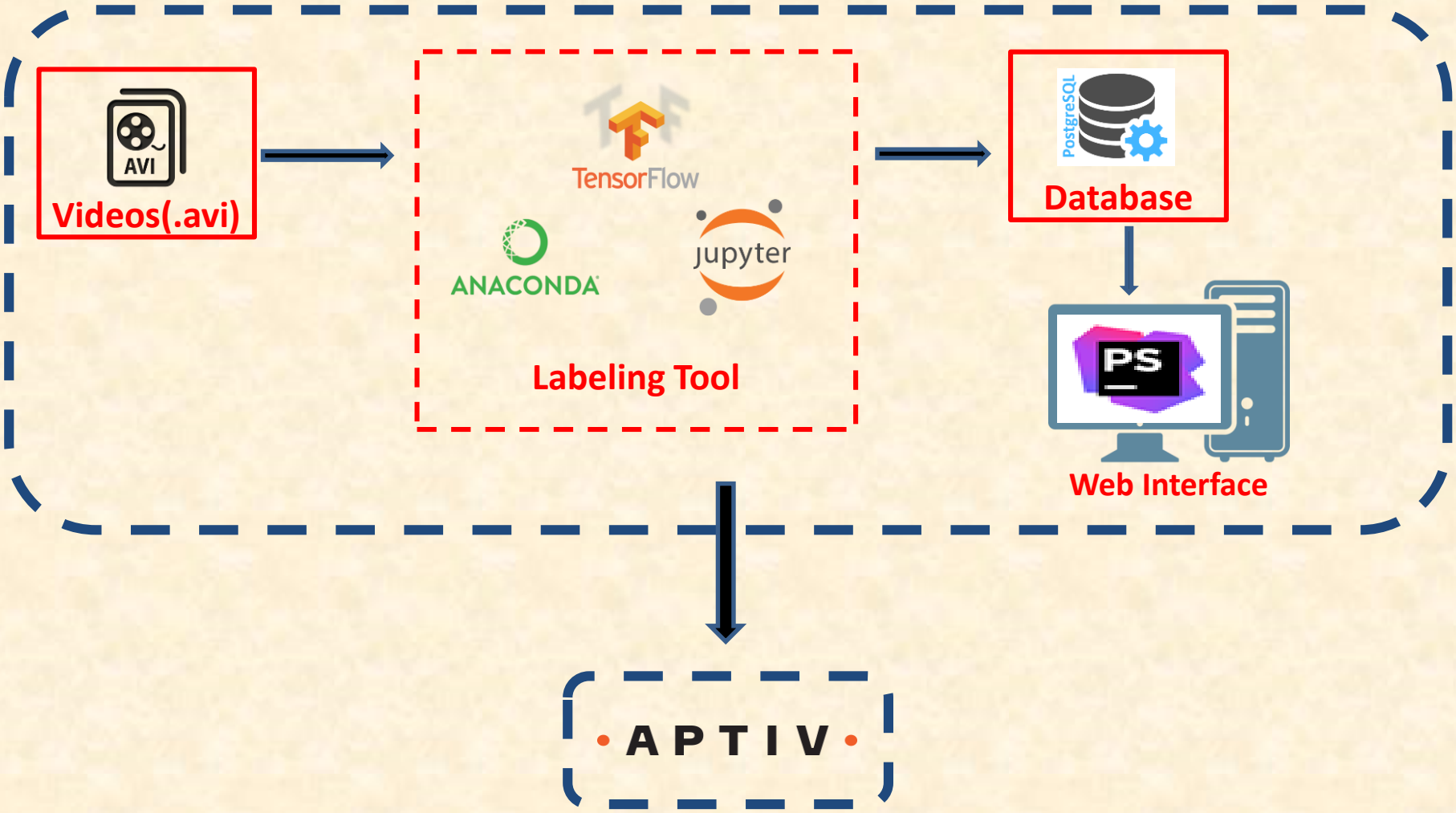
Screen Mockup: Database Visual



Technical Specifications

- Backend
  - PostgreSQL 11.1
  - Jupyter Notebook 5.4
  - TensorFlow 1.5 API
- Frontend
  - Web based application developed in HTML 5, CSS 3, JavaScript 1.8.5, and PHP 3.5+
- API
  - Python 3.6.1

System Architecture



System Components

- Hardware Platforms
  - Rack mount server
  - Aptiv provided PCs
- Software Platforms / Technologies
  - TensorFlow/Jupyter Notebook
  - Machine Learning and deep learning
  - PostgreSQL Database
  - HTML, CSS, JavaScript, PHP

Risks

- Knowledge Gap
  - Description: Lack of experience with Deep Learning Framework
  - Mitigation: Do tensorflow.org tutorials. Contact Prof. Tang.
- Lack of Large Dataset for Training Model
  - Description: Attempted to use Berkeley Driving Dataset, but data is in incorrect format and is unusable.
  - Mitigation: Client has given us data through Aptiv laptops and an external link as well.
- Communication with Client
  - Description: Team and Client not on within proximity to meet often.
  - Mitigation: Client has come forward to be more available through email.
- Image Processing Capabilities
  - Description: Need a machine with high computational power and memory to process video.
  - Mitigation: Spoke with Ryan to use MSU machines. Using Aptiv laptops as of now.

Questions?