Project Plan

ERP Air Force: Drone Elephant Recognition and Tracking

The Capstone Experience

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From Students…
    …to Professionals

Functional Specifications

- Problem: Preserve and protect South African wild Elephants

  - Current efforts are expensive and labor intensive

- Solution: Automate tracking and identification of Elephants

  - Identify moments in video where Elephants are in the frame

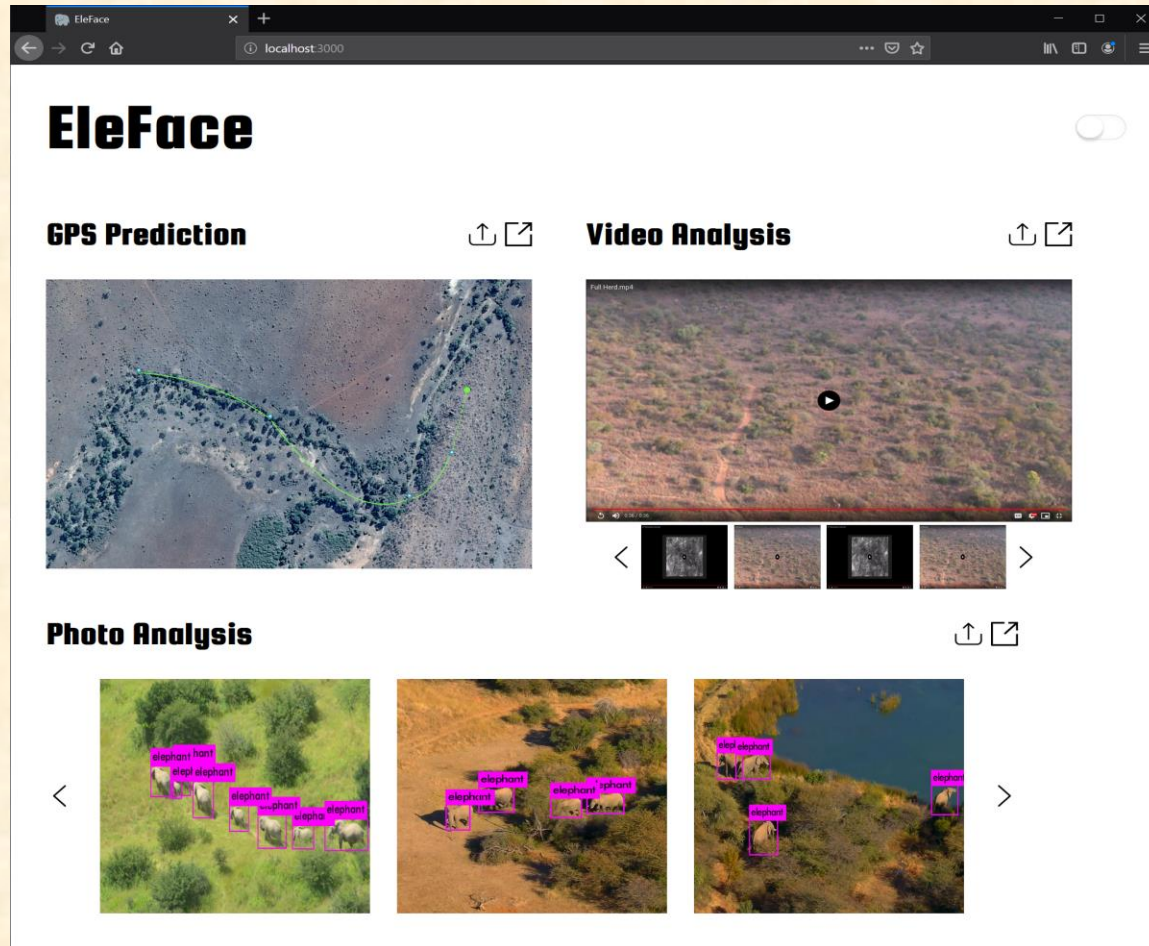 - Inform rangers where to search for Elephants
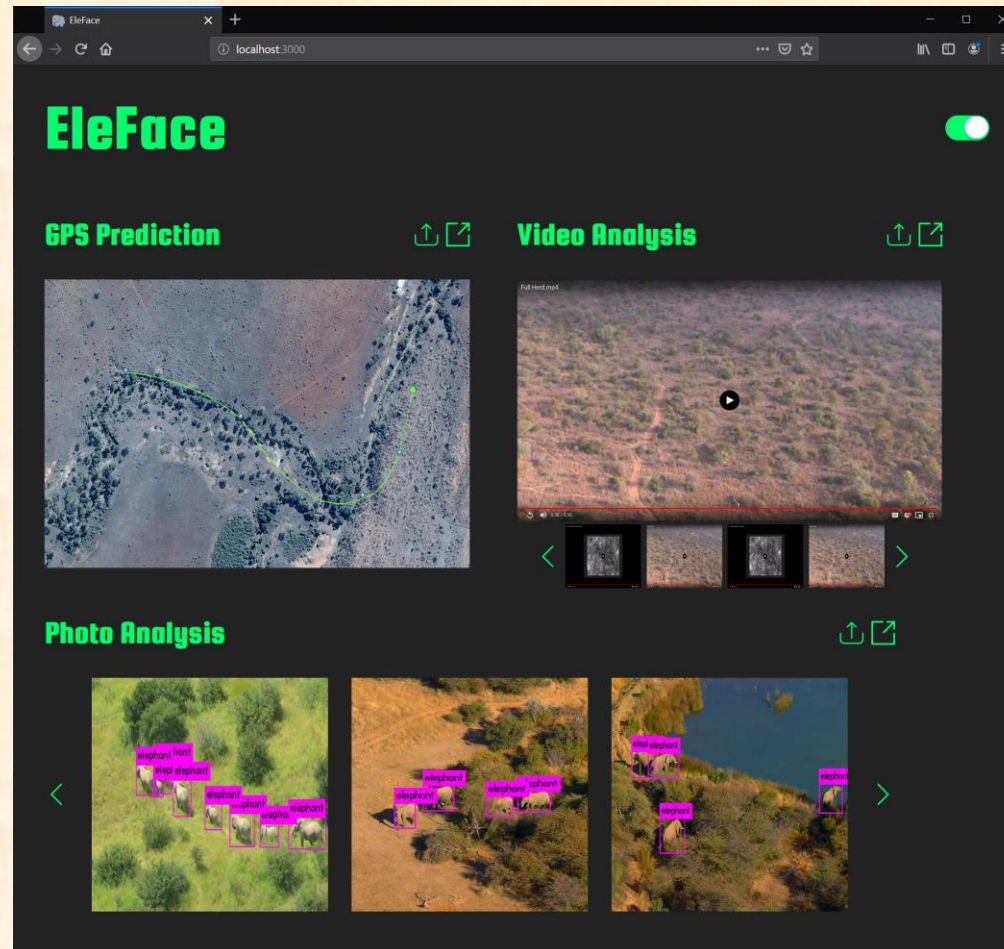
Design Specifications

- Create machine learning models for detection, auto-identification, and location prediction of elephants

- Build an API for high level access to each model

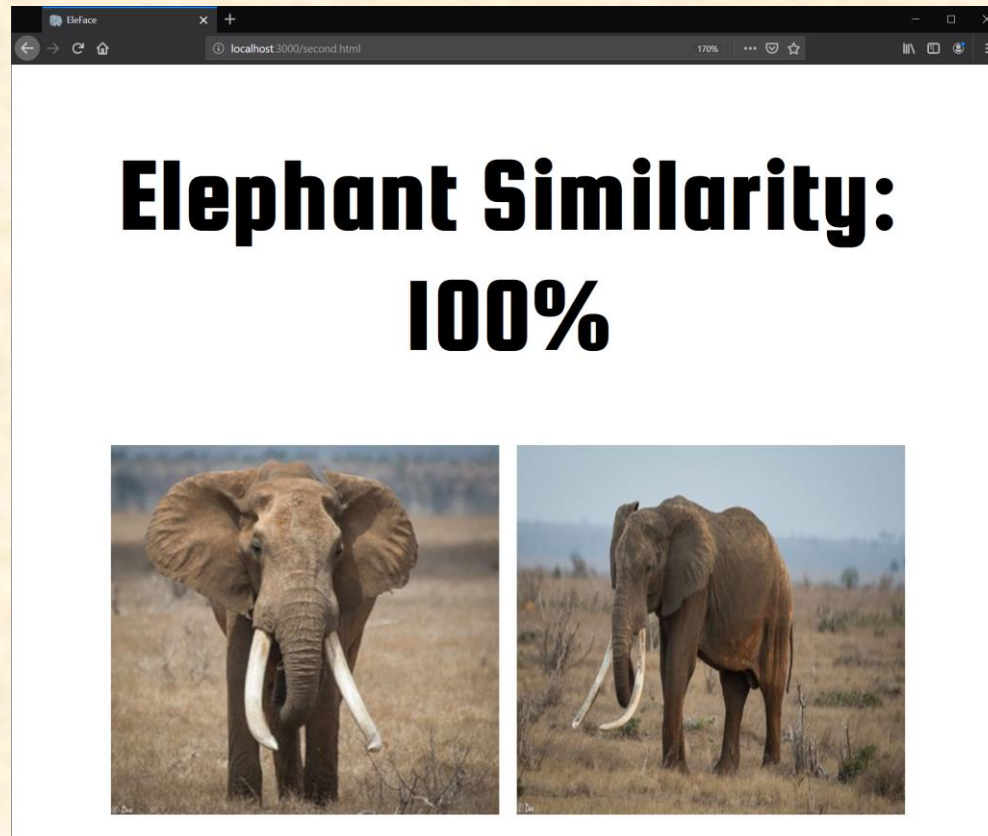- Build a dashboard for user-friendly interaction with the API

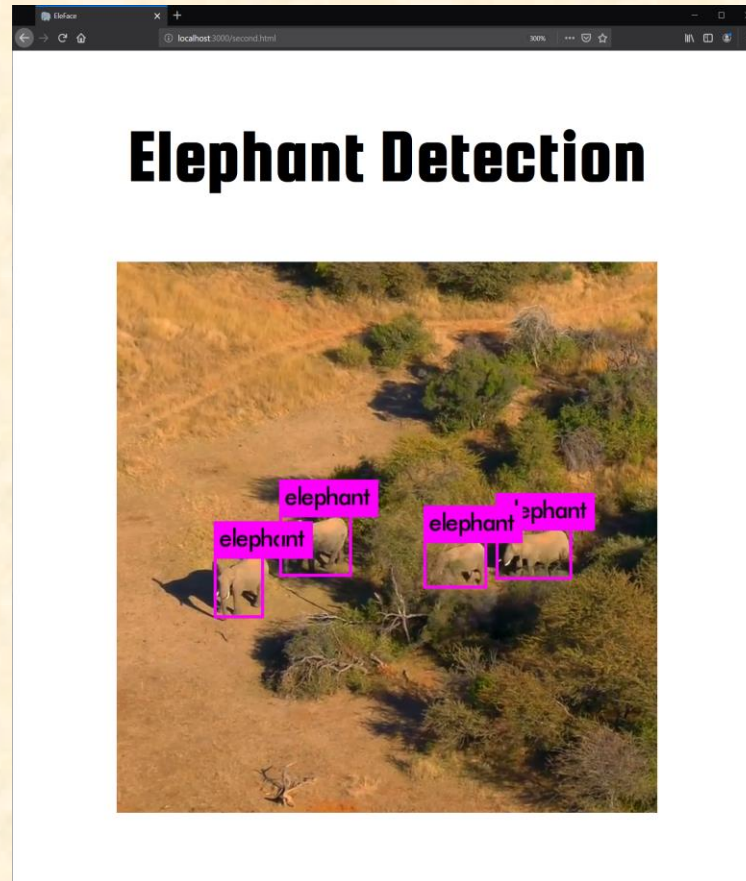# Screen Mockup: Dashboard Home (Light Theme)

Screen Mockup: Dashboard Home (dark theme)
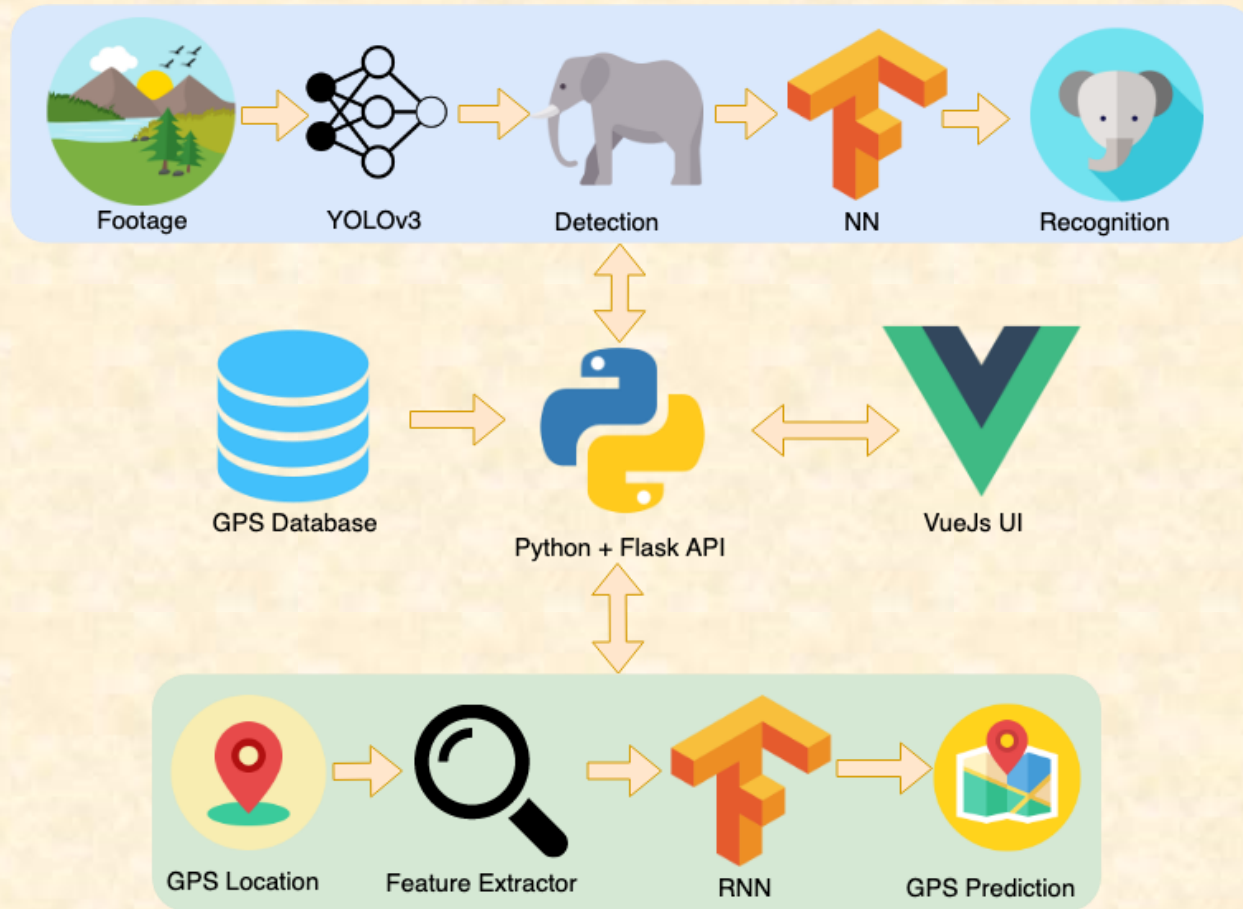
Screen Mockup: Elephant Similarity

Screen Mockup: Detection

Technical Specifications

- Detection
  - YOLOv3

- Identification
  - Multi-layered neural network for developing a similarity metric for Elephants

- Tracking
  - Two separate RNNs for longitude and latitude
  - Trained with historical GPS, elevation, and vegetation data

System Architecture

System Components

- Hardware Platforms
  - HPCC for training models
  - Project run and hosted locally
- Software Platforms / Technologies
  - UI: Vuejs
  - API: Python Flask
  - Machine Learning: YOLOv3 & Tensorflow

Risks

- Drone Footage not fit for model
    - Resolution limits ability to label and detect elephants
    - Request closer drone footage
- Lack of Verification Data
    - Unable to verify an identified elephant is truly the same elephant
    - Use famous elephants to develop similarity metrics
- Quantity of GPS data
    - Need GPS data from a long period of time to accurately predict movement
    - Use data from other sources
- Elephants Indistinguishable from above
    - Elephant image recognition is not necessarily possible from a drone
    - Focus more on trail cam footage and GPS prediction

Questions?