Advanced Wildlife Data Tracker

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Abstract

The project's aim is to help improve the overall state of trail cameras by providing consumers with the ability to detect animals and general information in the surrounding areas. The features included with the general area is the ability to determine humidity, temperature, and coordinates. Likewise, the device uses animal recognition to detect the animals and potential objects.

Data Analyzing Software

- Built using Python
- Utilizes multiple libraries and APIs, including CustomTkinter and OpenWeather
- Allows easy import, management, and visualization of field data
- Utilizes Folium for data mapping
- Data stored on a SQL Server for security
- Displays data points on an interactive map
- Clicking on a marker shows timestamped information:
  - Humidity
  - Temperature
  - Pictures
  - Animal identification
  - Weather forecast using historical data from OpenWeather API

Design
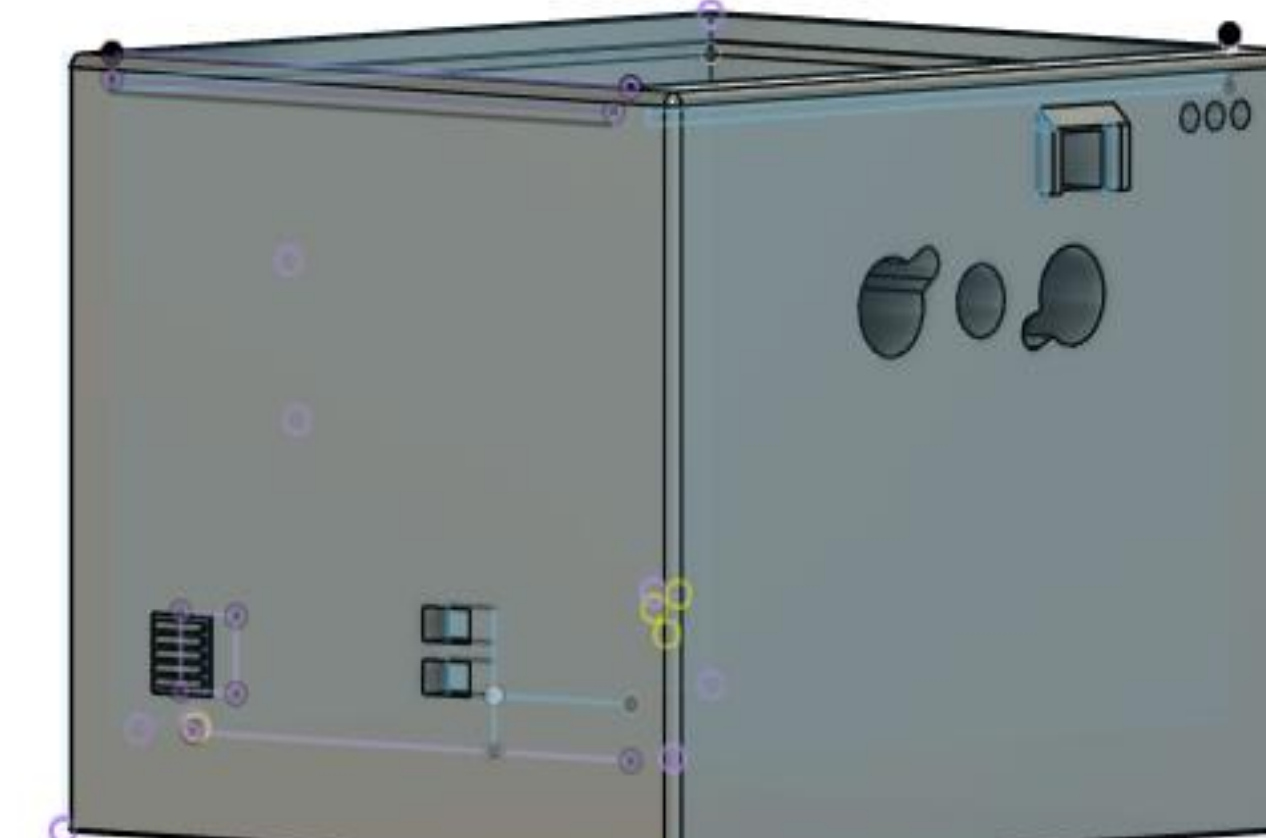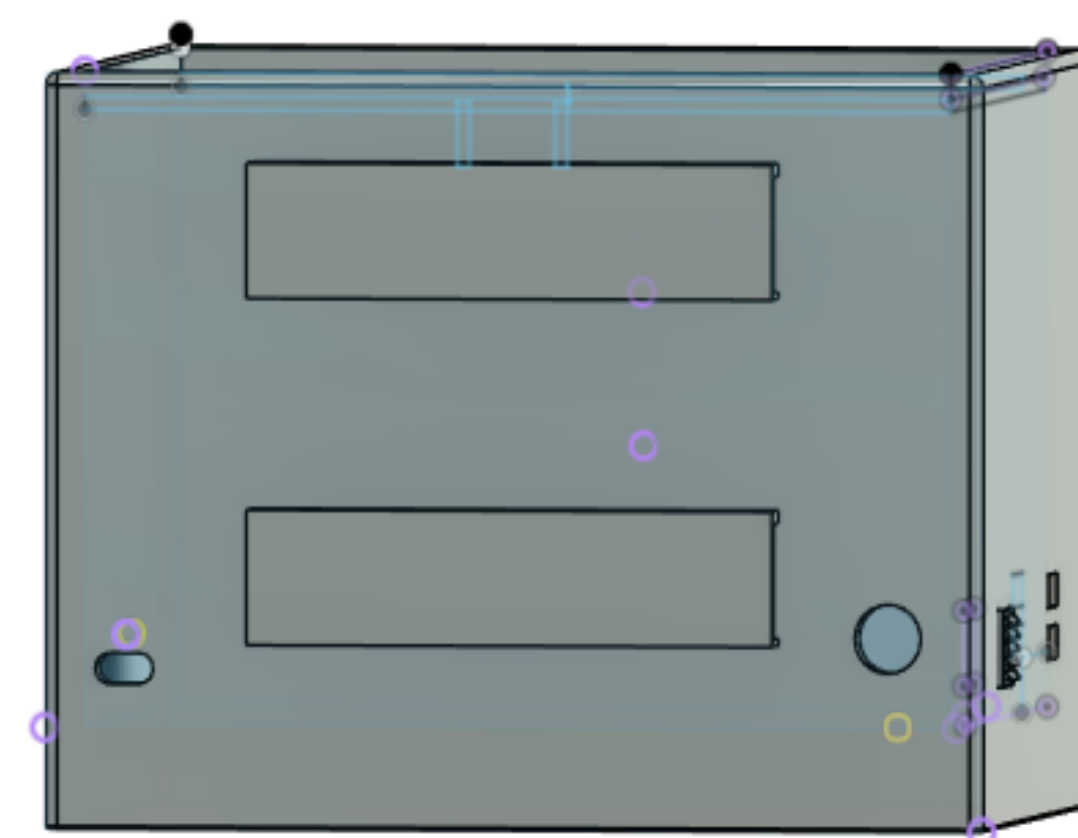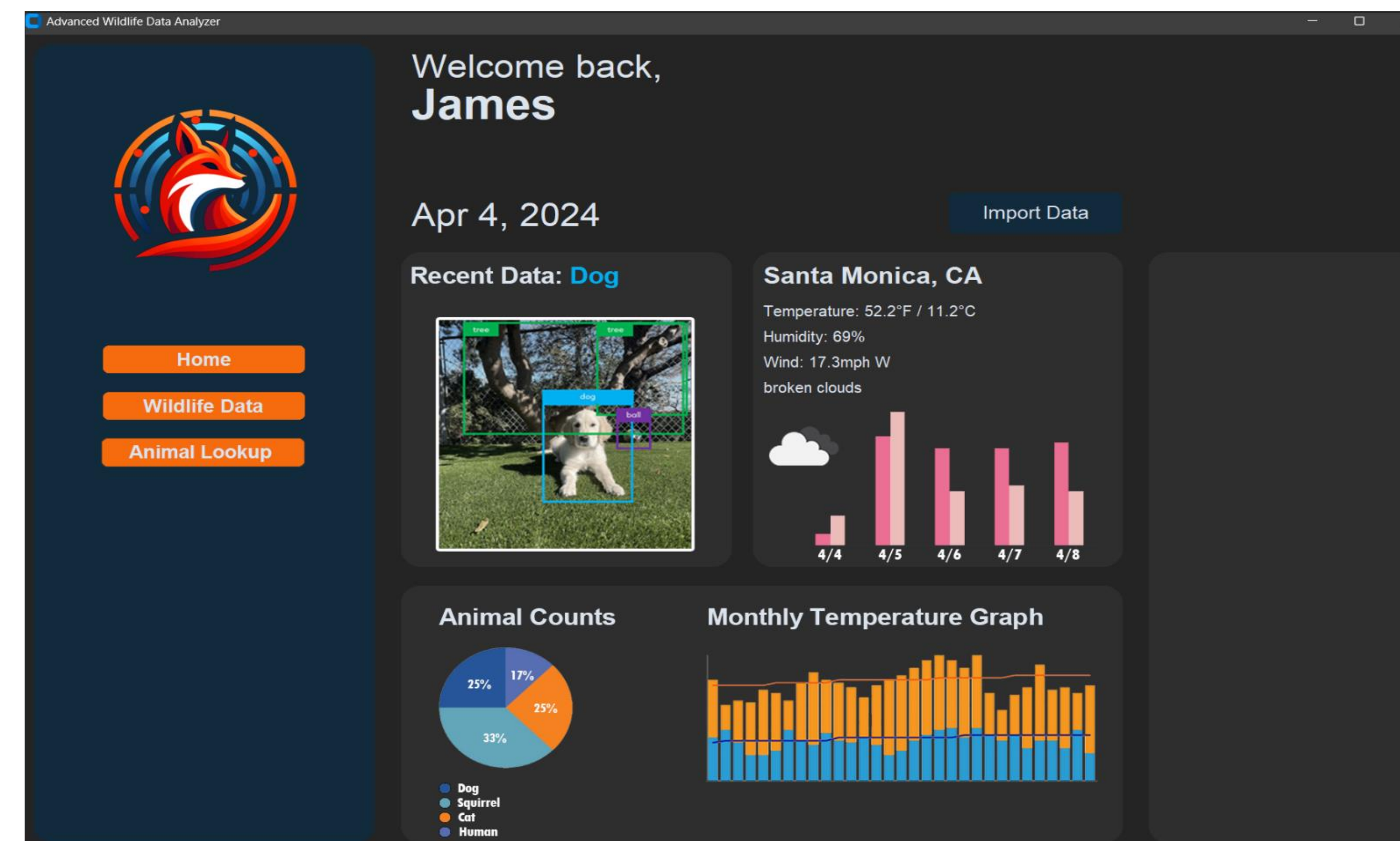
Hardware

- Raspberry Pi 4B 8Gb
- Heatsink
- GPS Tracker
- Temp/Humidity Sensor
- Infrared Camera
- Custom 3D Case
- LEDs
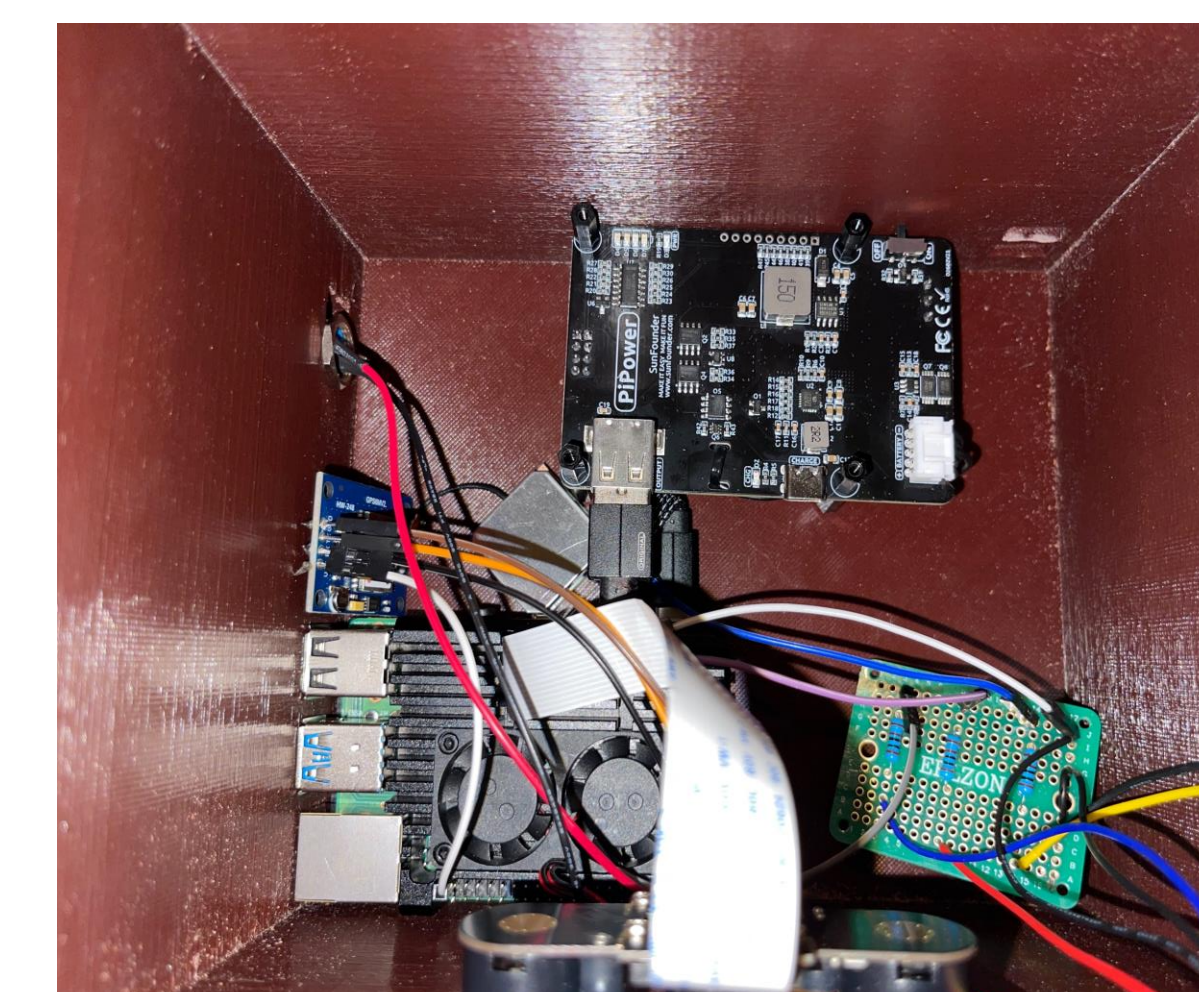
Benefits

- Animal Identification
- General Environment Info
- Simple GUI outlay
- Built in GPS
- Easier Data Export

Applications

- Trail Camera
- Security Camera
- Environmental Research
- Endangered Species Monitoring

Darknet-YOLO

YOLO (You Only Look Once) is a neural network created by Joseph Redmon programmed in C. This framework allows the program to run and fully analyze images or videos and outlines objects or people with an accuracy meter. This program allows minimal to no filtering need and allows for a high accuracy rate. Due to these facts, it allowed the project to use the framework as it gives the best readings for our scenarios.
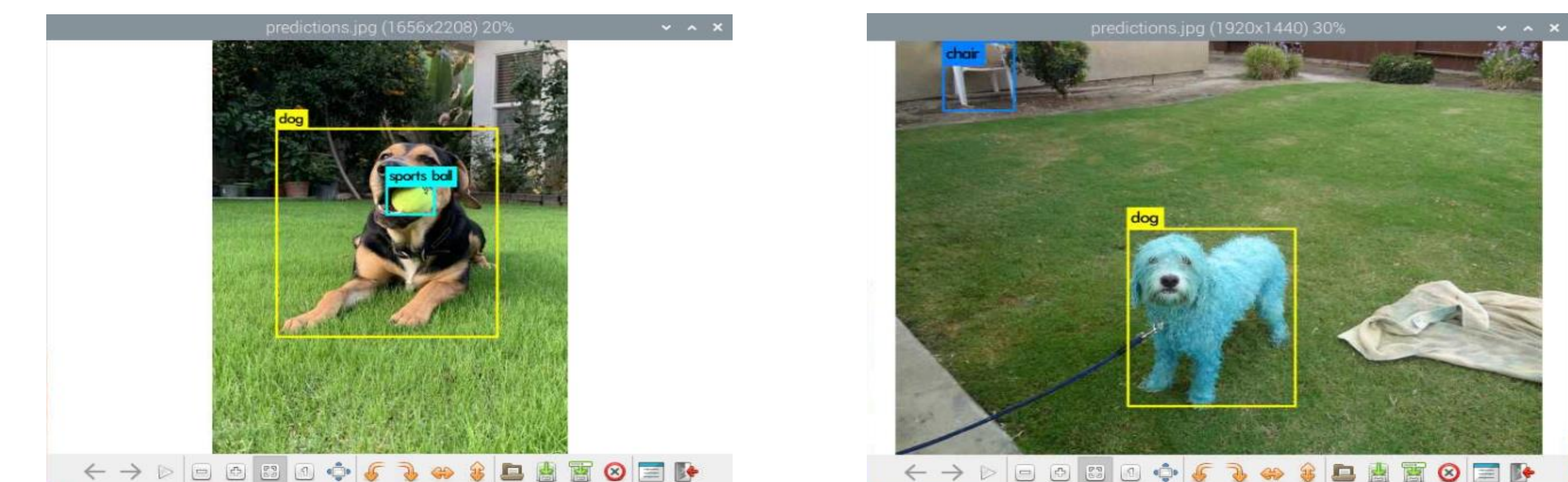
Data

- Data Gathering Insights:
  - Observing animal reactions to environments
  - Tracker reveals patterns when placed for an extended period
  - Patterns Include weather influence and humidity variations
- Visualization via Graphs
  - Animal-specific representations of humidity trends and temperature fluctuations