Perception

The Team - Aerospace

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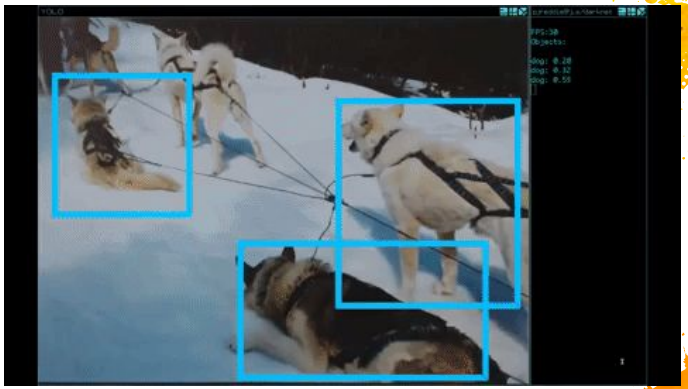
The Project

Automatic Image + Video Object Detection and Tracking

Image

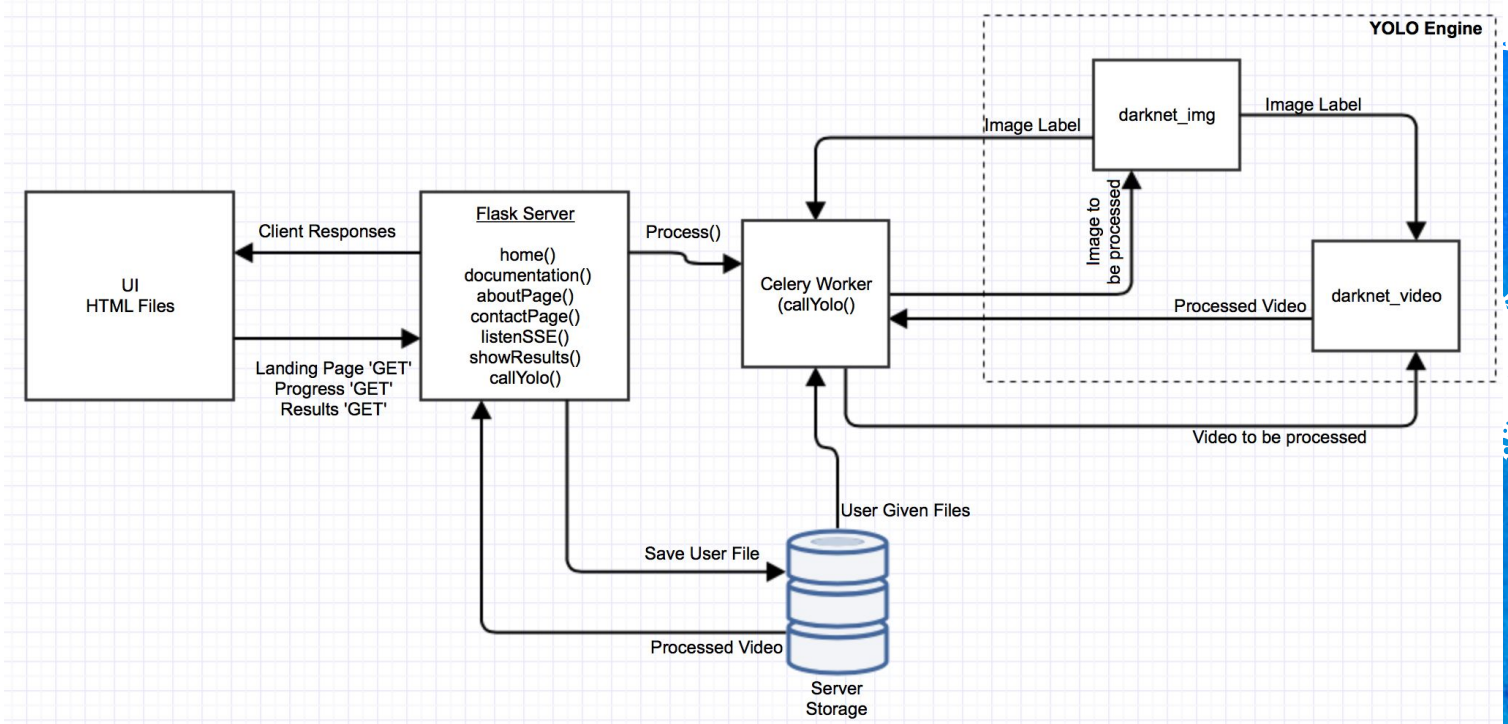


Video

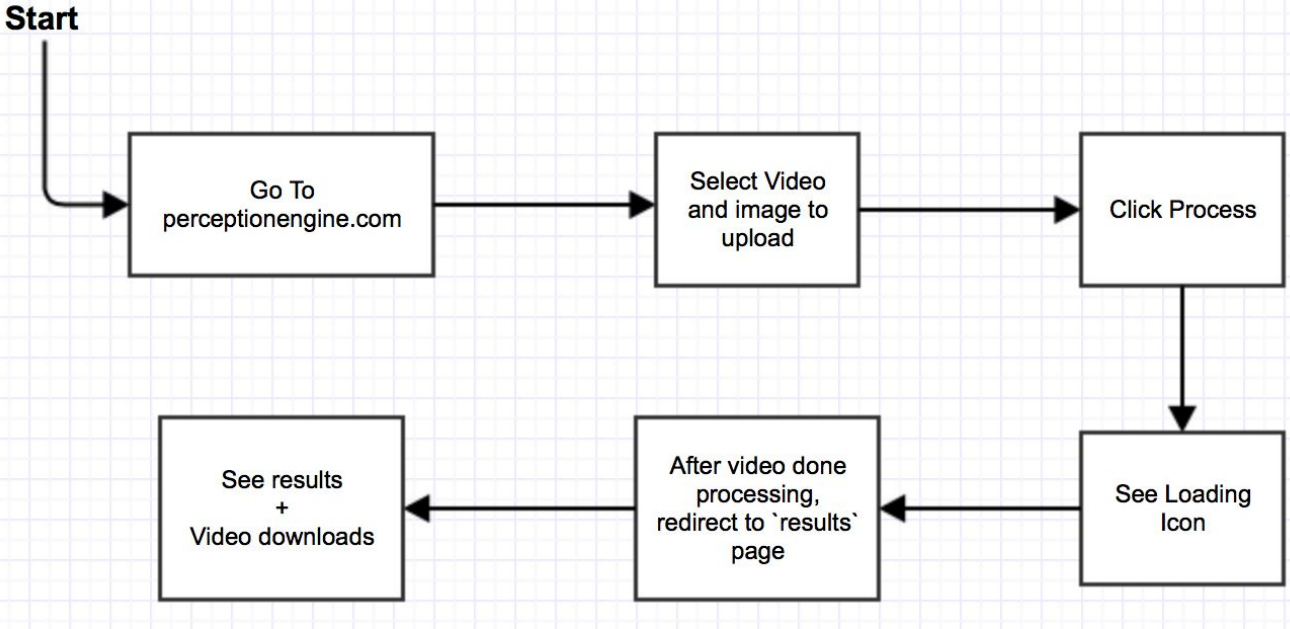
Specifications

- **Input**: Target Image, Video Recording
- **Output**: Streamed bounding box location and size.
  Processed Video
- **Action**: Finds desired object in video and tracks it

System Architecture



User Flow


Start
Go To perceptionengine.com
Select Video and image to upload
Click Process
See Loading Icon
After video done processing, redirect to `results` page
See results + Video downloads

Web Interface

HTML/CSS/JS

- To build out the web page user interface
- Minimalistic design
- Dynamic handling of changes in the Document Object Model (DOM)

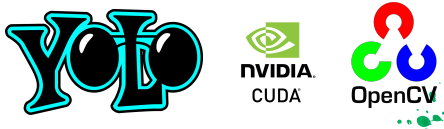
DropzoneJS/Ajax

- Adds user upload functionality
- Allows for asynchronous webpage loading
- JS server side event (listening)

Flask

- Python web microframework
- Allows for asynchronous webpage loading
- JS server side event (processing)

Server Side



Flask

- User Token Generation
- JS server side event (processing)
- Video Streaming HTML5

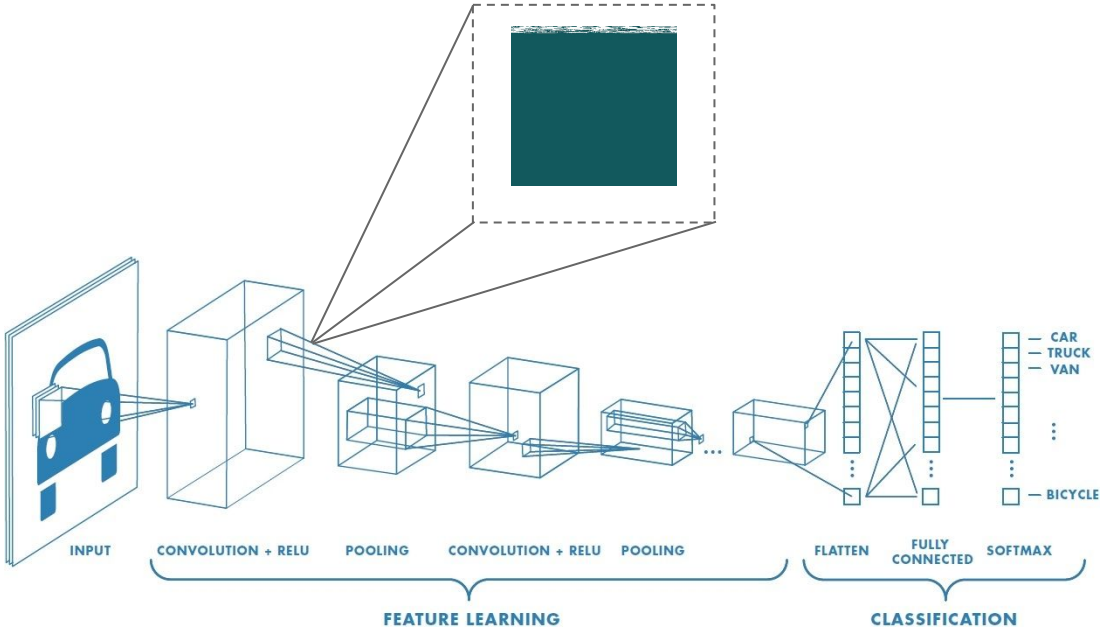
Celery/RabbitMQ

- Asynchronous task handling
- Process multiple user requests efficiently
- Broker message passing/storage

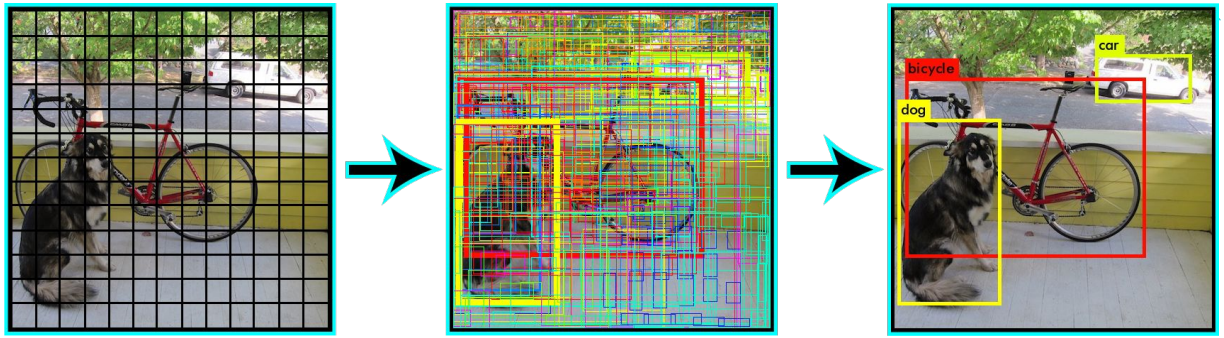
YOLO/OpenCV

- Fast Convolutional Neural Network based object recognition module
- Image + Video processing in one step
- OpenCV + CUDA for GPU speed up

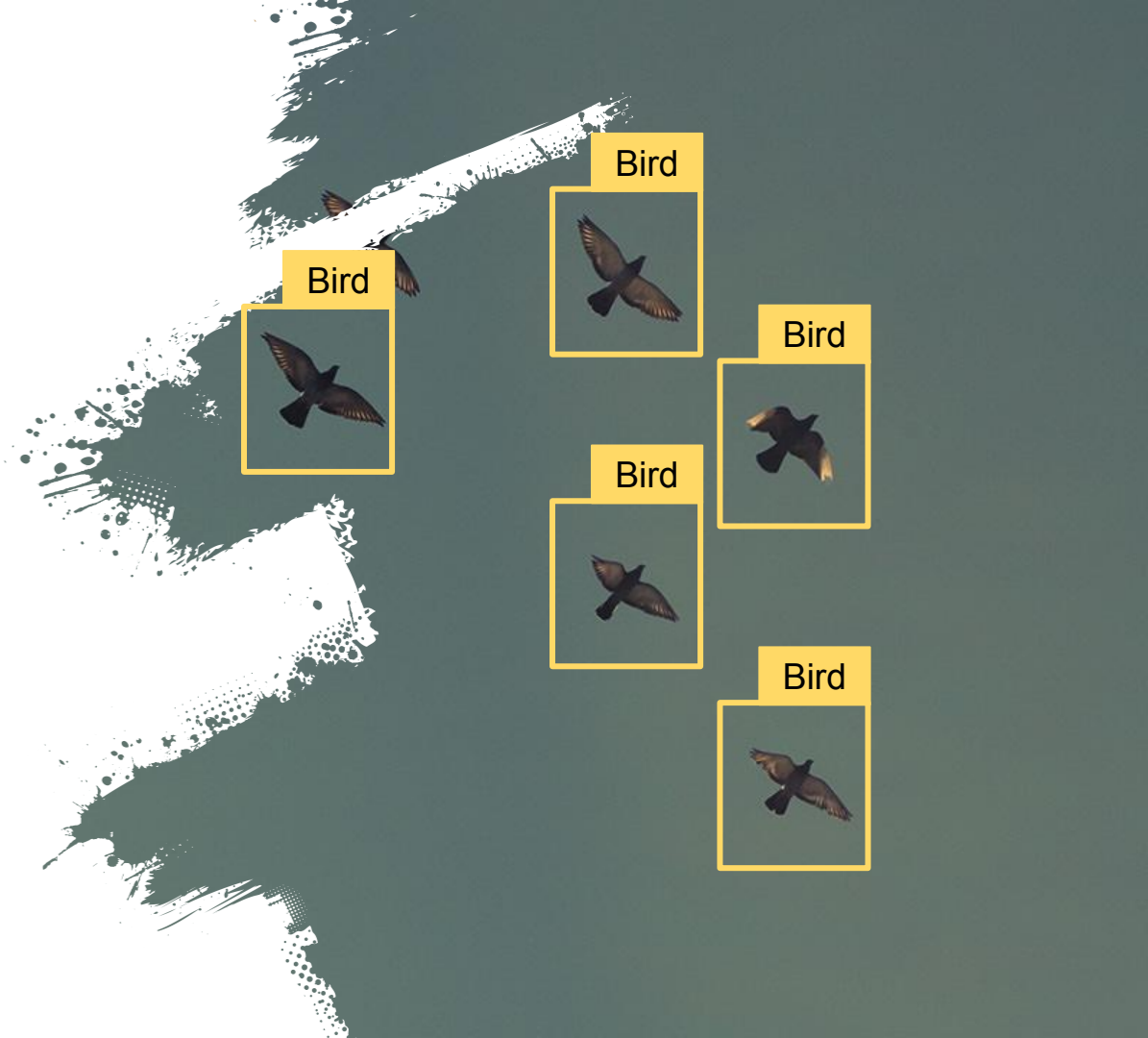
Deep Learning with YOLO

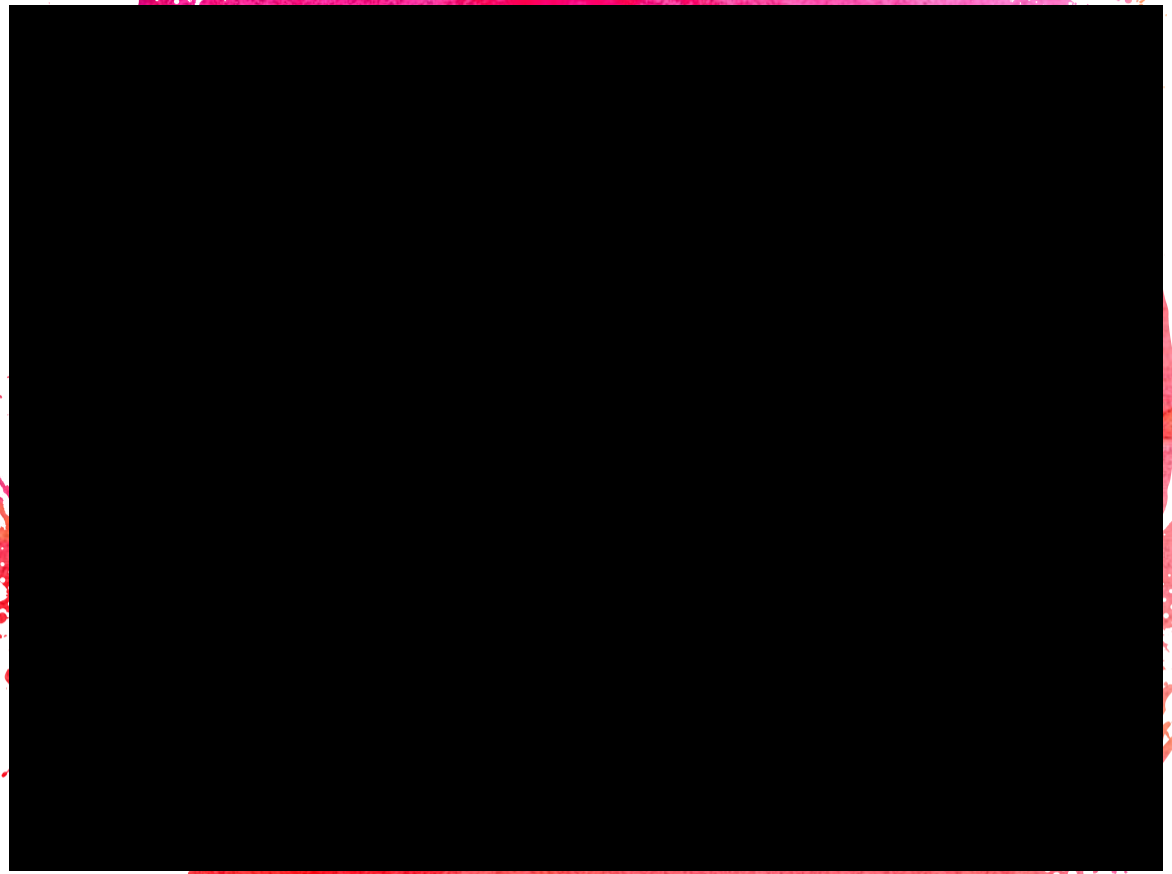


Deep Learning with YOLO



Demo





Future Plans

- Specificity in Object Detection
- Siamese Neural Network
- Live Video Stream Processing


Thank You