Project Plan Presentation
Image Similarity System

The Capstone Experience

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Project Sponsor Overview

• Software Company based in Troy, MI
• Signature product is the DeepAssociation people counter system
• Use cases include site occupancy tracking (gyms, stores etc.) and activity pattern analysis.

![DeepAssociation™](image)
Project Functional Specifications

• One service offered by Moii is real-time object detection and alerting in CCTV footage
• Process to collect training data to add a new object to detect is time-consuming
• Project saves time by enabling automatic parsing of CCTV footage to locate images similar to the new object
Project Design Specifications

• Website enables users to upload images and draw bounding boxes over them
• The images are compared against the stored CCTV footage
• Users can view side by side comparisons of the input image and the returned result
Screen Mockup: Select Images
Screen Mockup:
Select Image To Draw Bounding Box
Screen Mockup: Bounding Box Drawn

Current Image Edit

FILE NAME: IMG_243.png
Box Coordinates: (100, 50) (349, 123)

Uploaded Images

Images to be Uploaded

Upload
Start

Cl: 50
Number of Results: 10
Class Label: Motorc
Screen Mockup: Results

Current Result Image

Query Image

Class Label: Motorcycle

Result Image

Image Results

Sort Results

Sort By

Download
Project Technical Specifications

- User uploads images to Firebase Storage and receives links
- Links and bounding box coordinates sent to model
- Best patchwise similarity score calculated from each frame of footage using Deep Template Matching
System Architecture

Website

Tailwind CSS

TS

Cloud Storage for Firebase

Model

PyTorch
Project System Components

• Software Platforms / Technologies
  ▪ Typescript
  ▪ ReactJS
  ▪ Tailwind CSS
  ▪ Firebase
  ▪ PyTorch
  ▪ DECS Linux System via SSH
  ▪ Deep Template Matching
  ▪ Google Cloud Platform
Project Risks

- Risk 1
  - Operability: Transferring the images from the frontend to the model while ensuring consistency in aspect ratio, resolution etc.
  - Mitigation: Build prototypes to better understand how to transfer data and the best structure for the model to receive it.

- Risk 2
  - Operability: Uncertainty surrounding effectiveness of model
  - Mitigation: Get model up and running as soon as possible so we have time to experiment, and research other template matching techniques

- Risk 3
  - Operability: Parallelization On Running Similarity Score Calculation
  - Mitigation: Researching and testing parallelization in Python, PyTorch

- Risk 4
  - Operability: Current synchronous request-response architecture may be unsuitable for the task
  - Mitigation: Estimate running time, learn more about constraints surrounding server environment
Questions?
Deep Template Matching Explained

Image Credit: Kothawade et. al.