MICHIGAN STATE UNIVERSITY

Project Plan Presentation

Image Similarity System

The Capstone Experience

Team Moii

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From Students…
…to Professionals

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.

moii

DeepAssociation™

Project Functional Specifications

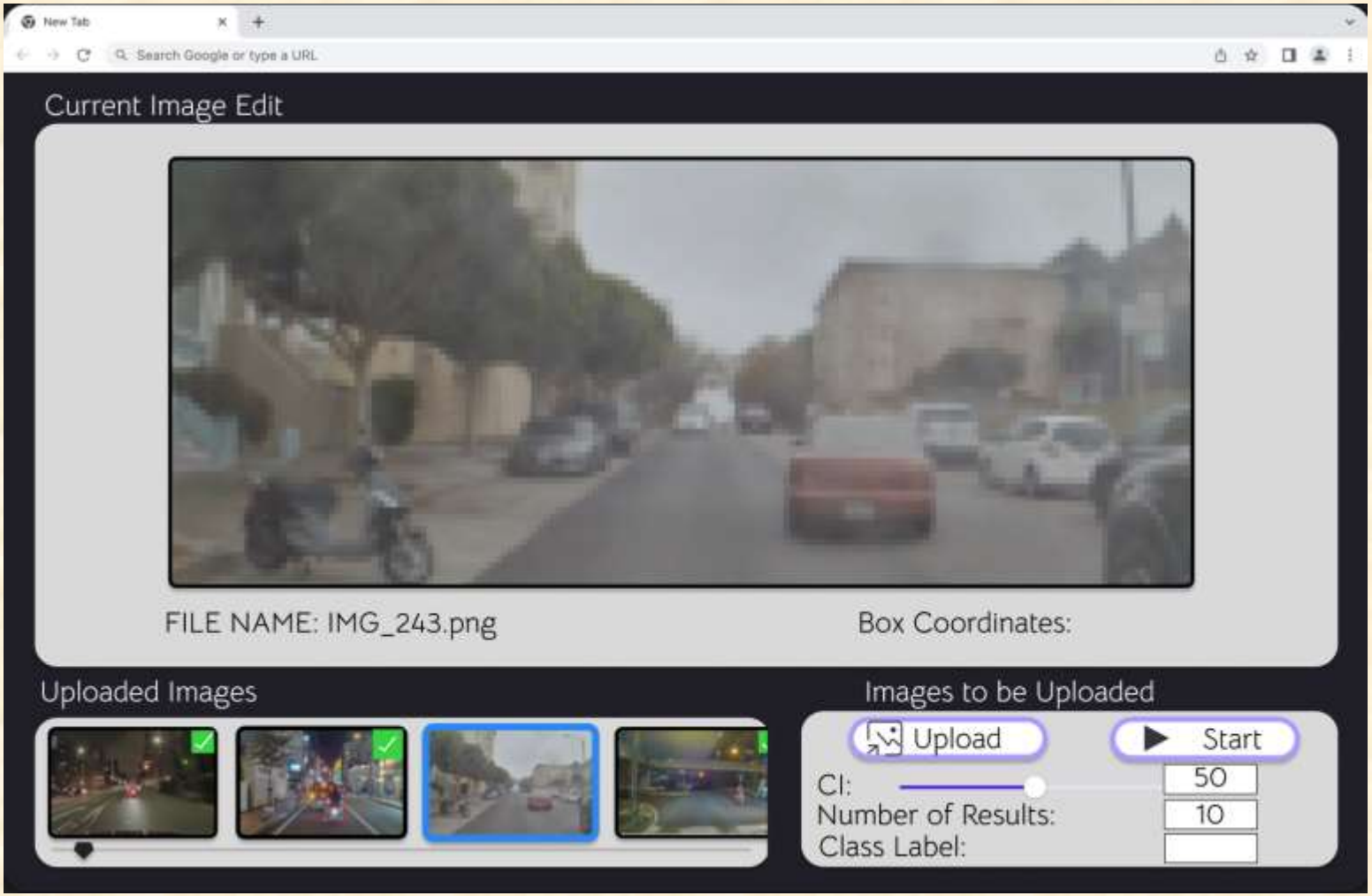
- One service offered by Moii is real-time object detection and alerting in CCTV footage
- Process to collect training data to add a new object to detect is time-consuming
- Project saves time by enabling automatic parsing of cctv footage to locate images similar to the new object

Project Design Specifications

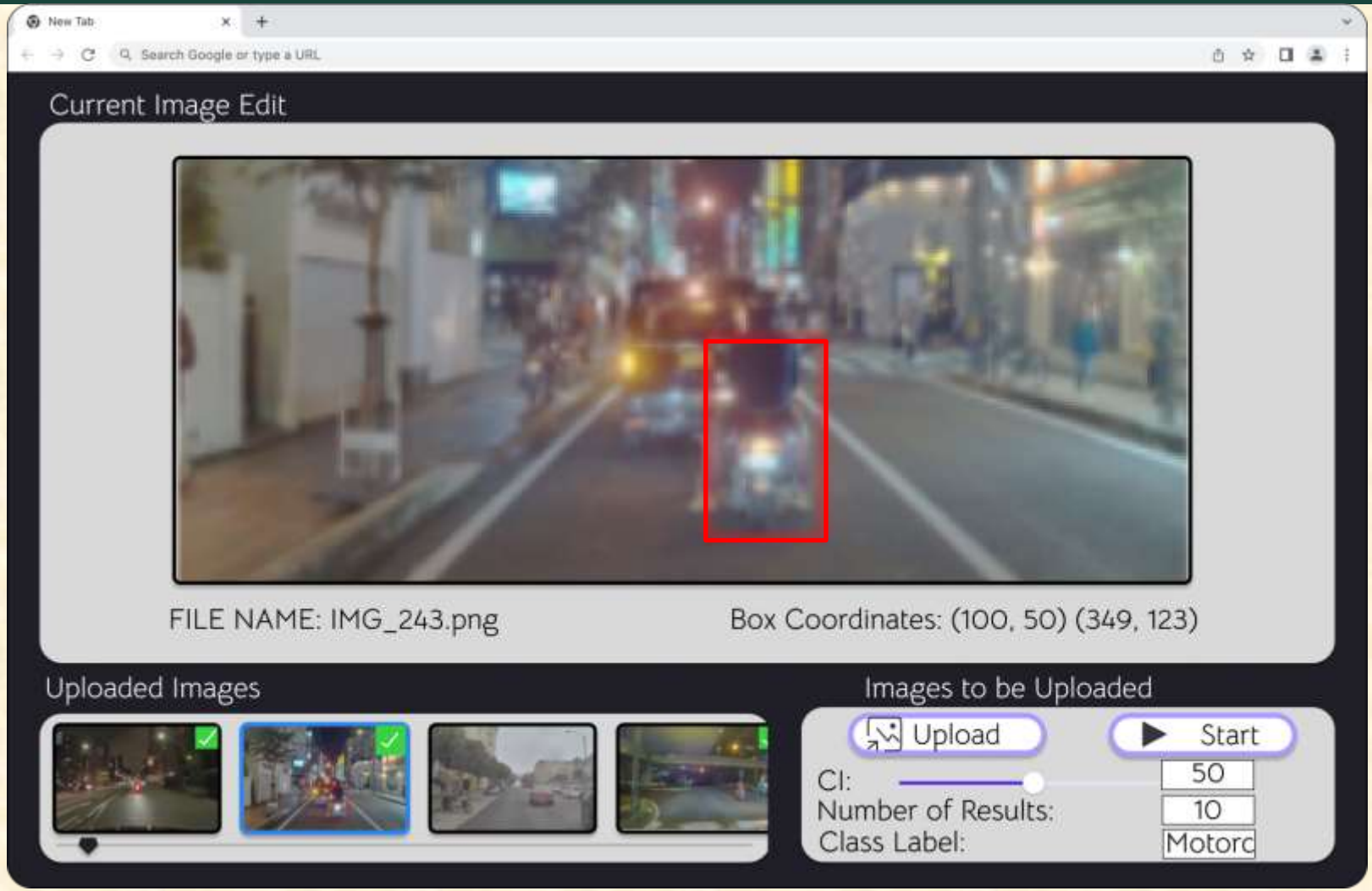
- Website enables users to upload images and draw bounding boxes over them
- The images are compared against the stored cctv footage
- Users can view side by side comparisons of the input image and the returned result

Screen Mockup: Select Images

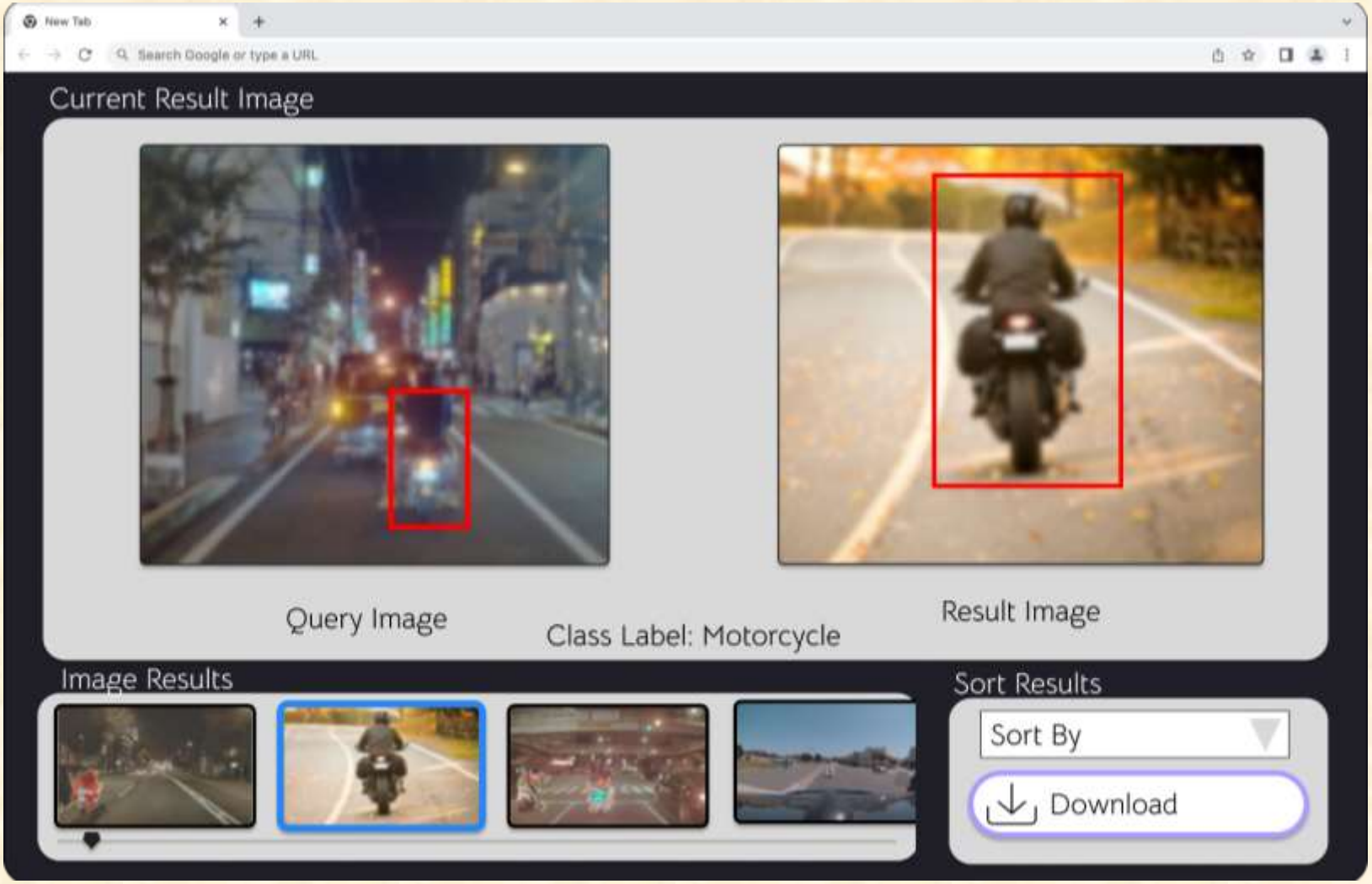
Screen Mockup:
Select Image To Draw Bounding Box



Screen Mockup: Bounding Box Drawn



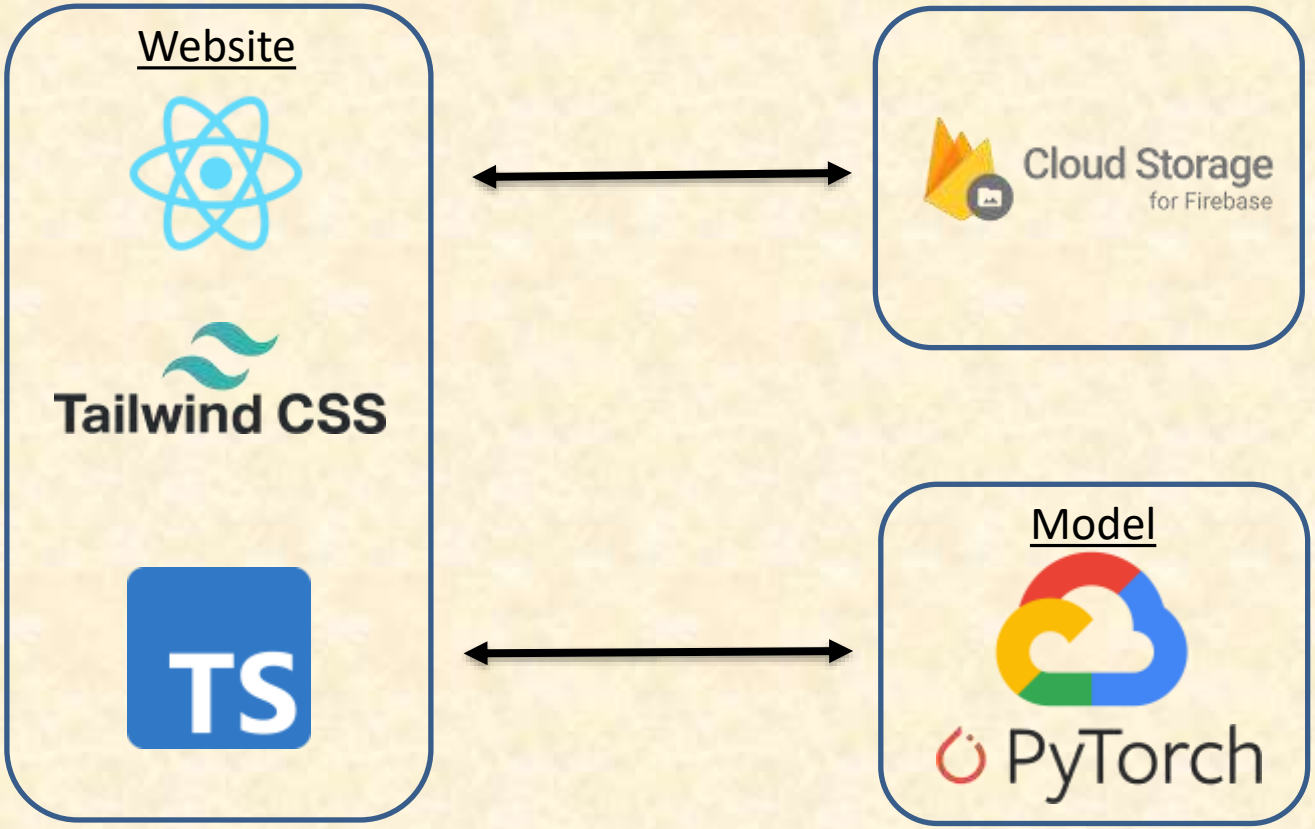
Screen Mockup: Results



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



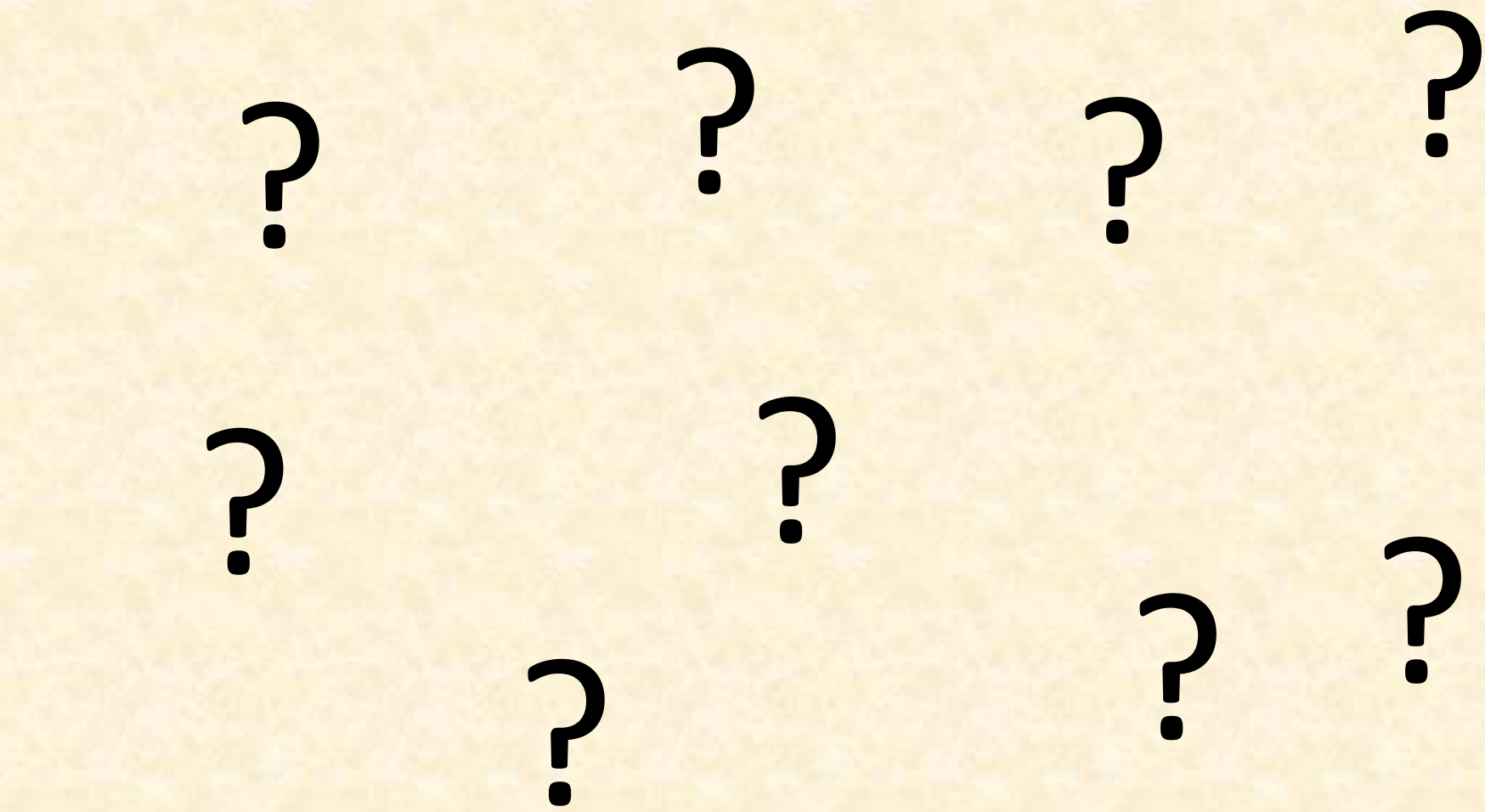
Project System Components

- 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

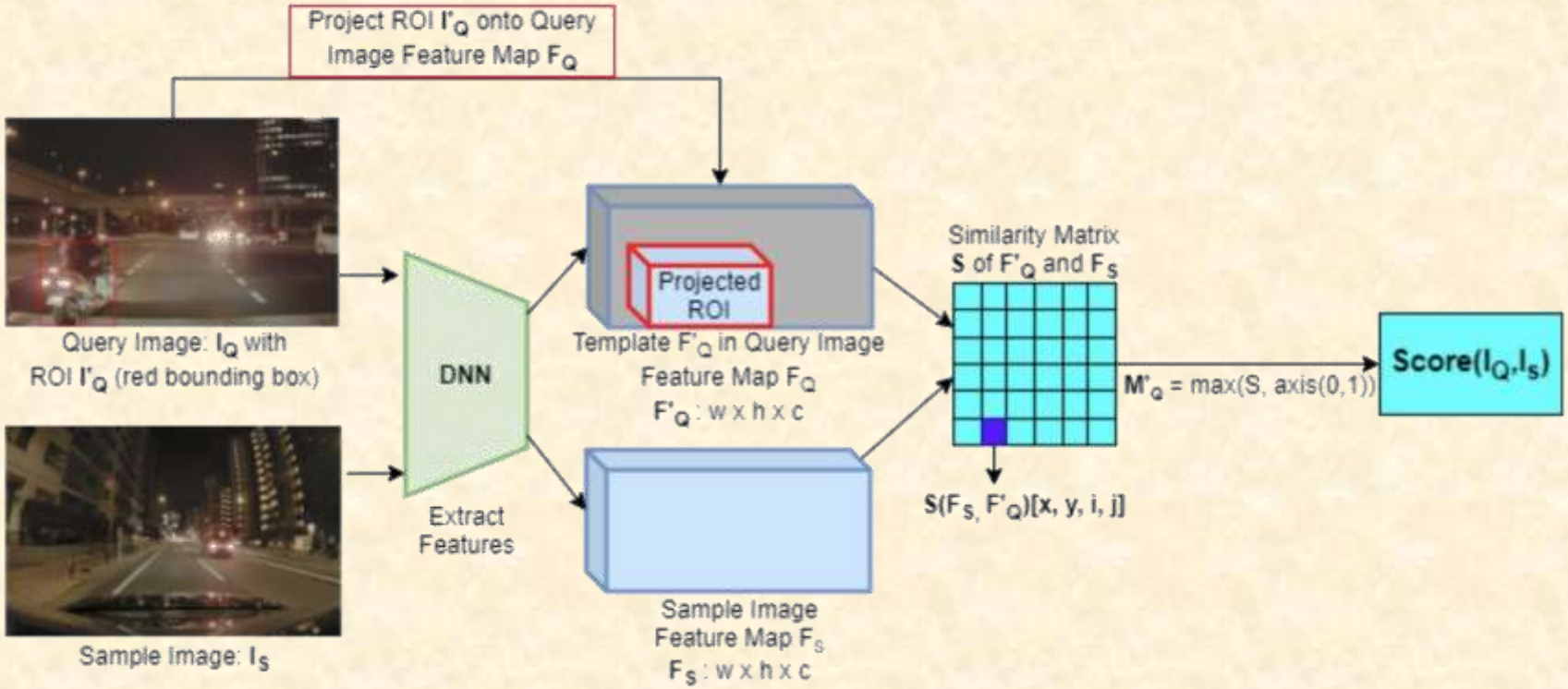


Image Credit: Kothawade et. al.