PROBLEM STATEMENT

- Finding a vacant parking space in congested parking lots is time-consuming and frustrating
- Industrial research is conducted to develop an intelligent parking guidance system to direct human drivers to the nearest available parking lot.
- Identifying traffic congestion in the parking lots contributing to time and fuel wastage, increased greenhouse gas emissions, and traffic accidents is crucial.

PROJECT OBJECTIVES

- Develop a vehicle tracking and vehicle localization algorithm. Deploy the algorithms in parking lots to identify and rectify any traffic congestion.

SYSTEM ARCHITECTURE

- Vehicle Detection
- Vehicle Tracking
- Monocular Camera
- Live Feed of Parking Lot
- Location of the nearest vacant spot
- Identifying Traffic Congestion
- Vacant Parking Space Detection
- Detect vacant parking space

HARDWARE SETUP

- GO PRO Camera
- TRIPOD
- Battery Pack
- (Power Source)
- Live Feed
- Edge Computer

VEHICLE TRACKING ARCHITECTURE

- YOLOv5 MODEL
- VEHICLE DETECTION
- CENTROIDS OF BOUNDING BOX
- TRACK CENTROIDS
- GENERATE TRACKING ID

VEHICLE TRACKING RESULTS

- LIVE CAMERA FEED
- COCO DATASET
- YOLOv5 Model
- VIDEO FRAME
- DETECT CARS
- 2D BOUNDING BOX & LABEL

VEHICLE DETECTION RESULTS

- 3D Vehicle Detection/ Tracking using Monocular Cameras for outdoor/indoor parking lots
- Vehicle Localization using a Monocular Infrastructure Camera for outdoor/indoor parking lots
- Vehicle Detection/Tracking using Cameras under adverse weather conditions, i.e., rain/snow

ACKNOWLEDGEMENT

I thank Dr. Junfeng Zhao for his unwavering guidance, invaluable insights, and tireless support throughout this research project. Thank you to all the team members for their outstanding dedication and collaborative efforts.