



# Visual AI Hackathon: Intelligent Traffic Signaling

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# Concept

- Late at night, traffic signals activate on fixed time increments, despite minimal vehicle traffic
- Safety issues
  - Drivers may be inclined to skip red lights at night to avoid unnecessary waiting (assumption that there are no other cars)
  - Pedestrians are inclined to cross intersections with less regard for vehicle traffic



# Solution

- Visual AI Implementation: object detection
- Identify vehicles, pedestrians waiting at intersections
- Reduce wait times for vehicles when there is no traffic in the other directions
- Turn pedestrian lights green when there are no vehicular traffic in the desired direction
- This would increase attention and abidance to traffic lights during low traffic scenarios

# Dataset: “Multi-view Traffic Intersection Dataset”

- Bounding box and segmentation info for Bicycle, Car, Bus, Lorry classes
- Data can be used to train object detection model for this specific overhead traffic view



(a) Infrastructure



(a) Infrastructure



(b) Drone



(b) Drone

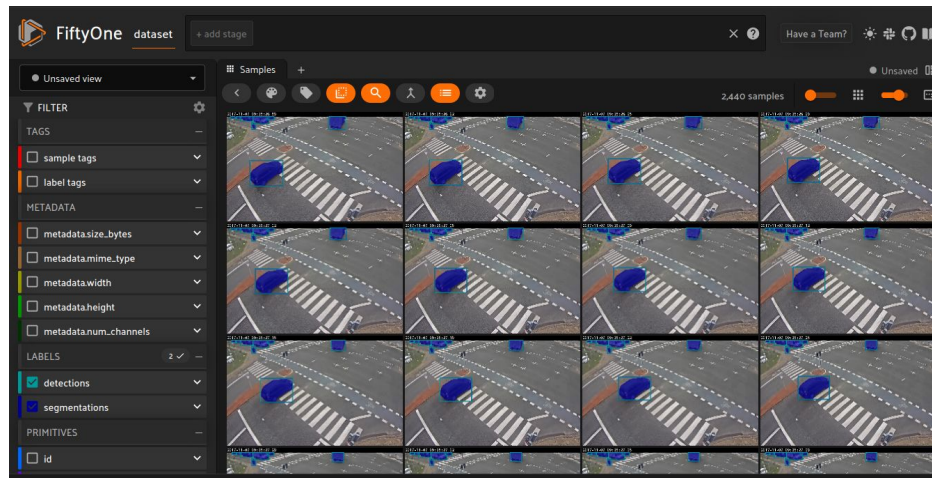


## Model - YOLOv8

- YOLOv8 is an advanced deep learning model architecture designed for object detection, classification and segmentation.
- Start with generic object detection model, YOLO v8, loaded with Voxel51 model zoo
- Run on images in intersection dataset
- Use bounding box output to calculate centroid, allowing us to place vehicle/pedestrian in environment

# Our work

- Download dataset into Jupyter Notebook
- Load into fiftyone.Dataset object
- Run YOLOv8 on dataset images
- Visualizing w/ FiftyOne was too slow to visualize model output (right: ground truth example)





## Future Developments

- Use transfer learning to train YOLOv8, specializing it for traffic intersections and vehicle/pedestrian classes, instead of generic object detection
- The cameras in our current dataset points at the center of the intersection, not at the approach towards the intersection which is required for our task - Acquire data from static traffic light cameras that would suite this purpose
- Based on the location of various labels (pedestrians, cyclists, vehicles) in the image, predict traffic flow and control lights.