

The Intelligent Mobility Meter

Purpose: The Intelligent Mobility Meter (IMM) is a portable data collection and analysis platform to collect fine-grained statistics on pedestrian, cyclist and vehicular traffic with the purpose of providing government officials and transit advocates with accurate and actionable data to effectively design for future infrastructure. This project is the expansion of a previous project titled “Automatic Counting of Pedestrians and Cyclists.”

Approach: The team needed to collect data of objects moving in each direction at a location, so they broke the problem statement into three different technical objectives:

1. Generate consistent detections of cars, pedestrians and bicycles as they move past the camera.
2. Track each object by assigning a unique ID for each object when it appears in the field of view of the camera.
3. Determine the total counts of the objects passing through a location in different directions.

Key Findings: The team found many opportunities for improvement related to the three technical objectives:

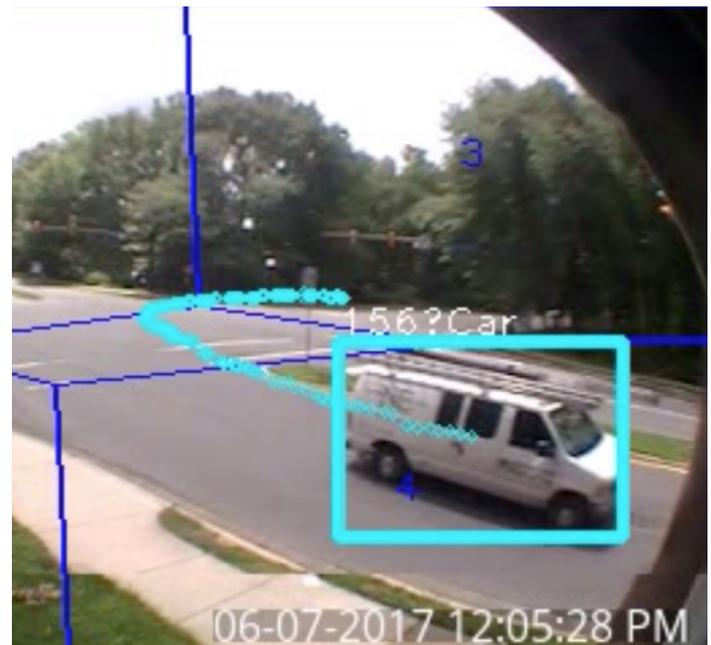
Detection – The team changed the detection algorithm to simplify the network architecture and uncovered that training the network produced results comparable to the previous project’s fast and complex algorithm.

Tracking – Consistent and early detections of objects can be achieved when the detector is trained. Early and consistent detection allows the tracker to assign a track ID to an object sooner resulting in better tracking.

Counting – By changing the tracking system that utilizes the shape of the tracks in a different way, the team was able to solve the problem faced previously. With the new technique, the complexity of the curve of the track does not affect the ability to make predictions.

Conclusion: The project significantly expanded the technical capabilities of the team’s previous counting projects and create a true mobility meter than can identify, track and count all road users.

The large-scale data counting conducted for the Virginia Department of Transportation demonstrated that the IMM is mature enough to tackle difficult real-world counting projects.



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Project Record:

- <https://ppms.cit.cmu.edu/projects/detail/21>

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