Computer Vision for Pedestrian Traffic Monitoring

Recipient/Grant (Contract) Number: 69A3552348310

Center Name: Pacific Northwest Transportation Consortium (PacTrans)

Research Priority: Improving the Mobility of People and Goods

Principal Investigator(s): Ahmed Abdel Rahim (UI)

Project Partners: City of Moscow, Idaho Transportation Department

Research Project Funding: $50,000 federal; $50,000 non-federal match

Project Start and End Date: 8/16/2023 – 8/15/2025

Project Description: Computer vision sensors provide several advantages over traditional traffic counting systems. They provide counts for more users: cars, trucks, bikes, and pedestrians, the speeds the vehicles are traveling, and the trajectory through space. The data is saved in a cloud-based system that is easy to query and download for further analysis. In addition, all of the information is recorded without keeping any personally, identifiable information to address the privacy concerns of jurisdictions and their citizens.

Six Numina Computer Vision sensors were purchased as part of a previous PacTrans project. Two sensors were installed in Boise, Idaho in November 2022. Two will be installed later this summer at different locations in Boise and two will be installed in Moscow, Idaho. The research team has previously investigated bicyclists riding under varying weather conditions. First, it sought to determine how the bike lane was used (or not used) during adverse weather. The hypothesis for this analysis was that bicyclists were riding in the street because the bike lane was left unplowed.

Data from these detection zones for the range between December 1st to February 6th was integrated with data for the same date range collected at the Boise Airport weather station. Counts were then retrieved for each of these days and compiled for the Bike Lane and the Street zone. The preliminary analysis confirmed our hypothesis that cyclists would ride in the street on days of adverse weather. Next, it used the same data to create prediction models for bicycle volumes.

The preliminary analysis was a success in terms of assessing the capabilities of the equipment. However, we only have three months of data from two locations. This project will provide the opportunity to collect a full year of data at the first two locations in Boise and provide the opportunity to explore other case study data for different situations in another community.

US DOT Priorities: The project directly addresses two of the USDOT research Priorities:

- Data Driven System safety:
  - Develop and test new methods and tools for safety data collection, management, analysis, and evaluation at intersections.
  - Advance transportation safety by evaluating the safety of existing transportation technologies and supporting the safe integration of emerging technologies.
- System Performance:
  - Develop and promote resources that support the integration of transit, pedestrian, bicycle, and micromobility designs and analyses into multimodal network planning and project development, particularly in traditionally underserved communities.
  - Identify and promote effective and successful tools and information necessary to integrate pedestrian and bicycle analysis into transportation planning and project development.

Outputs: We anticipate at least one journal publication in a peer-reviewed journal, as well as at least one conference presentation (in addition to a presentation at the annual PacTrans conference).

Outcomes and Impacts:

Outcomes/Impacts: We expect computer vision companies, such as Numina, to use our results to improve the features and capabilities of their projects. We expect city engineers and planners to use our case study examples to assist when using computer vision sensors.

Final Research Report: *will provide upon completion of the project*