BPAC Design Subcommittee Meeting
July 31, 2024 - 10:35 am to 11:15 am
Online Zoom Meeting

Attendance (in chat):

- Thom Stead (chair), DVRPC
- Sean Meehan, Rutgers-VTC
- Nikita Soni, Rutgers-VTC
- Danielle Baer, Urban Engineers
- David Verdia, McCormick Taylor
- Denise Nickel, Middlesex County
- Eric Derer, NJ Transit
- Erlea Maldonado, EZ Ride
- Gregory Wright
- Hannah Younes, Rutgers-VTC
- John Wheeler
- Katharine Schumacher, Rutgers
- Lou Luglio, HNTB
- Micheal Popovech, Monmouth County
- Mike Dannemiller, Middlesex County
- Mike Viscardi, NJ Transit
- Shilpy Mehta, Rutgers-VTC

1. Discussion on Reconnecting Communities – Route 9 TOD Enhancements

- There may be funding opportunities for larger-scale enhancements as the project moves into the design phase. Mike mentioned the possibility of needing to be added to a letter list.
- NJDOT has released an RFP for a project involving improvements that include Transit Signal Priority (TSP) along Route 9 in Monmouth County.
- Pedestrian access and crossings will be incorporated into the project package. The inclusion of technology for pedestrian safety will need further review.

2. Computer Vision Project Update

A. Overview

- For the past three years, a project funded by an NSF Grant, titled *"Making Micromobility Smarter and Safer,"* has been exploring AI and computer vision technology in the context of micromobility.
- A study is currently being conducted in New Brunswick, offering $30 gift cards for 30-minute participant surveys.
- Biometric sensors and eye-movement tracking glasses are being used to monitor micromobility users' attention while on the road.

B. Research Methodology

- Biometric (Person-Centric Research):
    - Utilizes biometric data such as eye-movement tracking to interpret traffic camera videos and simulate road user movements.
    - Machine learning is applied to predict trajectory paths, while biometric tools document personal experiences on the road, with 93.4% fixation on road and traffic-related objects.
    - The research also incorporates galvanic skin response measurements to gauge stress levels.
- LIDAR and Computer Vision (System-Based Research):
    - Cameras and LIDAR sensors have been installed at intersections in New Brunswick, helping to analyze land use and track vehicles.
    - Computer vision technology, particularly models like YOLOv5 (You Only Look Once), has been effective in detecting motor vehicles, but detecting bicycles, pedestrians, and e-scooters has been more challenging.
    - While detection has improved, the system still lacks full accuracy, particularly in identifying e-scooters.

C. Questions and Future Applications

- Discussed the potential future applications of biometric, LIDAR, and computer vision technologies in infrastructure design.
- Biometric sensors can help gauge stress levels and cognitive workload in different environments. The technology offers a quantitative approach for practitioners to assess safety in bike lanes or protected bike lane environments.
- Collaboration between researchers and policymakers can use this data to develop safer infrastructure designs.
- Gauging stress involves using sensors like galvanic skin response and heart rate monitors. Techniques for measuring public stress were discussed, with an update to the Level of Traffic Stress (LTS) mapping system ("LINK") in progress to analyze how street changes affect stress levels.
- Expansion of the project technology, particularly in scaling up the biometric and computer vision research, is hindered by high costs.

3. Additional Topics Discussed

- Data City Living Lab is a testing facility for autonomous vehicle research by Middlesex County.
- Middlesex County Greenways Plan includes 42 greenways across the county.
- EZ Ride Demonstration Project in Passaic includes a mural with curb extensions at each corner, using specific materials (H&C Shield, Shark Grip seal) to make surfaces less slippery and flexible bollards from U-Line. The project is funded by Bloomberg, with local police conducting speed studies for the demonstration.