Research Recap

Mobility21
A USDOT NATIONAL UNIVERSITY TRANSPORTATION CENTER

Real-Time Traffic Analytics at Intersections

Purpose: As more intelligent transportation systems and tools come online, city planners need ways to access real-time data. Visual data requires a large bandwidth capacity and time to transfer to remote computers for analysis. This project's work focused on developing computer vision algorithms to help analyze and share visual data more quickly and efficiently in real-time for planners.

Approach: The team began by developing computer vision algorithms to analyze visual data and computing to understand vehicle motion in 3D space and time, and to track the pose of people in 3D. The algorithms developed are vital to computing analytics on real data in the presence of occlusions, cluttered scenes, and varied lighting conditions.

Key Findings:

- *Vehicle Reconstruction in 3D Space and Time*
  - Experimental results show that the team's self-learning framework dramatically improves detection accuracy and reconstruction on long-term testing videos unseen by the detector.

- *Multi-Person Articulated 3D Pose Tracking*
  - Experimental evaluation on five challenging datasets show significant improvements in multi-person 3D pose tracking and multi-person 3D pose reconstruction accuracy.

Conclusion: Cameras and other sensors provide a wealth of knowledge and information but require heavy computing to make sense of the data. This project set out to address the technical challenges of detecting, tracking, and reconstructing vehicles and people quicker and more efficiently. The algorithms that were developed will enable the potential for real-time information about activity on the road, which in turn can inform planning decisions to help provide the necessary attention required towards road infrastructure.

Photo by Deb Dowd on Unsplash

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Project Record:
https://ppms.cit.cmu.edu/projects/detail/335

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