

Bus On the Edge: Continuous Monitoring of Traffic and Infrastructure

Purpose: To test a new way to collect data using public transit buses already routinely travelling on roadways. The buses existing cameras or newly installed ones can record information on traffic conditions, weather conditions, or infrastructure. The data collected can be used for event detection, traffic and/or infrastructure monitoring and provide input for up-to-date detailed maps of roads and traffic. This research project is evaluating whether a new way to record and process the video using an edge computer can work.

Approach: The research team tested the conversion of the traditional recording box that collects all the video recordings to an edge computer that can analyze the video streams live to detect relevant events and send only these detections over a cellular network to a central location.

Key Findings:

Utilization of an edge computer was successful, as evidenced by:

- Automatic startup and shutdown when bus starts and finishes operation
- Running for one month with minimal interventions
- Sending relevant warnings, info, or data through cellular or WiFi network
- Remotely managing the system by monitoring its health, sending requests, and changing functionality

Successful running of the overall system at central location, including:

- Displaying of relevant results in a timely manner through a user-friendly interface
- Displaying of health indicators of the edge system
- Issuing of requests, updates, and change the functionality of the edge system
- Updating map with new information and removing expired information

Conclusion:

The test was a success. The next phase of the project will begin in early 2021 when the basic building blocks and functionality of the system is tested while it is running live. Eventually, the research will include combining this platform with data streams from stationary cameras to create a city-wide system that can monitor traffic and infrastructure on many different time scales.



Research Team:

- Christoph Mertz
<https://orcid.org/0000-0001-7540-5211>
- Canbo Ye
<https://orcid.org/0000-0002-8011-5881>
- Mahadev Satyanarayanan
<https://orcid.org/0000-0002-2187-2049>

Project Record:

- <https://ppms.cit.cmu.edu/projects/detail/282>

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