Project Title: PORTABLE AND INTEGRATED MULTI-SENSOR SYSTEM FOR DATA-DRIVEN PERFORMANCE EVALUATION OF URBAN TRANSPORTATION NETWORKS

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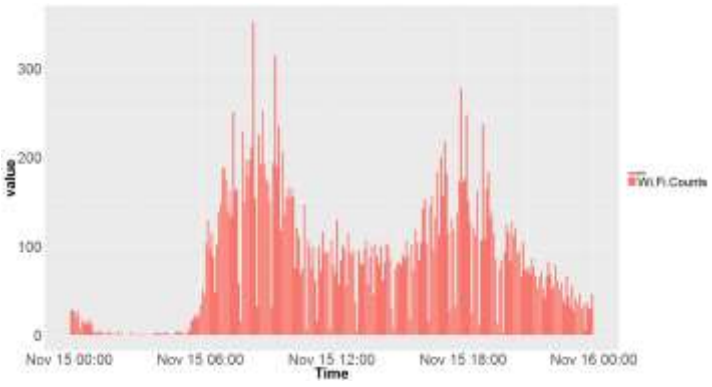
The primary objectives of this research study are to deploy low-cost portable and integrated multi sensor systems for data-driven performance evaluation of urban transportation networks and to develop a system capable of real-time remote monitoring of external changes, such as air quality, noise, humidity, temperature, and crowd and vehicular densities in an urban setting.

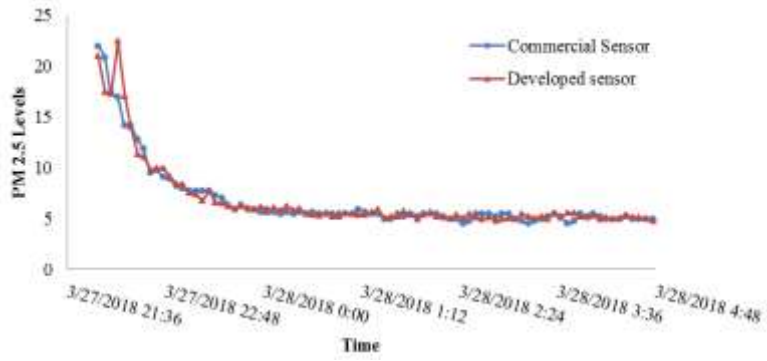
The developed system uses multiple low-cost, yet effective, sensors to capture particulate matter level, humidity, and temperature of ambient air as well as pedestrian and vehicular traffic. All sensors were tested in a laboratory environment. The research team also investigated instances in which similar sensors were used in a real-world application to identify secondary crashes, which illustrates the applicability of these systems to some of the most important transportation safety and operations problems.



Pedestrian counts for a day at Entrance A

The sensors were used to record and analyze pedestrian movements in a transit terminal. The initial filtering of the data showed that capturing recurring patterns of the passengers in the terminal is probable, and peak periods can also be detected at sensor locations. This information makes it easier to estimate passenger demand in a transit terminal.

The air quality, temperature and humidity readings of the multi sensor platform were found to be consistent with the samples collected using commercial sensors in the testing environment. Although the noise sensor is not calibrated up to the level that it can accurately represent sound pressure levels, it still provides a nominal noise level to make comparisons between different installation sites.



PM2.5 Comparison between Dylos and Developed Sensor

The major outcome of this research project is the development of a smart sensing system capable of acquiring and then sending detailed critical environmental and traffic information wirelessly from the fixed installation location to a remote server with the ultimate goal of making on- and off-line decisions to improve urban operations. The project also highlighted the low cost of the developed sensor system, demonstrating the economic feasibility of large-scale deployment of such a system.

Sponsors:

Completion Date: Sept 10, 2018

University: New York University