

Thesis Portfolio

The Implementation of Cellular Location Data Analytics on the Analysis of Food Accessibility
Issues in the Washington, DC and Baltimore, MD Metropolitan Areas
(Technical Report)

Washington, DC and Baltimore, MD: A Study of Two Food Deserts
(STS Research Paper)

An Undergraduate Thesis

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Bachelor of Science, School of Engineering

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Thesis Prospect

Sociotechnical Synthesis

Using cellular location data and novel computational methods to analyze such data, a database describing consumer activity to specific food stores within the Washington, DC and Baltimore, MD metro areas was produced. With this dataset, a variety of descriptive statistics were created. The resulting statistics from this dataset were then used to enhance an analysis of food accessibility issues in the Washington, DC and Baltimore, MD metro areas in a tightly coupled STS analysis. Using Actor-Network Theory as an analytics lens, it was found that both metro areas had heterogeneous frameworks to attempt to address food desert issues. While food store businesses were found to be actants in both cases, the metro areas differed in both primary actors and additional actants. The Washington, DC metro area was found to have only one primary actants: the Washington, DC government through the Washington Metro Area Transit Authority and their outreach programs. The Baltimore, MD metro area was found to have civilian actors which were more prominent on how food access issues were being addressed, with such low to middle-income actors attempting to influence both outreach and transport efforts of the Baltimore, MD metro area government and potential healthy food store operators. The statistics collected during the technical project indicated that citizen behavior regarding the opening of unhealthy food stores worked against such mitigations, as activity to unhealthy food stores independent of the newly opened food store increased at a greater rate than other food store types. The significance of transit systems as a food accessibility aid was also clearly indicated, as the Washington, DC metro area food store generally had significantly less traffic from users than equivalent Baltimore, MD metro area food store despite adjustments for food store density per user capita and the distances traveled by Baltimore, MD metro area users was significantly less than Washington, DC metro area users.