

# Using Data Analytics to Optimize Public Transportation on a College Campus

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**Abstract**—Using a large volume of bus data in the form of GPS coordinates (over 100 million data points) and automated passenger count data (over 1 million data points) we have developed (1) a system of analysis and prediction of future public transportation demand (2) a new model that uses concepts specific to college campuses that maximizes passenger satisfaction. Using these concepts, we improve service of a model college public transportation service and more specifically the Indiana University Campus Bus Service (IUCBS) by decreasing overall fuel usage by nearly 20% while increasing passenger participation by 15%. The scheduler, which forms the nexus of the system, is generated with a modified simulated annealing algorithm using the entire class schedule for the entire campus of all students, then measured against previous traffic data to select a near optimal new schedule.

**Keywords**— public transportation, bus, GPS, APC, big data, simulated annealing, data science

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## About author



**Mehmet M. Dalkilic** is an Associate Professor in the Computer Science Department/Adjunct in the Statistics Department and is the Director of the Undergraduate newly created Data Science Program. Dr. Dalkilic's research interests include Data Science in areas of astronomy,

geology, public transportation marine ecology, and computational biology (RNAseq). He was the first full-time faculty at the Luddy and created the introductory curriculum for Informatics and a new Data Science introductory class that also serves as an introductory class for the Computer Science major as well. The class, which began with 22 students, three years ago, has grown to 265 for the Fall semester and nearly 200 for Spring—and is taken by students

throughout the University. Dr Dalkilic is the author of over fifty conference, journal articles, and book chapters. His laboratory has also produced an R package that has been accepted by CRAN for optimizing EM for clustering.