

To Whom It May Concern:

Background

I received my PhD in the field of Information Science in the School of Computing and Information at the University of Pittsburgh. My research has been particularly focused on mathematical optimization, spatial database systems, artificial intelligence (AI) and machine learning (ML) with an application in optimal resource allocation and intelligent transportation systems (ITS) among others. My papers have been cited by researchers from all over the world, including prestigious journals and conferences in computer science and GIS such as ACM and ISPRS. My master thesis about moving object databases has also been referenced as one of the few existing models established in the area of spatial databases. My PhD dissertation, entitled “a distributed approach for robust, scalable, and flexible dynamic ridesharing”, concisely was about developing a distributed optimization model for solving dynamic ridesharing problem, a large-scale combinatorial optimization problem. I got insight from spectral graph theory, designed and implemented a set of algorithms to decompose the NP-hard underlying optimization problem into several subproblems and then solve the subproblems in parallel. In order to evaluate the proposed approach, I implemented a simulator in Java and used two metrics for evaluation: solution quality and running time. I utilized CPLEX to find a lower bound for the original optimization problem and used its solution as a benchmark in comparison with the solution provided by the proposed algorithms.

Future Research

In the future, I intend to extend my research on mathematical optimization and algorithms, particularly in operations research, AI and ML in order to build models for solving real-world problems in different areas such as scheduling, ITS, the environment, and public health among others. Rapid urbanization engenders serious challenges in cities such traffic congestion, increased fuel consumption, and the production of greenhouse gasses which are harmful to the environment. Performing research in optimization, operations research, and applying ML and AI facilitates opportunities for brainstorming, proposing solutions, and solving the above issues with the aim of saving the environment. My research addresses a fundamental need of decision makers and planners: the need for optimal resource utilization, building intelligent systems for smart cities, and improving the environment. Considering the impact my work has had thus far, I am confident that my work will continue to positively influence my field of study in the future. I am confident that my research experience, technical skills, relevant coursework, strong writing ability, and creativity will allow me to thrive in this research position.