Factors guaranteeing QoS in shared bus scheduling

Lee Jae Won
Sungkyunkwan University

지도 교수: 정재훈 교수님

연구실명: IoT Lab

개 요

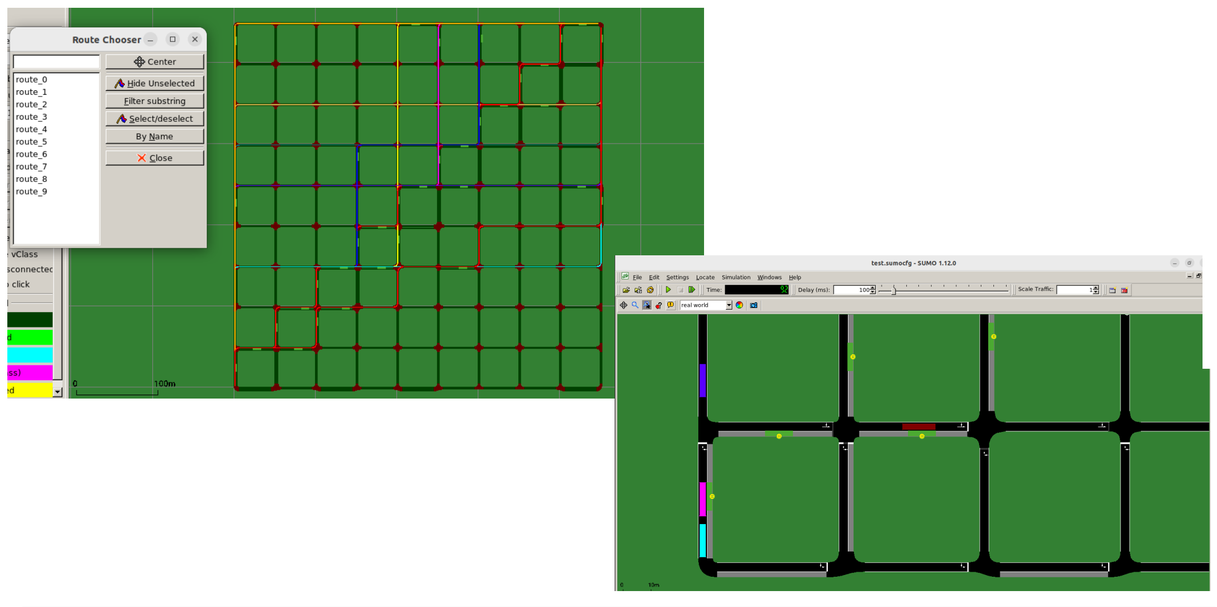
A shared bus can serve groups of passengers from different pick-up locations to drop-off locations. Previous research papers tried to provide algorithms for the most efficient and fastest path from the perspective of public transportation with minimum travel time, travel distance and energy cost. Greedy algorithm is one of the known algorithms to solve the Traveling Salesman Problem (TSP) in polynomial time. Meanwhile, the COVID-19 pandemic has changed the travel behavior, for instance, avoiding crowded buses at peak hours. This project experimented on a Quality of Service (QoS) factor that can affect the travelling time of passengers, particularly the number of passengers taking the bus at once. In this project, the Simulation of Urban Mobility (SUMO) program is used to test the relationship between QoS factor and the travelling time of passengers taking buses.

실험

no. of people added	personCapacity in bus	no. of people landed at correct destination	
		trial 1	trial 2
20	10	12	14
20	20	10	11
20	30	9	10

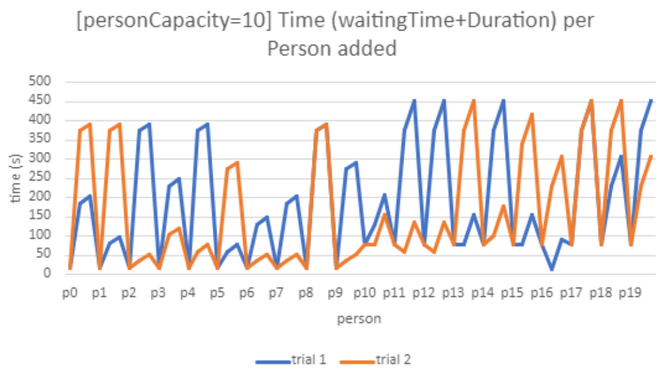
Table 1. Number of people landed at correct destination. As the personCapacity increases, number of people landed at correct destination decreases.

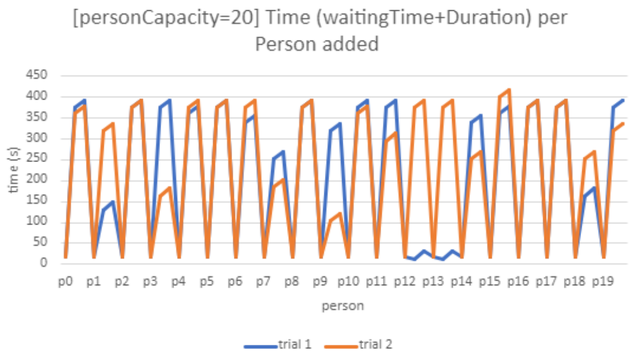
시스템 구성

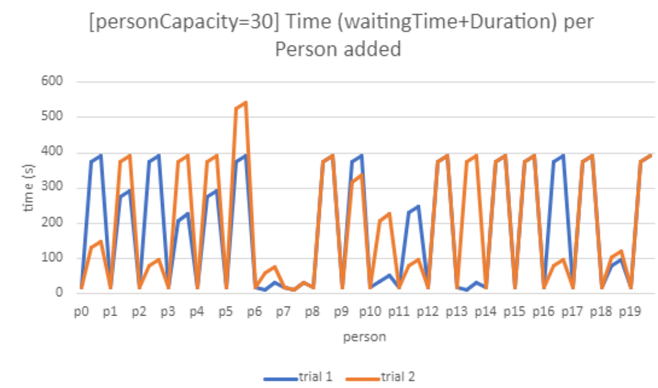


System	Linux Ubuntu v22.04.3 LTS on Oracle VM VirtualBox v7.0
Simulation Software	SUMO v1.8.0
TraCI File	python runner.py
Configuration Files	Net-file: 9x9grid.net.xml Route-file: bus.rou.xml Additional-file: test.add.xml Sumo Configuration File: test.sumocfg

성능평가 및 결론







When personCapacity is 10, only 10 out of 20 people can take the bus first. Among the first ten people, people with the travelling time that exceeds 300s means they could not land till the bus reaches the last bus stop of the route. Among the second ten people, people with the travelling time that exceeds 400s means they could not land as well. Similar pattern goes for when personCapacity is 20 and 30. As graphs show, two trials are carried to show the variety and the randomness of the destinations.