

Autonomous Public Transportation Project

Multi-Agent Systems

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March 19, 2017

Week Six Milestone

Based on the implementation delivered in the previous weeks, we keep the same strategy for picking and delivering passengers, and for choosing the following station to travel to. Besides, we still use a Borda count voting procedure for deciding whether to bus new buses or not. In this week's submission, we implement a competition mechanism to decide which passengers a bus picks up upon leaving from a particular station.

The basic idea is that once a bus arrives to a station S_t it drops all the passengers that is carrying. Then, both the arriving passengers and those who were already at S_t will enter an auction for a place inside the bus. This situation fits into the setting of an action since the seats in the bus are limited depending on the bus type, and are thus a scarce resource.

Note that once the auction takes place, the bus has already decided where to go in the next trip. Then, each passenger will make a bid equal to the dot product of the displacement vector of the bus towards the next station, $S_{t+1} - S_t$, and the displacement vector from the current station and the passenger's destination, $D_p - S_t$, where D_p is the coordinates vector of passenger p 's destination. This dot product is positive if the direction towards the passenger's destination and the bus movement coincide, and negative if they go in opposite ways.

Finally, the bus receives all these bids and allocates seats to those passengers that submitted a positive bid, on a descending order of the bid magnitude. Note that the bus does not allocate a seat to a passenger travelling in a direction that is opposite to the bus route. A possibility we might consider for the final submission is to weight the bid of the passenger depending on his/her current waiting time.