

Abstract

In most large cities with high population densities, there are many problems that arise due to traffic jams as it happened in metropolitan cities in Indonesia. The causes of traffic jams or traffic congestion is population density, the number of vehicle is too much, and traffic light setting that does not comply with the conditions at the junctions at that time. If the traffic light can be set the sequence of green light that will turn on, also duration on that green light, based on the condition at the junctions at that time (adaptive), of course, this will help reduce congestion. Basically, the main problem in traffic light control is having to make decisions sequentially. One method that matches the characteristics of these problem is a Markov Decisions Process (MDPs) and Reinforcement Learning (RL) or approximate dynamic programming (ADP). With this background and the results of previous studies, the author has developed a simulation application about Intelligent Traffic Light Control with Collaborative Q-Learning Algorithms methods. The purpose of this final project is to optimize the waiting time at traffic light control based on method of collaborative Q-Learning that can be used to be a reference model for the solution of traffic congestion in real world. Based on test results, it can be concluded that the Collaborative Q-Learning Algorithms. Method is the best traffic light control algorithms among the other method tested with a waiting time is 54,67 seconds. The simulation process is using Green Light District Simulator. The test results showed that the best parameters to Collaborative Q-Learning algorithms method is the learning rate has a value of 1 and the discount factor has a value of 0.8. also, the immediate reward method is in the form of results of the subtraction of the waiting time before, and the waiting time at the moment.

Keywords : *Intelligent Traffic Light Control, Reinforcement Learning, waiting time, Collaborative Q-Learning Algorithm, Junction, Optimization*