An Agent-Based Model of Intersection Traffic in Inclement Weather

Michael Duff
Dept. Electrical & Computer Engineering
University of Manitoba
umduffin@cc.umanitoba.ca

Vehicle traffic through signalized intersections in urban environments are heavily affected by inclement weather, with vehicle throughput being greatly reduced [1]. In order to try and see if simple changes to the signal timing from normal weather intervals could help to restore traffic throughput an Agent-Based Model [2] was used to simulate a simple signalized intersection. In this model two different Agent types were used: agents representing human drivers and traffic signal agents. Vehicle throughput was measured in the simulation for a range of signal timings. This simulation was carried out under normal driving conditions, and then again for inclement weather conditions. Inclement weather was simulated by varying driving parameters that are affected by weather. The results of the simulations indicate that increasing signal intervals increases traffic throughput in general, although with diminishing returns. As expected, traffic throughput drops sharply during inclement weather. Increasing signal interval timings in bad weather helps to increase traffic throughput, although it cannot fully restore it to normal weather values. In conclusion, this simulation suggests that increasing signal interval times during inclement weather may help to increase traffic throughput, and potentially alleviate some traffic congestion. Adding a third agent to represent autonomous drivers augmenting human drivers and the potential impacts on traffic this could have will also be discussed.

REFERENCES
