**Literature survey**

Traffic simulation is modeling of transportation system that can help in plan design and operate transportation. The traffic simulation models can be classified according to discrete and continuous time, state and space [1]. The queuing model has long been used to study discrete event simulation [2~5]. Priority queue is a queue data structure for each element has an associated priority. In a priority queue, an element with high priority can be popped before an element with low priority. Queuing model had good performance in simple traffic micro-simulation [6]. It is possible to use such a dynamic, event-based approach to simulate transportation with affordable data and hardware. For example, Vandaele and his team developed some queuing models based on traffic counts and modeled the behavior of traffic flows as a function of some of relevant factors [7]. Furthermore, for the computation of the large-scale it can also be speed up by parallel implementation [8]. In general the queue model is simpler and easier to improve than the flow models of DYNASMART(Dynamic Traffic Assignment and Simulation for Advanced Network Informatics)[9], DynaMIT[10], and the cell transmission model[11]. The disadvantage of queuing model is that the speed in traffic jam condition cannot be realistically modeled; the advantage is higher speed in computation.

[1] Pursula, Matti. "Simulation of traffic systems-an overview." Journal of Geographic Information and Decision Analysis 3.1 (1999): 1-8.

[2] Henriksen, James O. "An improved events list algorithm." Proceedings of the 9th conference on Winter simulation-Volume 2. Winter Simulation Conference, (1977).

[3] Kingston, Jeffrey H. "Analysis of tree algorithms for the simulation event list."Acta Informatica 22.1 (1985): 15-33.

[4] McCormack, William M., and Robert G. Sargent. "Analysis of future event set algorithms for discrete event simulation." Communications of the ACM 24.12 (1981): 801-812.

[5] Chi, Sung-Do, Ja-Ok Lee, and Young-Kwang Kim. "Discrete event modeling and simulation for traffic flow analysis." Systems, Man and Cybernetics, 1995. Intelligent Systems for the 21st Century., IEEE International Conference on. Vol. 1. IEEE, 1995.

[6] Simon, Patrice M., Jörg Esser, and Kai Nagel. "Simple queueing model applied to the city of Portland." International Journal of Modern Physics C 10.05 (1999): 941-960.

[7] Vandaele, Nico, Tom Van Woensel, and Aviel Verbruggen. "A queueing based traffic flow model." Transportation Research Part D: Transport and Environment5.2 (2000): 121-135.

[8] Cetin, Nurhan, Adrian Burri, and Kai Nagel. "A large-scale agent-based traffic microsimulation based on queue model." IN PROCEEDINGS OF SWISS TRANSPORT RESEARCH CONFERENCE (STRC), MONTE VERITA, CH. 2003.

[9] Mahmassani, H. S., T. Hu, and R. Jayakrishnan. "Dynamic traffic assignment and simulation for advanced network informatics (DYNASMART)." Urban traffic networks: Dynamic flow modeling and control. Springer, Berlin/New York(1995).

[10] Ben-Akiva, Moshe, et al. "DynaMIT: a simulation-based system for traffic prediction." DACCORS Short Term Forecasting Workshop, The Netherlands. 1998.

[11] Daganzo, Carlos F. "The cell transmission model: A dynamic representation of highway traffic consistent with the hydrodynamic theory." Transportation Research Part B: Methodological 28.4 (1994): 269-287.