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Abstract of 2018 Master's Thesis

## **Studies on Geographic DTN Routing with Random Mobile Agents**

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In this thesis, we investigate geographic DTN routing with random mobile agents. The main contributions of this thesis are fourfold. First, we derive the average and the distribution of message delivery delay with geographic DTN routing under random walk mobility in small-scale networks. Our analysis reveals the effect of system parameters — the number of mobile agents on the field, the number of message loadings at a geographic location, the message generation rate and the number of message replicas — on the average and the distribution of message delivery delays. Second, we approximately derive the average message delivery delay with geographic DTN routing under random walk mobility in large-scale networks. We show that geographic DTN routing is scalable; i.e., its average message delivery delay is approximately proportional to the network size (i.e., geographic locations) unless heavily loaded. We also show that the network topology has limited impact on the performance of geographic DTN routing except heavily loaded conditions; the average message delivery delay is mostly determined by the degree of the destination node. Third, we derive the mean recurrence time of the CRWP (Constrained Random WayPoint) mobility model to reveal the impact of mobility models on the performance of geographic DTN routing. Fourth, we derive the hitting time of the CRWP mobility model to reveal the characteristics of the CRWP mobility model.