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A SCALABLE ROUTING FOR DELAY-TOLERANT HETEROGENEOUS NETWORKS

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Abstract. *A Delay Tolerant Network (DTN) is an intermittently connected mobile wireless network in which the connectivity between nodes changes frequently, due to the nodes' movement. Recently, there have been a lot of researchers working in this area. However, to the best of our knowledge, no work has addressed itself specifically to DTN routing within heterogeneous network environments. In this work, we propose a prediction-based routing protocol for heterogeneous delay tolerant networks, wherein edge servers are distributed over the borders of the different network domains. First, a location prediction algorithm based on user online logs is used to intelligently estimate the most probable future location of a destination, if the destination is currently unavailable. Then, an edge server selection algorithm, based on fuzzy logic, is employed to select a close-by intermediate node along the path to the destination, so that messages can be saved temporarily once the destination's location has been predicted. The experimental results show that the proposed routing protocol can efficiently deliver a message under limited buffer space, compared with other two representative delay tolerant network routing protocols found in the literature. The scalability of the proposed model is also confirmed in the simulations.*

Keywords: Heterogeneous network, Delay tolerant network, Edge server, Routing, Fuzzy logic

1. **Introduction.** A Delay Tolerant Network (DTN) is an intermittently connected mobile wireless network in which the connectivity between nodes changes frequently, due to the nodes movement. Typical examples of DTNs include interplanetary networks, wildlife tracking and habitat monitoring sensor networks [1-3], etc. In DTN routing, messages are sent in an extended store-and-forward manner, and nodes may cache messages for considerably long periods of time before getting the opportunity to send them to the next hop nodes.