

**MobiT: Distributed and Congestion-Resilient Trajectory-Based Routing for Vehicular Delay Tolerant Networks**

**Abstract:**

Packet routing is important for vehicular delay tolerant networks (VDTNs). Opportunistic routing algorithms based on historical records are insufficiently accurate in forwarder selection due to movement randomness of vehicles. Trajectory-based routing algorithms tackle vehicle movement randomness but cannot be directly used in VDTNs due to the dependence on APs. In this paper, we develop a distributed trajectory-based routing algorithm (called MobiT) for VDTNs. This non-trivial task faces three challenges. First, vehicle trajectories must be sufficiently collected. Second, the trajectories cannot be updated frequently due to limited resources of the repository nodes. Third, achieving high routing performance even with partially collected trajectories. Our real trace study lays the foundation of the design of MobiT. Taking advantage of different roles of vehicles, MobiT uses service vehicles that move in wide areas to collect vehicle trajectories, and rely on the service vehicles and roadside units (called schedulers) for routing scheduling. By using regular temporal congestion state of road segments, MobiT schedules the packet to arrive at a roadside unit prior to the destination vehicle to improve routing performance. Furthermore, MobiT leverages vehicles’ long-term mobility patterns to assist routing. Our trace-driven simulation and real experiments show the effectiveness and efficiency of MobiT.

**Existing System:**

Previous opportunistic routing algorithms define different utilities (e.g., meeting probabilities) and forward a packet to vehicles or Roadside Units (RSUs) that have larger utilities with the destination vehicle. However, these algorithms use the vehicles’ historical meeting records to schedule packet forwarding, which has been proven insufficiently accurate due to movement randomness of vehicles. Determining packet forwarder based on vehicles’ trajectories is effective in handling movement randomness. In the trajectory-based routing algorithms, vehicles repeatedly report trajectories to Access Points (APs)

sparsely located along roads. A central server then uses these shared trajectories to schedule forwarders to carry the packet to the destination vehicle in its driving route. However, these algorithms cannot be directly used in VDTNs due to the dependence on APs.

**Proposed System:**

We aim to develop a distributed trajectorybased routing algorithm for VDTNs. However, this task is non-trivial. First, the vehicle trajectories must be sufficiently collected in repository nodes for determination of trajectory-based routing path. Second, the trajectories cannot be updated frequently due to limited resources of the repository nodes. Third, it is hard to achieve high routing performance with partially collected vehicle trajectories due to lack of APs.