A Survey on Position-Based Routing in Mobile Ad Hoc Networks

2001
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Routing Basics
- Ad hoc = self-organizing
- Static vs mobile
- Topology-based vs position-based
  - Proactive
  - Reactive
  - Hybrid

Position-Based Routing
- Goal: to limit the need for fixed routes
  - Costly storage, updates
  - Frequent changes in a mobile environment
  - Nodes know most about their neighbors

Requirements
- A node must know:
  - its own position
  - its one-hop neighbors’ positions
    - Periodic broadcasts
  - position of the destination node
  - Need a “location service”
Key Implementation Issues

- Location service
- Forwarding strategy
- Recovery strategy

Location Service

- Some for some
  - Ex. Quorum-Based
- Some for all
  - Ex. cellular networks
- All for some
  - Ex. Grid Location Service
- All for all
  - Ex. DREAM

Forwarding Strategy

- Location of destination is in the packet header
- Intermediate nodes may update location with better information
- Plan: send packets in the right direction
- Latency vs. energy

Types of Forwarding Strategies

- Greedy packet forwarding
- Restricted directional flooding
- Hierarchical approaches
Greedy Packet Forwarding

- Packet sent to the “best” neighbor in the direction of the destination
- If no neighbor that is closer, recovery phase

Choosing the Next Hop

Options:
- Most Forward
- Nearest with Forward Progress
- Compass Routing
- Random selection

Restricted Directional Flooding

- Forward to several neighbors that are closer to destination
- Must determine which nodes represent progress
  - Ex: DREAM
  - Ex: Location Aided Routing

Hierarchical Routing

- Often hybrid of a topology-based method and a position-based method
- Examples:
  - Terminodes routing: improved scalability
  - Grid routing: position-unaware participants
Recovery Strategies

- No recovery
- Least backward progress
- Planar graph traversal
- Random selection

Future Research

- Quantitative performance comparisons
- Anonymity
- Improved recovery mechanisms
- Ways to connect very large networks

FIN
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<tr>
<th>Criteria</th>
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Table 1: Characteristics of the presented location services.

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