Privacy-Enhanced Social Routing in DTNs

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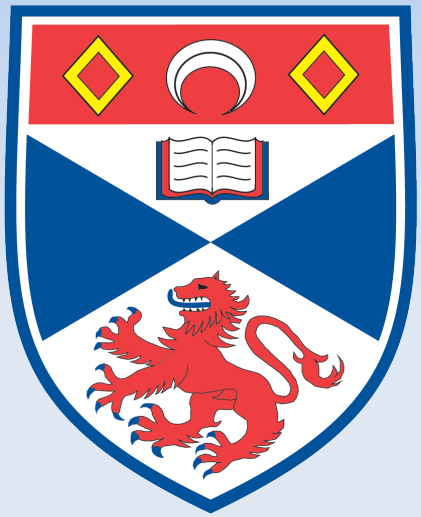

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Delay Tolerant Networks

High delays

Episodic connectivity

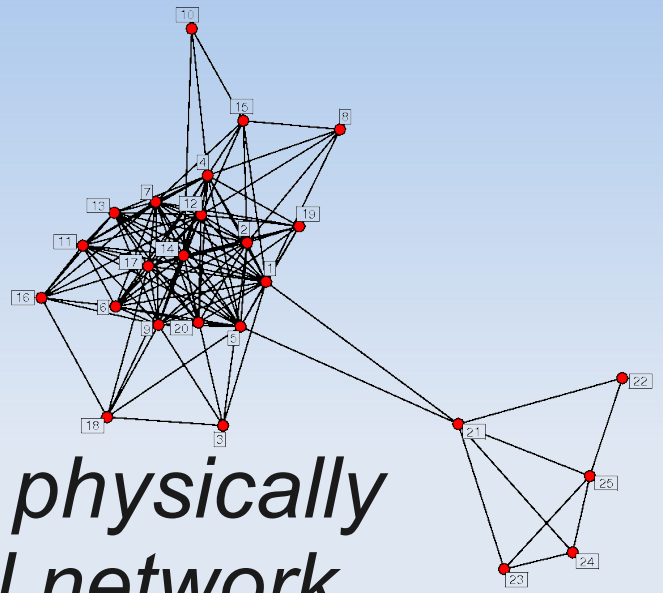
Store-and-forward

Can use the mobile devices that people already carry around

Routing?

- Epidemic routing – high cost flooding
- **Social routing** – lower cost, but requires known network

Social Routing



Reduce the cost of routing

- Wasted messages
- **Battery** life

Assumption: *people are likely to physically encounter others in their social network*

Work by Bigwood et al* – comparing routing protocol efficiency for *detected* social networks and *self-reported* social networks

* *Exploiting self-reported social networks for routing in ubiquitous computing environments* [1]

Privacy

Naïve algorithm

- Message includes the *sender's social network* as a *header*
- Sender, and intermediate nodes, forward message to any person who is in the sender's social network

Privacy problems

- Everyone in sender's social network **must** know who else in sender's social network

Privacy-Enhanced Social Routing

Approaches

- **Add** nodes
- **Remove** nodes
- **Probabilistic querying** of whether encountered node is in the social network
  - Bloom filters? Challenge-response?

Routing **performance**

- Simulate with ns-2
- Independent simulations: tweaking parameters
- Metrics

Contact information

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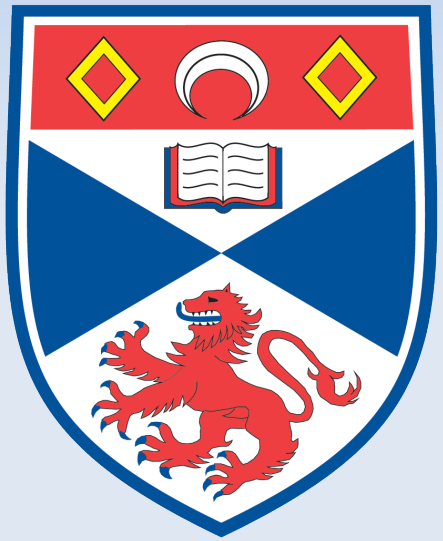

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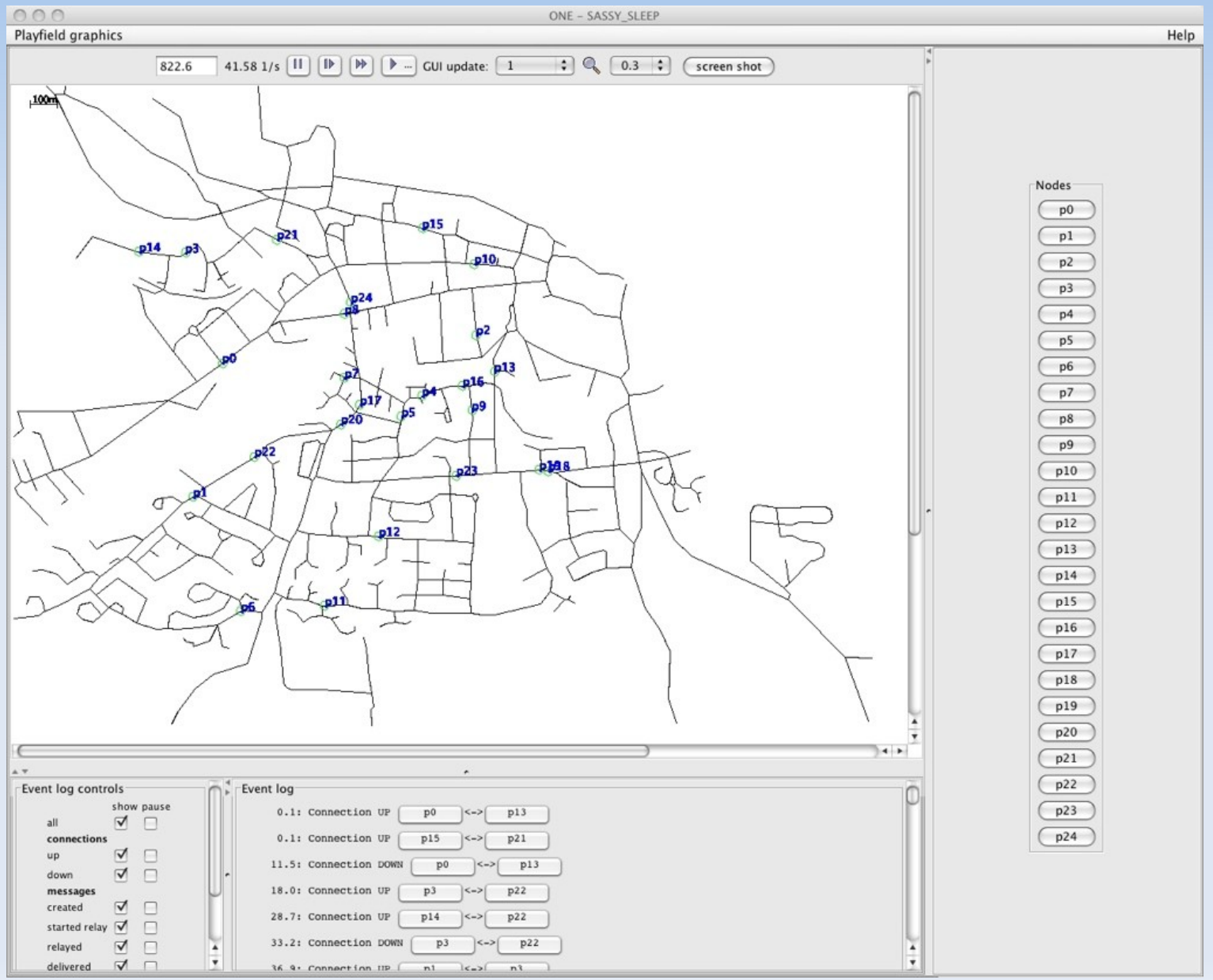
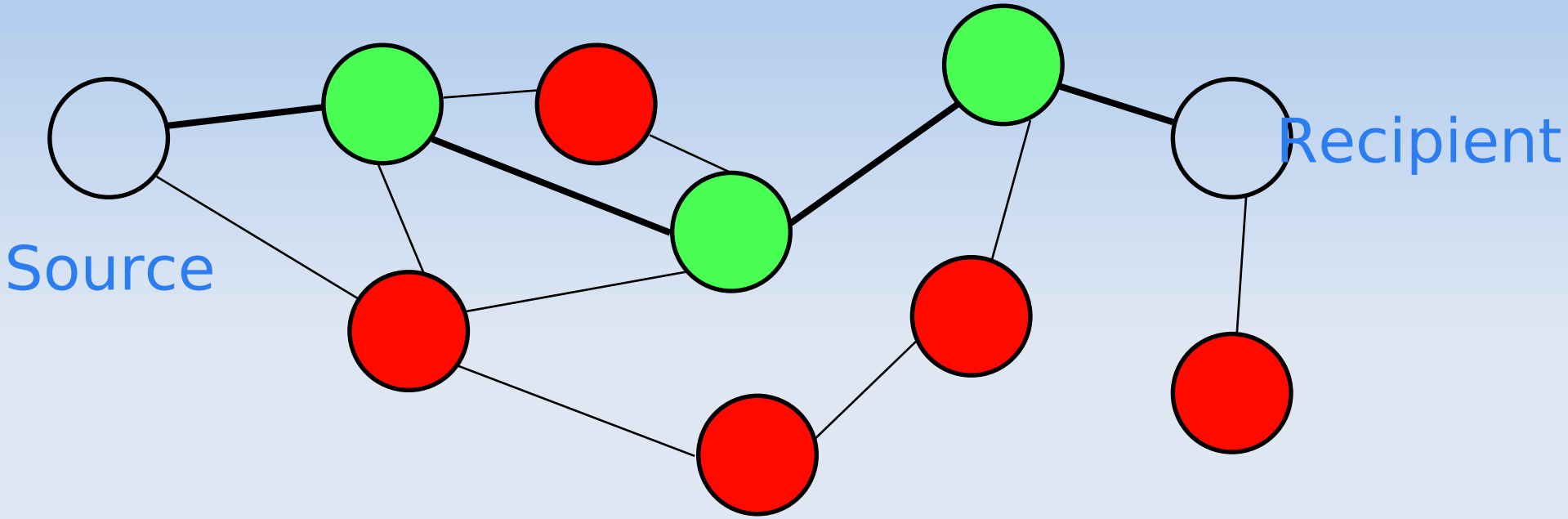
References

[1] G. Bigwood, D. Rehunathan, M. Bateman, T. Henderson, and S. Bhatti, "*Exploiting self-reported social networks for routing in ubiquitous computing environments,*" in Networking and Communications, 2008. WIMOB '08. IEEE International Conference on Wireless and Mobile Computing, Avignon, France, October 2008, pp. 484-489. [Online]. Available: http://dx.doi.org/10.1109/WiMob.2008.86

Mobility Traces



Social Routing: Diagram



Green nodes: In source's social network

Red nodes: Not in source's social network

Links: Encounters in a particular timeframe (day)

Bold path: Message path with social routing