

Matt Stabeler

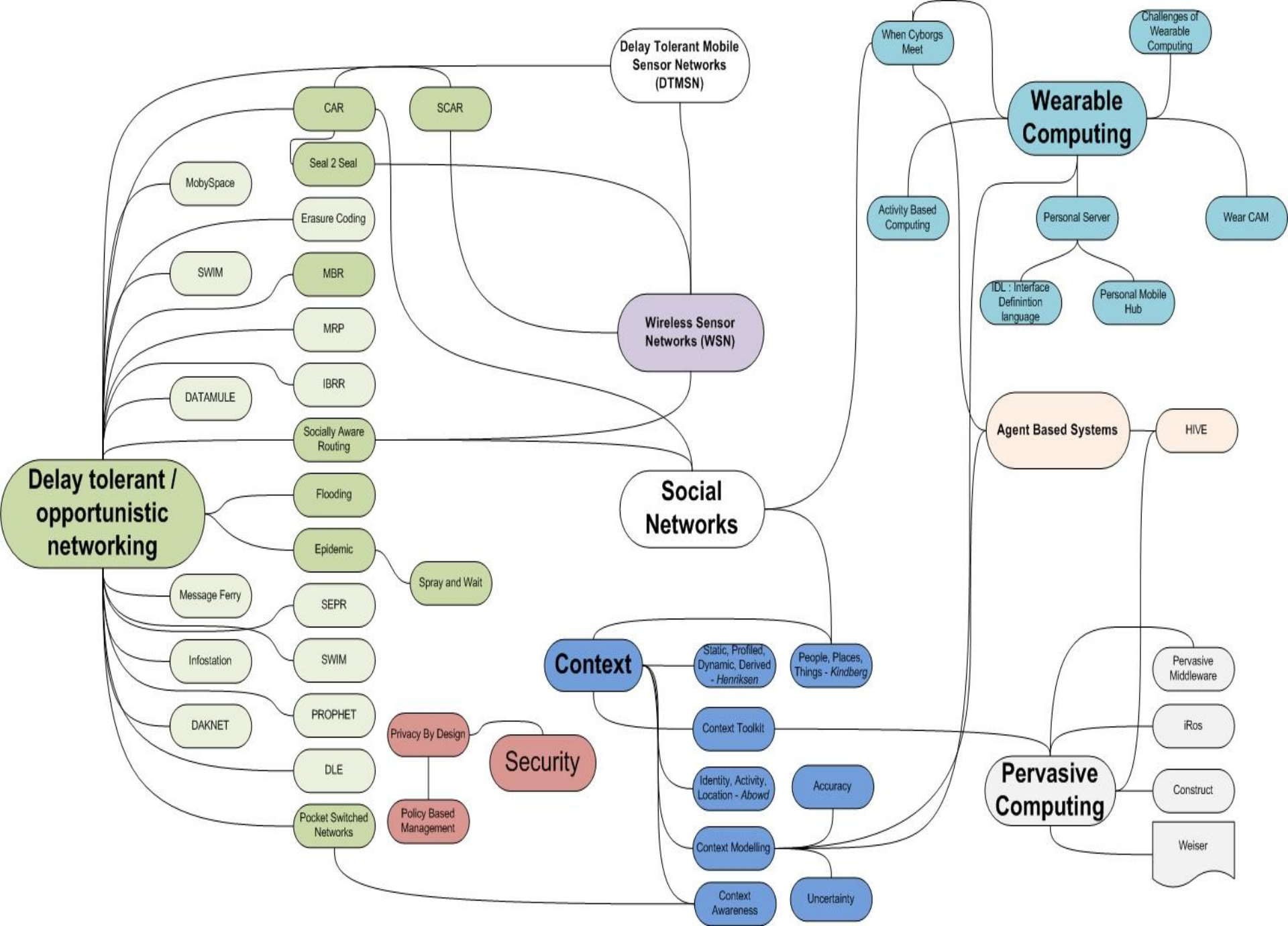
Paddy Nixon & Simon Dobson
Systems Research Group

Overview

- Areas of Research
- Objective
- Plan
- Publications and Current Projects

Research interests

- Pervasive Computing
 - Wireless Sensor Networks
 - Context Awareness
 - Wearable Computing
 - Agent based systems
 - **Delay Tolerant / Opportunistic Networking (DTN / ON)**



DTN/ON Aspects

Routing types

Data Types

Infrastructure

Real World Networks

Sensing Networks

Simulated Network

Simulated Movement

Why?

Problem

- Infrastructure is expensive
- Infrastructure is not there
- No established model of human movement

Motivation

- People move about, have social networks and own powerful mobile computing devices.
- Scope to exploit this ready made network

Objective

By exploiting the *features* of **social, ad-hoc, mobile networks**, **opportunistic** movement of *sensing* and *messaging* data, can be **efficient** and **delay tolerant**, with *guaranteed* delivery in most cases, **without** reliance upon installed **infrastructure**.

Exploit

- Social / Mobile Networks (Opportunism)
- Situation / Context Awareness (Opportunism)
- Mobility (Profiling)

Opportunistic Networking

- Combined approach
 - With or without infrastructure
 - Knowledge of social networks
 - Situation/Context awareness
 - Mobility

Exploit opportunistic networking, with the side effect of
Delay Tolerant Networking

Plan

- Literature review
 - Opportunistic/ DTN protocols,
 - Evaluate models of human movement and social networks
 - Reality Mining Data Set, Social Sensing Study, Random Waypoint + Caveman, WaveLAN traces, second life network
- Implement and compare existing DTN protocols
- Analyse the +ve and -ve of each existing protocol
- Design approach to address +/-ves
- Prototype designs
- Compare system against existing protocols using chosen model/models

Evaluation

Simulation

- Urban environmental sensing
- Using reviewed mobility traces
- Simulated context data
 - places, activity recognition, routes, familiar strangers

Deployment

Publications and Current Projects

Steve Neely, Matthew Stabeler, and Paddy Nixon **SensorMash: Exploring System Fidelity through Sensor Mashup**. *Adjunct Proceedings of the Sixth International Conference on Pervasive Computing, 2008*.

(Winner of best one-minute-madness presentation, Pervasive 2008)



Lorcan Coyle, Juan Ye, Susan McKeever, Stephen Knox, Matthew Stabeler, Simon Dobson and Paddy Nixon. **Gathering datasets for activity identification**. *In Proceedings of the Workshop on Developing Shared Home Behaviour Datasets to Advance HCI and Ubiquitous Computing Research at CHI 2009*. Boston, MA.

Construct – context datastore and dissemination

Basadaeir – User profile store, API, and simple location system.

- use to build dataset for mobility traces



UCD WaveLAN Dataset – deriving movement patterns and synthesising social networks from wireless access point logs.

Conferences Targets

- Percom
- Pervasive 2009 – LBR – 27th Jan
- Ubicomp – 17th April
- LoCa 2009 – 9th Jan
- Mobiquitous – 20th March

Questions?

Questions?

- How will you evaluate existing protocols?
 - Comparison in terms of
 - Movement models used, network overhead, speed, delivery ratio..
- How will you simulate your ideas?
 - Using simulators from the literature
- How long have you been looking at DTN's?
 - For about 3 months, but previous paths have contributed

Areas of research - DTN

- Models of movement
 - Human
 - Animal
 - Other
- Routing
 - Pro-active / Re-active
 - Probabilistic
 - Flooding / Epidemic
 - Context-based
- Infrastructure
 - None / Mixed / Full

