SUPPORTING CONTINUOUS MONITORING USING SENSOR HUBS

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CONTINUOUS MONITORING APPS

- Leverages the rich sensing platform on smartphones
- Enables applications in healthcare, lifestyle monitoring, participatory environment sensing, and several other areas.

EXAMPLE ISTC APPS

Ambulation

Monitoring Parkinson's patients: by sensing/ classifying mobility

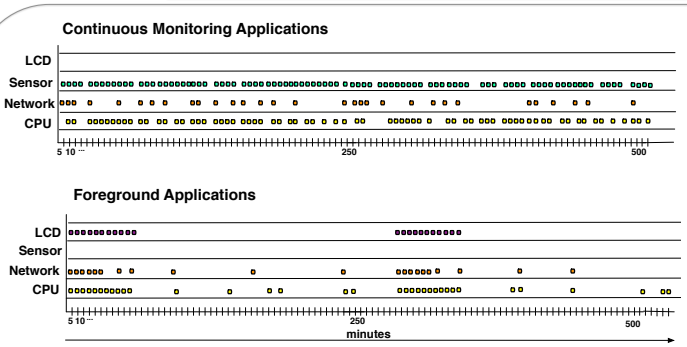
BeWell

Lifestyle monitoring: by sensing user context.

PEIR

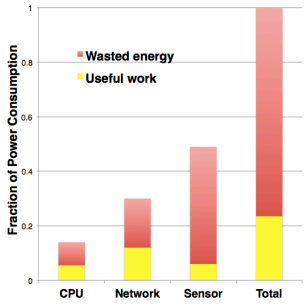
Environmental impact monitoring: using participatory sensing

WASTED POWER DURING CONTINUOUS MONITORING



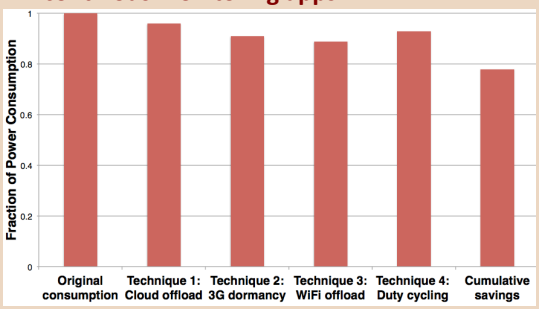
System active times when running 3 continuous monitoring apps vs. running two foreground apps (YouTube and Angry Birds)

Continuous monitoring apps: 77% of power wasted in overheads; only 23% used for actual work



A CASE FOR SENSOR HUBS

Using state-of-the-art optimization techniques for continous monitoring apps

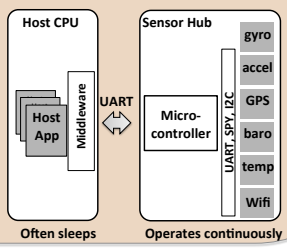


Existing techniques only provide 5--10% improvement in power

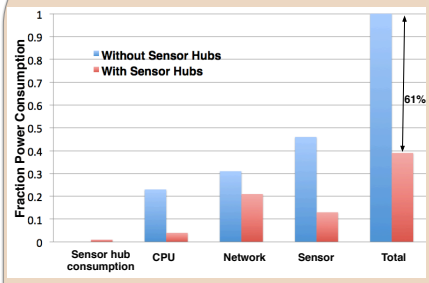
Sensor Hubs

Dedicated microcontroller that interfaces with sensors and the host

The host can be idle for longer periods, by offloading sensing/ computation



Sensor hub benefits



61% reduction in power mostly in sensing and CPU; only modest reduction in network power.

Research Challenges

How can sensor hubs be leveraged to reduce network power consumption?

How can app developers seamlessly use the sensor hub?