Locy: Energy-efficient sensing with Android smartphones.

Martin Kukla (Supervisor: Dr Tristan Henderson)

Introduction

- Phone sensing may be utilized by mobile applications to provide **advanced services** such as navigation systems.

- **Phone sensing** fetches raw sensor data (e.g. from an accelerometer) and tries to extract high-level information from it (e.g. a user is walking).
- Such a process may have **high energy demands**, which is crucially important to mobile phone users.
- Energy-efficient phone sensing vs Tristan's results? or maybe HOW (what approach) ?!

Solution

- different energy efficiency levels across devices [GRAPH the difference]
- however, accelerometer always better than others [GRAPH accelerometer]
- movement detection which leverages energy-efficient accelerometer to switch off GPS [MAYBE GRAPH]
- duty-cycling + adaptive towards the battery life

Evaluation

- scenario I [GRAPH]
- scenario II [GRAPH]

Conclusions

What does it mean? [GIF HAPPY FACE + mobile phone + full battery]

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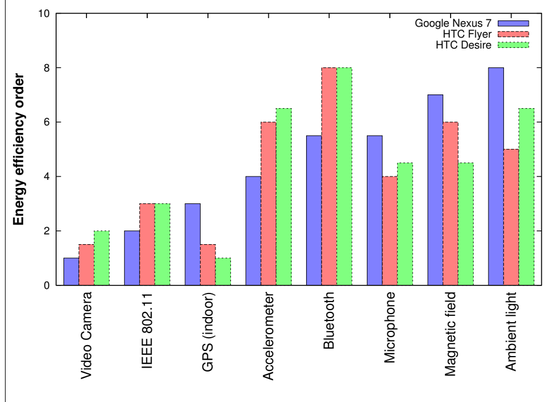

Figure 1: Energy efficiency of shared sensors across different devices. The order of energy efficiency differs depending on a device e.g. Bluetooth is the most energy efficient sensor for HTC Desire and HTC Flyer, but not for Google Nexus 7.

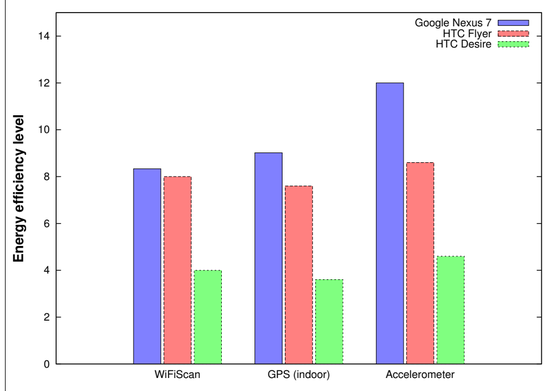

Figure 2: Energy efficiency levels of IEEE 802.11, GPS and accelerometer sensors across different devices. Accelerometer is more energy-efficient, but the difference is not substantial, and thus, efficient accelerometer sampling strategies needs to be introduced.

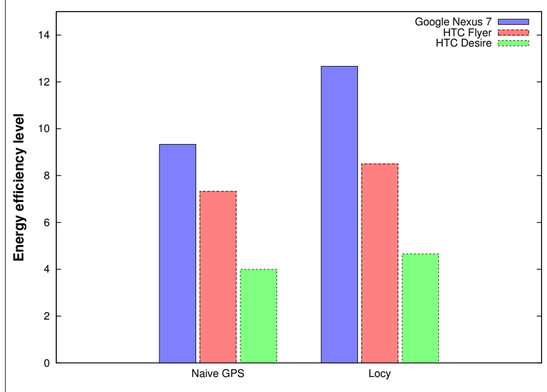

Figure 3: Energy efficiency levels of Locy library and Naive GPS Localization while a user is in place. Locy is more energy-efficient than baseline implementation for every phone.

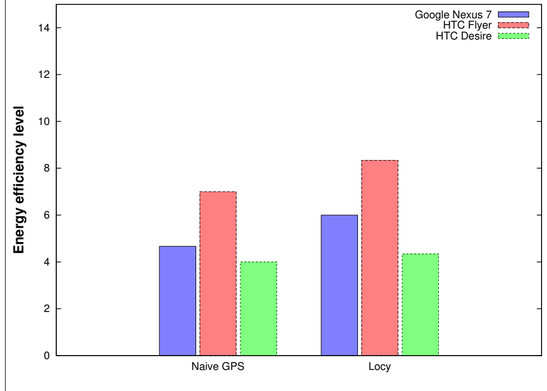

Figure 4: Energy efficiency levels of Locy library and Naive GPS Localization while a user is half of the time moving and the rest he is staying in one place. Locy is more energy-efficient than baseline implementation for every phone.