Locy: Energy-efficient sensing with Android smartphones.

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Introduction

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

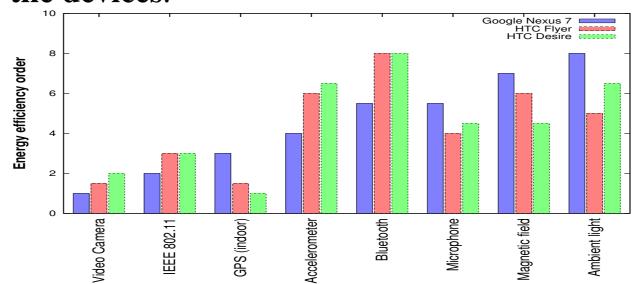


- **Phone sensing** fetches raw sensor data (e.g. from an accelerometer) and tries to extract high-level information from it (e.g. a user is walking).
- Phone sensing has **high energy demands**, which is crucially important to mobile phone users.
- To solve the problem:
 - investigate many devices.
 - establish the energy efficiency of their sensors.
 - leverage results for energy-efficient sensing.
 - build **Locy**, an energy efficient sensing library.

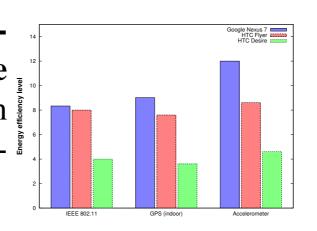


Solution

• Energy efficiency of sensors are **different among** the devices.



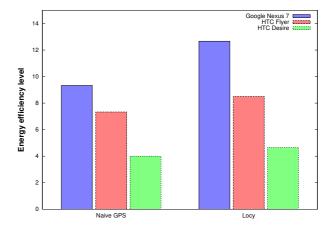
However, accelerometer is always more energy-efficient than the standard localization sensors.



- Locy is an energy-efficient sensing library:
 - if a user is not moving, it switches off high-power GPS.
 - movement detection is based on energy-efficient accelerometer (the standard deviation of the total magnitude over accelerometer data). [GRAPH]
 - the library uses duty-cycling sampling (sleeping period interleaves sampling).
 - duty-cycling ratio (sampling over sleeping period) is adaptive to battery life.

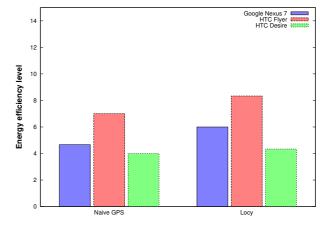
Evaluation

• the first scenario:



While a user is staying in one place, Locy is more energy-efficient than the naive GPS localization.

• the second scenario:



While a user is half of the time moving and the rest of the time he is staying in one place, Locy is more energyefficient than the naive GPS localization.

Conclusions

Locy is more energy-efficient than the standard Android implementation.

