

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.

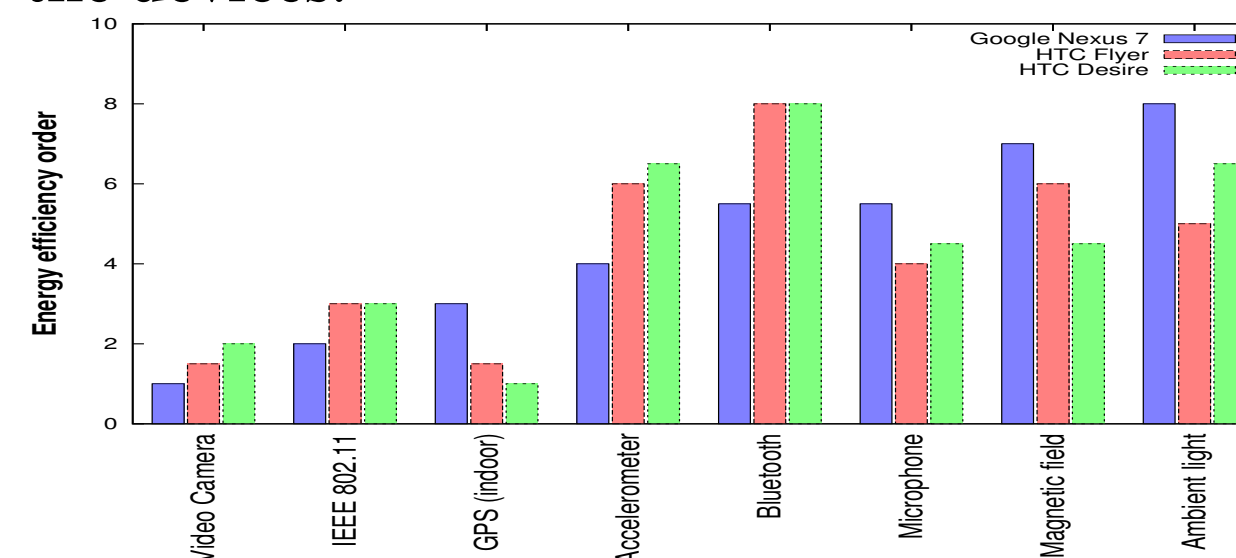


- Phone sensing** fetches raw sensor data (e.g. from an accelerometer) and tries to extract high-level information from it (e.g. a user is walking).
- Phone sensing has **high energy demands**, which is crucially important to mobile phone users.
- To solve the problem:
 - investigate many devices.
 -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

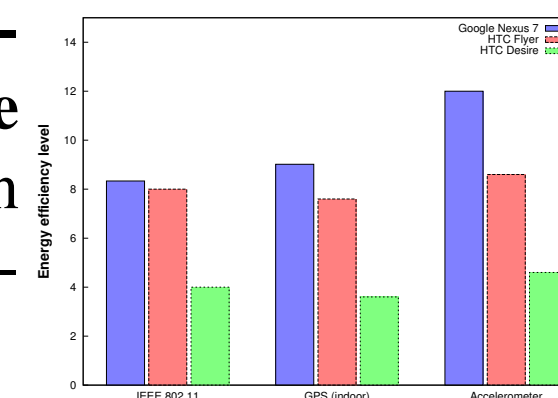


Solution

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



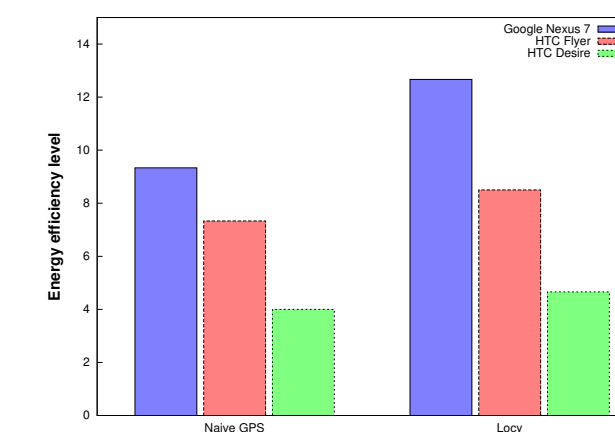
However, **accelerometer is always more energy-efficient** than the standard localization sensors.



- 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.

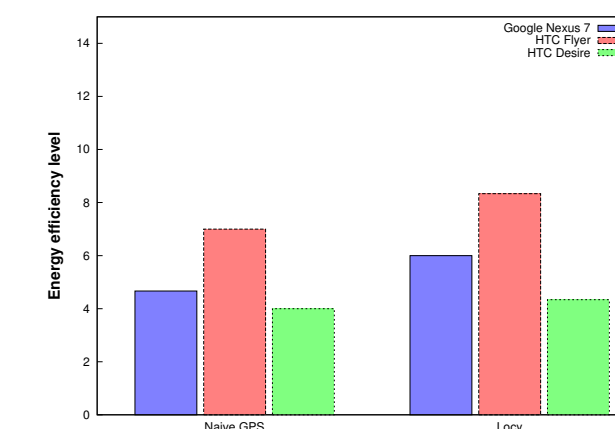
Evaluation

- 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 energy-efficient than the naive GPS localization.

Conclusions

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

