

# 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.

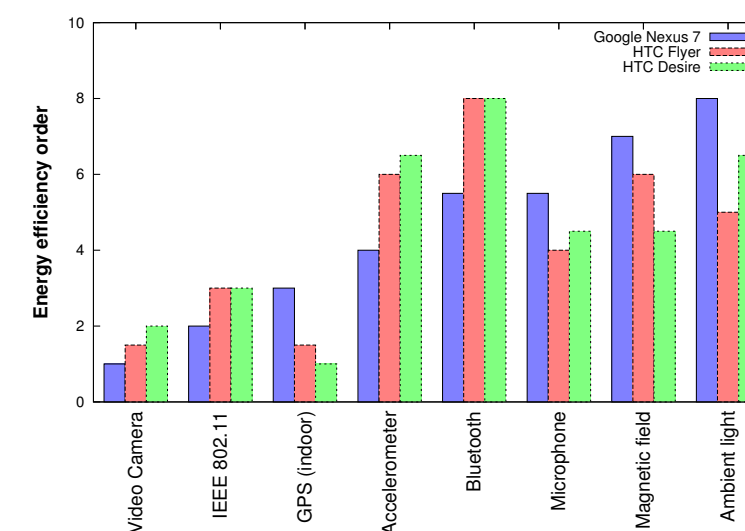


- **Phone sensing** fetches raw sensor data (e.g. from an accelerometer) and tries to extract high-level information from it (e.g. a user is walking).
- Such a process may have **high energy demands**, which is crucially important to mobile phone users.
- To solve the problem:
  - investigate many devices.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

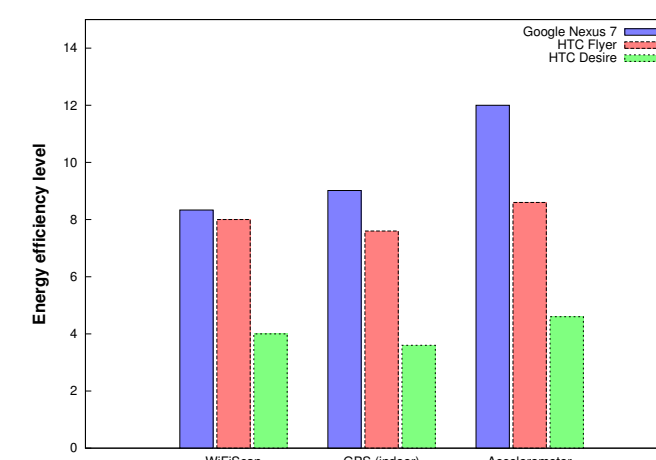


## Solution

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



- For all mobile phones, **accelerometer is 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.
  - a user movement is detected basing on energy-efficient accelerometer (the standard deviation of the total magnitude over accelerometer data). [GRAPH]
  - the library uses duty-cycling sampling (it samples and sleeps on repeat).

- duty-cycling ratio (sampling time over sleeping one) is adjusted depending on the battery life of a mobile.

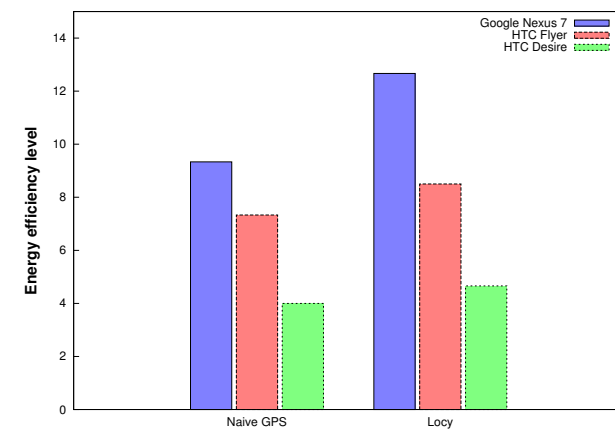
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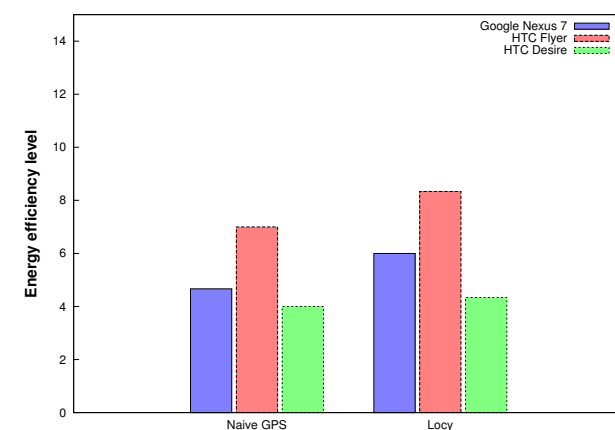


## Evaluation

### • the first scenario:



### • the second scenario:



XXX explain

## Conclusions

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

