

# SensingKit: A Multi-Platform Mobile Sensing Framework

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<http://www.sensingkit.org>

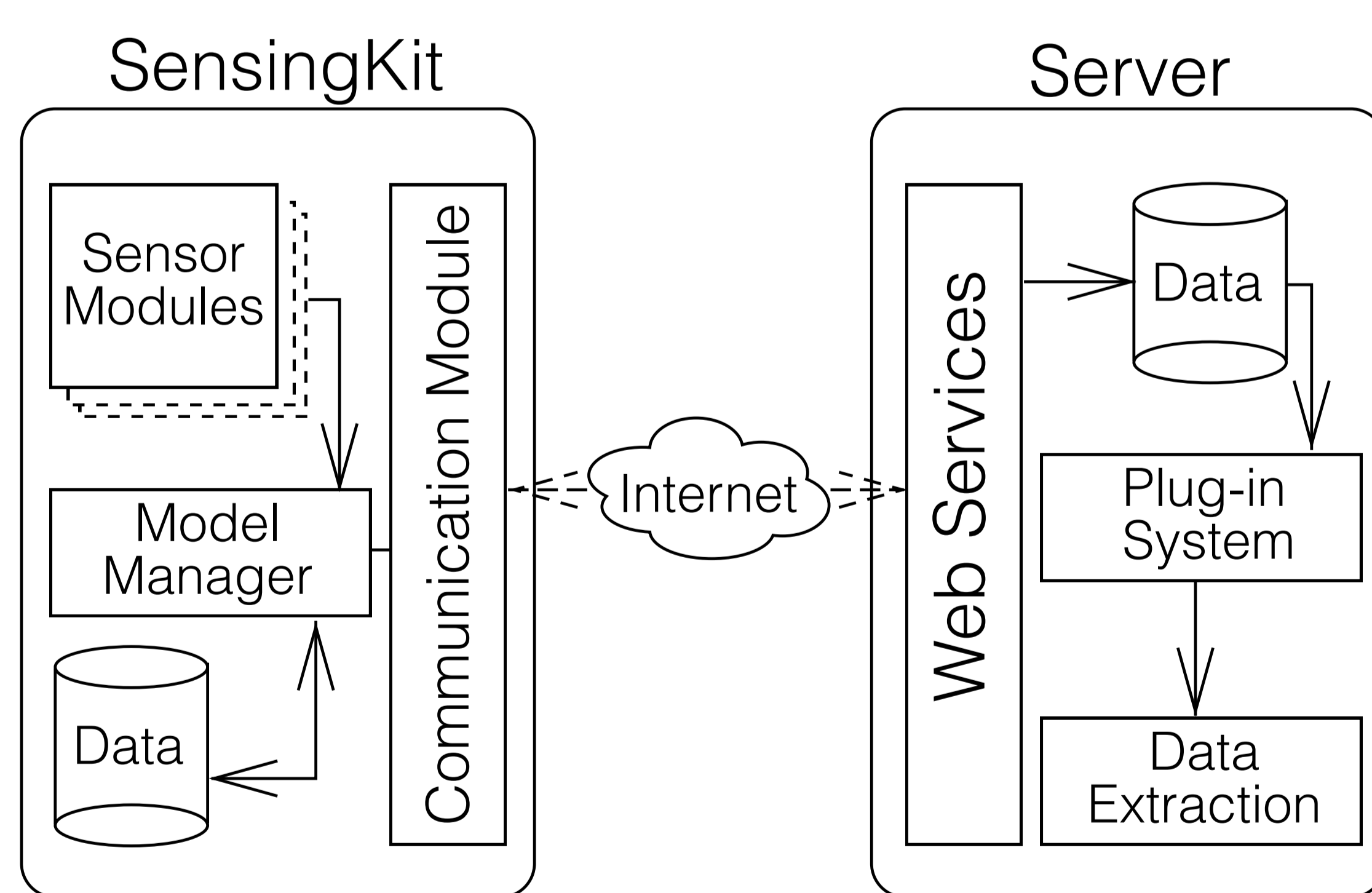
## Introduction

Motivated by the lack of a universal, multi-platform library, we present SensingKit, an efficient, open-source, client-server system that supports both **iOS** and **Android** mobile devices. SensingKit is capable of continuous sensing the device's **motion**, **orientation**, **location** and **proximity** to other smartphones and transmit the data to a server for further analysis over any Internet connection. We believe that this platform will be beneficial to all researchers and developers who need to perform mobile sensing in their applications and experiments.

## Platform Characteristics

- Works in Android and iOS mobile systems.
- Supports most of the available smartphone sensors: Accelerometer, Gyroscope, Magnetometer, Device Motion, Motion Activity, Pedometer, Altimeter, Battery, Location, Microphone, Ambient Temperature, Light.
- Power efficient proximity sensing using **iBeacon™** / **Eddystone™** technology over Bluetooth Smart (BLE).
- Easily extensible using a modular design.
- Automated time sync and data processing on the server.
- Available in open-source under the GNU LGPL v3.0.

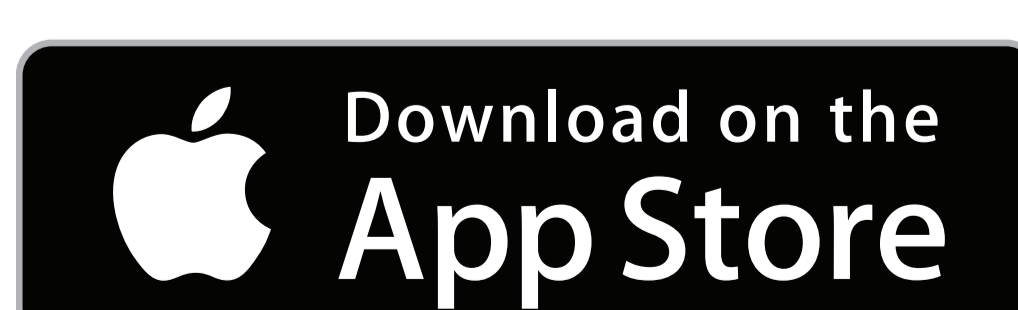
## Platform Architecture



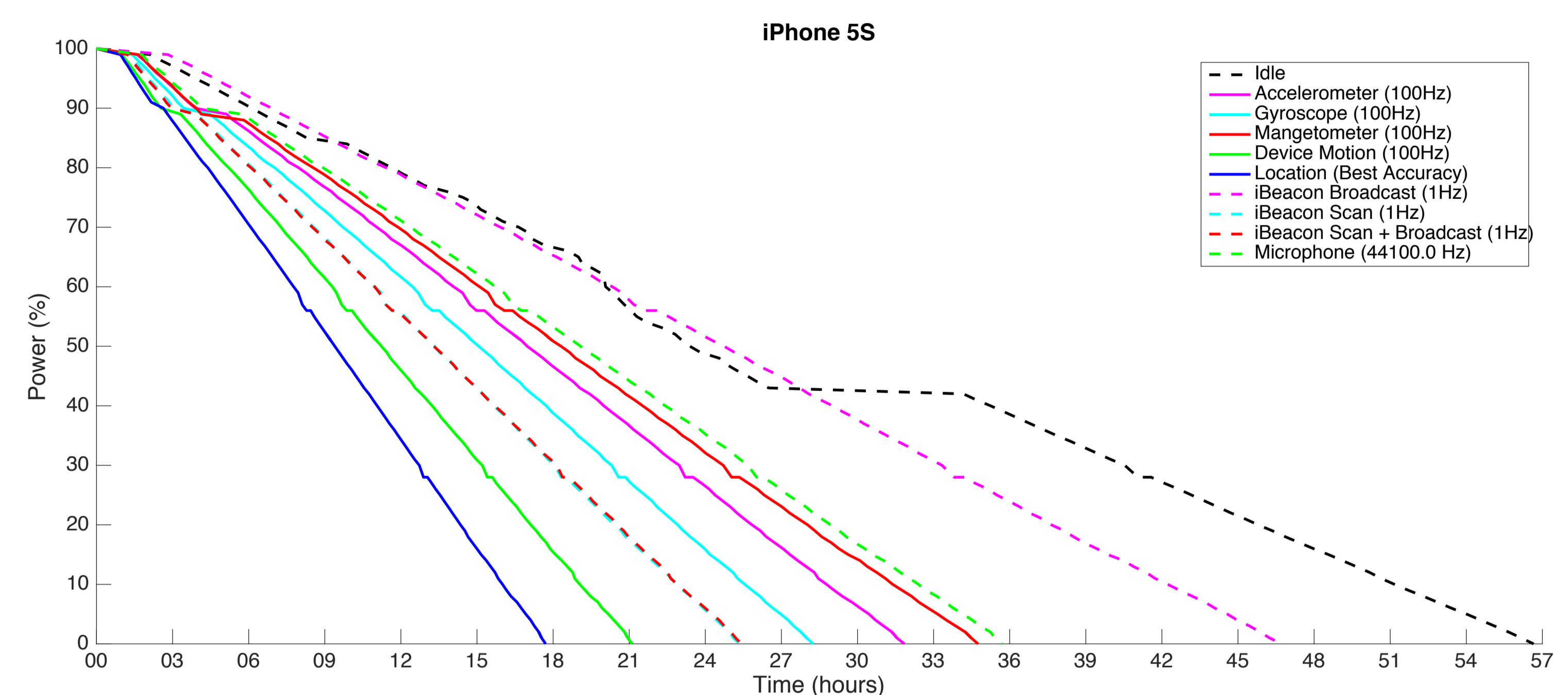
SensingKit System Architecture

## CrowdSense for iOS / Android

A free continuous sensing tool, based on SensingKit open source library. It provides an easy way for researchers to capture sensor data using any iOS or Android device.



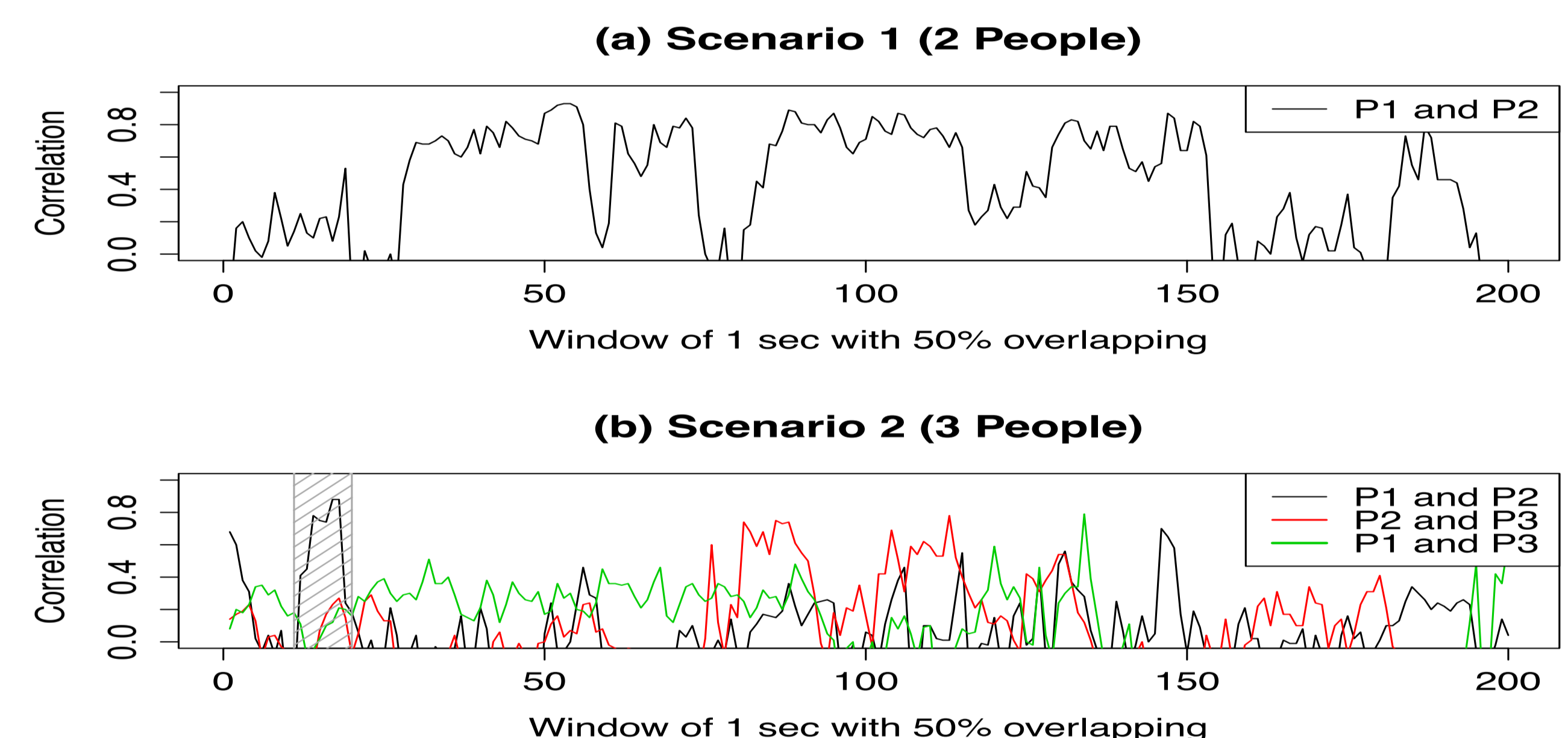
## Power Consumption



Power consumption of SensingKit running on an iPhone 5S smartphone.

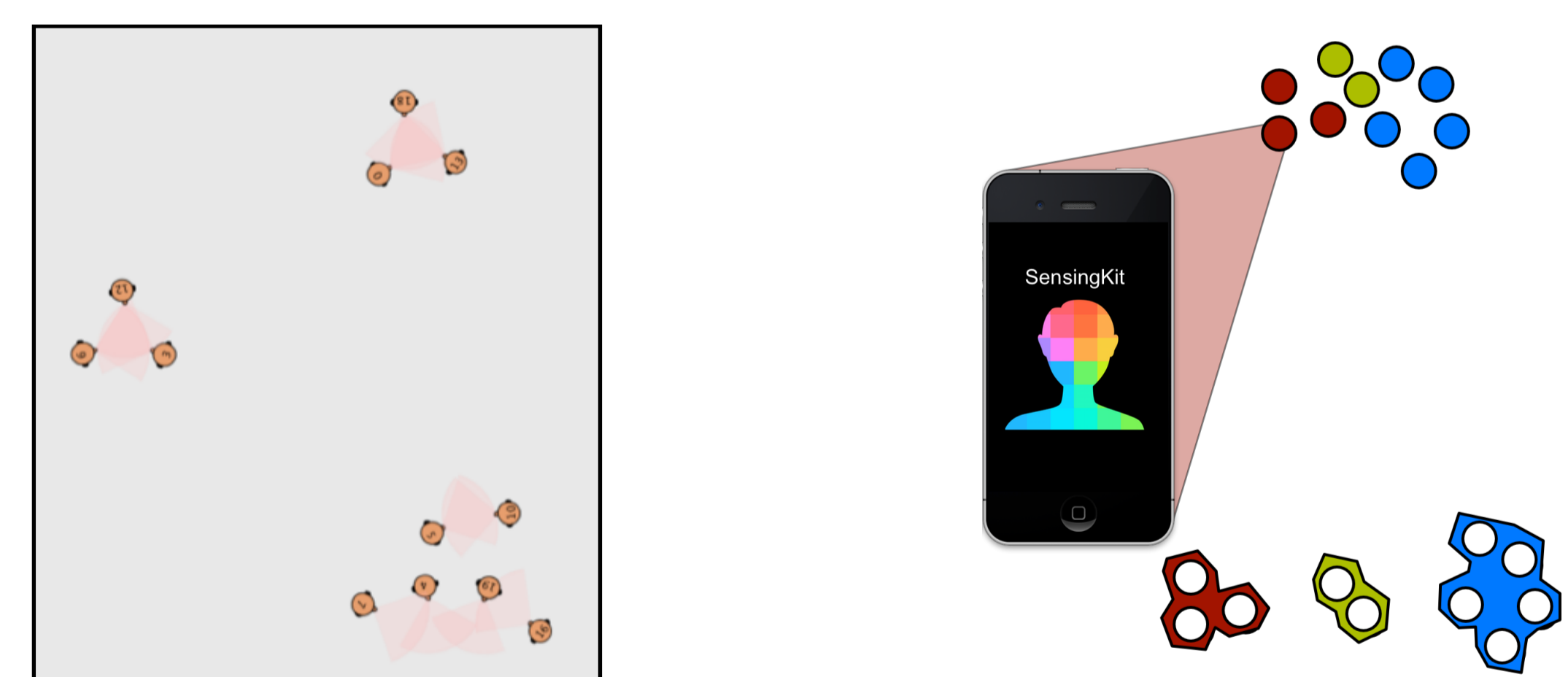
## Walking in Sync

We used smartphones to capture the motion of two groups of people during a 12 minute walk in a park using high frequency accelerometers.



Pearson Correlation applied to windows of 1 sec (with 50% overlap)

## Future Work



Multi-sensory modelling of different qualities of social interactions. (Narasimhan, 2014)

## References

- Kleomenis Katevas, Hamed Haddadi, Laurissa Tokarchuk, and Richard G. Clegg. 2015. Walking in Sync: Two is Company, Three's a Crowd. In *Proceedings of the 2nd workshop on Workshop on Physical Analytics (WPA '15)*. ACM, New York, NY, USA, 25-29.
- Kleomenis Katevas, Hamed Haddadi, and Laurissa Tokarchuk. 2014. Poster: SensingKit: a multi-platform mobile sensing framework for large-scale experiments. In *Proceedings of the 20th annual international conference on Mobile computing and networking (MobiCom '14)*. ACM, New York, NY, USA, 375-378.
- Narasimhan, K. P., & White, G. (2014). Agent Clusters: The Usual vs. The Unusual. In *Advances in Practical Applications of Heterogeneous Multi-Agent Systems*. The PAAMS Collection (pp. 244-255). Springer International Publishing.

## Acknowledgements

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