



ErdOS: An energy-aware social operating system

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ErdOS Project: <http://www.cl.cam.ac.uk/~nv240/erdos.html>

1. Introducing ErdOS

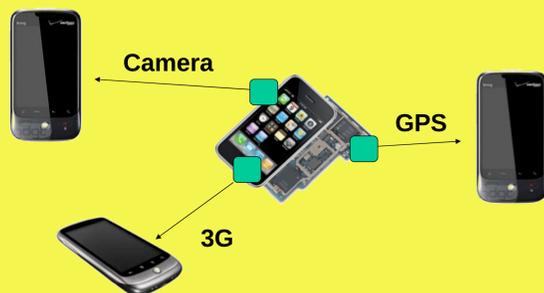
ErdOS is a new paradigm of **energy-aware social OS** in which mobile handsets can access resources available in co-located devices by:

- **Opportunistic** connections between handsets
- Ubiquitous low-energy wireless interfaces
- Proactive resources management

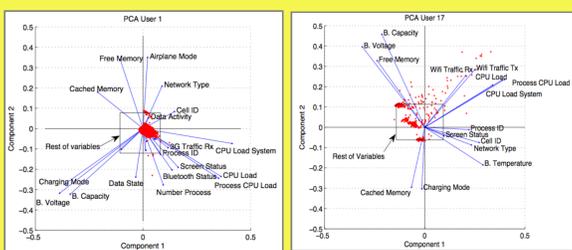
Users social links are used to provide access control

ErdOS aims to:

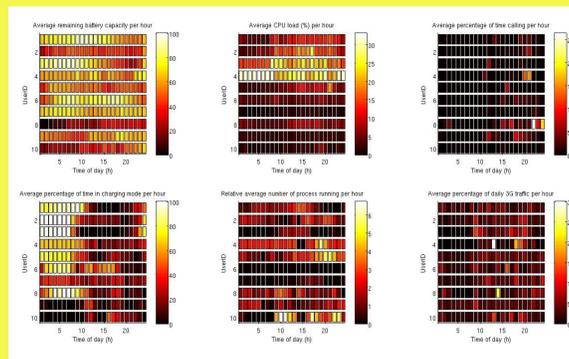
- Improve mobile handsets **usability**
- Reduce **energy** consumption



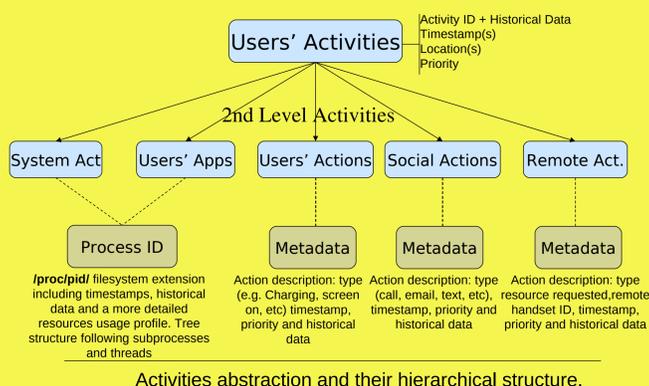
3. System Features



PCA of users interaction and interdependencies among resources



Importance of temporal context



Activities abstraction and their hierarchical structure.

2. Motivation

Mobile resources can be **redundant** at a specific scenario over multiple devices.

Current mobile OS provide a **limited control** over **mobile resources**.

Energy is the main limitation in mobile systems.

Energy savings and better **Quality of Service (QoS)** can be achieved by accessing co-located resources opportunistically.

3.1 User-centered resources management

Users interaction with the handset cause complex interdependencies among embedded hardware devices.

Resources management must be **proactive** and **customized** to users' needs.

Contextual information (e.g. location and time) helps to achieve a more **efficient** and **flexible** resources management.

ErdOS profiles resources demands to **activities**.

3.2 Resources discovery and Access Control

Robust naming scheme:

- Resources diversity requires adapted inter-process communication mechanisms to each type of resource.
- User's social graph to know social links
- Physical Addresses to access devices

Low energy resources discovery protocols:

- Adaptation of Bluetooth and 802.11 standards

Social links facilitate **access control** and **security**:

- Unix permissions are made automatically based on users' social network
- Proximity reduces privacy and security threats

3.3 Implementation

ErdOS modules as an Android OS extension:

- **Activities Manager.**
- **Context Manager.**
- **Name Manager.**
- **Discovery Manager.**
- **Social Cloud Manager.**

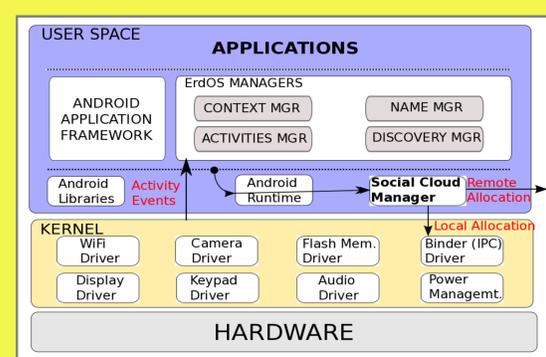
4. Future work

Investigate accurate activities profiling techniques (Machine learning)

Multiple types of applications can benefit from an OS with resources sharing capabilities.

Prototype Implementation as an Android OS extension.

Performance analysis to accurately evaluate its benefits, scalability and identify security and privacy issues.



ErdOS architecture.

Further Reading:

(*) Narseo Vallina-Rodríguez, Pan Hui, Jon Crowcroft, Andrew Rice. *"Exhausting Battery Statistics"*. ACM Mobiheld 2010.