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Programmatic prediction of network/CPU energy consumption for mobile phones.

145 commits

1 branch

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1 contributor

BSD-2-Clause

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brettdh

Aaagh, relative link fix.

Latest commit 42e8e5e on 26 Jul 2014

android_project	added mocktime to libraries loaded.	3 years ago
cpp_source	Merge branch 'master' of endplay.eecs.umich.edu:mobility/libpowertutor	3 years ago
.gitignore	Updated for new build process. Needs updating for the new phone.	6 years ago
LICENSE	Updates for open-source release.	3 years ago
README.md	Aaagh, relative link fix.	3 years ago

README.md

LibPowerTutor

This library provides calculation of energy usage according to the mobile device power models developed in the [PowerTutor](#) project. It was developed independently (though also at the University of Michigan) for use in the [Informed Mobile Prefetching](#) project.

Currently it includes models for the HTC Dream (G1) and the Nexus One phones, and the choice of power model is hard-coded to the Nexus One. It is designed for easily adding new power models. The [PowerTutor Android application](#) includes power models for three phones (libpowertutor does not support the HTC Sapphire), and the original paper describes a method for deriving power models based on a suite of benchmarks that isolate and exercise various device components.

Installation/Build setup

First, clone and set up the lone dependency: [Mocktime](#). From there, follow the steps below for your platform.

Android

The `android_project` directory contains an Android library that you can use by importing it in Eclipse and adding it as a library project to your Android project. See the Android documentation for more details.

Alternatively, to use from JNI, first symlink the `jni` directory into your NDK modules path:

```
$ mkdir $NDK_MODULE_PATH/edu.umich.mobility
$ ln -s /path/to/libpowertutor/jni $NDK_MODULE_PATH/edu.umich.mobility/libpowertutor
```

then add this line to the end of your `Android.mk` :

```
$(call import-module, edu.umich.mobility/libpowertutor)
```

Other

```
$ cd cpp_wrapper
$ make
$ sudo make install
```

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Only tested on Linux; may work on other platforms by happy accident. Note: if you're not running libpowertutor on an Android device, presumably it's because it's running in the server at the other end, which is attempting to predict the energy impact of sending data back to one of the client's multiple network addresses. It will not be of much use if you are attempting to estimate the energy usage of a server.

Usage

For Java, you can use the `EnergyUsage` class to track energy usage, either total or by component. The two components are network and CPU, which are tracked separately.

For energy prediction, use the static methods of the `EnergyEstimates` class. For the most part, they are thin wrappers for the similarly-named functions in `libpowertutor.h`; refer to the documentation there for details.

For C/C++, see documentation in `libpowertutor.h`. Its functions fall roughly into three categories:

- Estimating future energy usage
- Reporting past energy usage
- Experimental/unsupported functions

Caveats

LibPowerTutor estimates energy usage of the phone's 3G data radio and CPU. It may run without breaking on other phones than those listed above, but its estimates may be wildly inaccurate -- particularly if the phone uses LTE, since the energy usage of an LTE radio differs significantly from that of a 3G radio.