

## Mobilis – A library for the creation of data mining algorithms using mobile services and cloud computing

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### Abstract

Mobilis is a library developed to allow programmers to write applications to collect, mine and analyze behavioral information available at mobile devices and social media of the user. During the research we managed to successfully create the data collection infrastructure as well as some basic inferences methods (e.g. where did the user spend most of its day?) and made good usage of social medias like Facebook (using FQL queries).

*Key words: data mining, mobile, android.*

### Introduction

The project has the main purpose of developing a library that would allow programmers to write applications to collect, mine and analyze behavioral information available at mobile devices and social media of the user.

The final idea is that the Mobilis library, when finished, would integrate different social medias like Twitter, Facebook and Foursquare to answer programmers questions like if a user is at home, or at work, if it is traveling, etc. Something that is extremely useful, but requires a lot of data collection and complex algorithms that treat and interpret the data correctly. It would allow the user to find nearby friends, so programmers could take decisions in case they locate a close friend.

Mobilis intends to increase the level of abstraction of the data types and methods in the programming interface, in a way that programmers could start to think about places, people, their daily routines and social interactions, taking out their necessity of dealing with low level details (like speed, position, GPS coordinates, etc).

Another objective of the project was to develop a functional Android application that used the library so we could prove its effectiveness and so we could learn the difficulties a programmer would have with Mobilis, so we can in the future improve our already created methods and add new functionalities.

### Results and Discussion

For the data collection we had to create five databases. The activity database stores what activity the device was doing at a specified time and place (walking, stopped, etc.). We also have a location database and a geofence database, that relate to each other and are used to know where is the device. At last, we have a power database and a WIFI database that store

information like where did you charge the device or connected to a wifi.

Basic inferences were created, for example, where did the device spend most of its day or night.

Many Facebook queries were developed, so we can track friends, events, where your friends checked in, and many other useful data.

We developed SmartTask, a functional Android application that uses Mobilis. With it you can create a task, link a friend (from Facebook) and/or a place, so when one of your friends is near you in the selected place, the application will warn you so you can remember to do the specified task, like returning a borrowed book, for example.

### Conclusions

We can see that the Mobilis library has a good data collection infrastructure that will be very important in the future. The database of activities, of Geofences, of energy and of networks can give us a lot of information about the user and will be used a lot in the progress of the library. In this whole year of research, we had to overcome challenges like inexperience, lack of developers and the project complexity. The number of Facebook queries created was very good, and a lot of them proved their efficiency in SmartTask, and the creation of more can be easily done. The inferences created also will be used in the future for our methods like `is_at_home()` or `is_at_work()`, but as soon as Mobilis is released other developers can easily have better ideas and use them in a way we did not imagine.

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