Sistemas de Computação Móvel e Ubíqua (2018/19)

The goal of the project is to build a system comprising a mobile application that interacts with an (or more) Arduino controllers that sense and act upon the real world. The application's field and purpose is for you to define, taking into account the preciously published list of requirements.

The project is due on **May 30th** but you will have to deliver to intermediate reports:

- **Project Description** to be delivered until **April 5th**
- **System Architecture** to be delivered until **May 10th**

The delivery of all these documents is mandatory, but the project's evaluation will focus exclusively on the final report. The purpose of the intermediate documents is only to ensure that the development is on schedule and it complies to the goals of the assignment. The following sections detail what must be delivered on each date.

Project Description

The main goal of this document is to give a (non-technical) description of your project. Begin by describing the goal and context of your application. Proceed to describe the main elements of your system and how they relate with each other (you can use an image or schema to better illustrate the system). Finally, describe which functionalities your system will provide, from the end-user's perspective. You must also explicitly indicate how your system complies to all the project requirements.

More specifically, concerning the mobile application: make a brief description of the behavior of your application, you may present some sketches of the user interface. Explain how it connects/communicate with the ubiquitous part of the system, and enumerate which of the device's sensor you are planning to use.

Concerning the Ubiquitous part (Arduino part): enumerate the sensors and actuators that your application requires and, if it is not possible to use such sensors and actuators, elaborate how you plan to simulate them. Note: If you are not yet sure about the sensors/actuators that you will use, describe what physical phenomena you plan to measure and what actions you want your system to take.

Concerning the mobile application, enumerate and describe the main functionalities that you intend to implement. You can present a draft of the screenshots (or some sketches) or just a text with the description.

System Architecture

The main goal of this document is to give a technical description of your system's architecture. You must provide a description of:

- the overall architecture, including all its the components, e.g. mobile application, service running in the Cloud (if you need one — note that, for proof of concept, this service may run in your laptop), Arduino controller(s), sensors and actuators;
- how the system's components communicate and interact with each other (protocols);
- how you will implement your mobile application, including the server counterpart (if such element exists).

Concerning the mobile application, you must present screenshots (or some sketches) of your application and all relevant implementation details that you are planning for you application.

Final Report

The final project report should follow the structure similar to the described below. Note that you can use or base you text on the previous delivered documents.

1. Introduction

Present the context of your work, why it is interesting and useful, and how it fits on the Mobile and Ubiquitous Computing course.

2. General Overview

Present which functionalities your system will provide, from the end-user's perspective. Present an eagle-eye view of your system, describing its key software and hardware elements but without going into implementation details. Points as the following must be made clear:

- Your solution is for one or more mobile clients?
- It requires a server?
- How many Arduino (or other) units you need?
- Which sensors you use and how many of them?
- Which are the interactions between the system's elements?

3. Mobile Application

Explain how you have implemented your mobile application, including the server counterpart (if such element exists). You must present screenshots of your application and all relevant implementation details.

4. Sensing and Reacting

Explain how the system sensors and actuators are integrated within your application. Present a simple and short explanation of their behaviour and the electronic schema of the connections. You must also explain the more relevant details of the code where the sensors and actuator signals are handled and how they interact.

5. Experiments

Report the experiments you have conducted to assess the correctness and usability of your solution. For each experiment, always indicate its purpose, the assumptions made, and the test bed.

6. Conclusions and Lessons Learned

Describe some of the aspects that, in your opinion, should be addressed in a real world implementation of your project. Present the more relevant lessons that you learned from this work and some final remarks.