Domotic Room
Smart City
Process Report Template

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1 Introduction

This is the template of the project of the smart city course at university of Bologna. Here you can find all the process of analysis of the project: models, problems and resolutions, interaction with the environments, sensors and other.

Feel free to use this project as you want. We hope to be an inspiration for others.

2 Vision

Our vision is to reach rapidly the dream of a smart city: with an environment full of augmentend reality and capable to comunicate directly to the user, take decision and made actions in order to deal expecially with crysis or simply to facilitate the life of every day.

We want expecially to be ready in design and build systems embedded in this context and fullfill the gap between hardware and software because recently the hardware had an exponential grow in term of sensors, elaboration capacity and availability of resources due to the decrease of the hardware itserf.

If also you share the same vision

You are in the right plate.

3 Goals

Our goal is to explain a concrete and free inplementation of a domonic application and face all the problems in order to let the development of future application of the same type more easily.

In the same way we want to explore this field and learn the theory of the smart city with the concepts explained in the course and the basics of how to deal with sensors, external input made from environment and not directly from the user.

4 Requirements

4.1 Step 1

Is required to design and build a system that manage the status of a room in terms of temperature, humidity, sound evironment and light.

The user can interact with the system through a web interface and insert in input the ranges of every parameters above. The system have to monitor the room in realtime through specified sensors and check if some of the parameters goes off the range inserted from the user. When this happen the system must show a notification of the exception in the web interface.

The user can change the ranges dinamically when the system is running and also watch, from the web interface, the realtime data and the historic data, with particular enphasis when the environment goes out of the range and when the ranges changed.

4.2 Step 2

Implement an android application that allow to interact with the system in the same way as the web interface and implement a special notification if the android device, with the GPS enables, is near the room (fixed range, 1KM).

5 Hardware Procurement

Unfortunately one of the first problem in this project consist in buy the right hardware. So we searched for the right packs of sensors, resistors, wires and stuff for the building of a hardware configuration to satisfy the requirements.

5.1 Computational Device

First of all we need a computational device that can be connected to a large bunch of sensors and fully programmable. In the course we see two possibilities in this sense:

- Arduino
- Raspberry Pi 2 model B

We choose the second one because we have more familiarity with that and because it can be more easily recycled at the end of this project, by one of us, for other jobs.

the price is 44,50 €

5.2 Sensors

We need enough sensor in order to capture the parameters in the requirement, so we choose this sensors:

Environment Parameter	**Sensor Cost**
Temperature / Humidity	
Light	
Sound	

Table 1. Sensor Table

5.3 Addictional Hardware

At the end we need also some support for electrical circuits and for resistors, needed for the properly connection between sensors and Raspberry Pi.

Hardware	**Cost**
Breadboard	
Wires	
Resistors	

Table 2. Addictional Hardware

6 Requirement Analysis

6.1 Use cases

6.2 Scenarios

6.3 (Domain)model

6.4 Test plan

7 Problem Analysis

7.1 Logic architecture

7.2 Abstraction gap

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9.1 Structure

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