PROJECT 10 – ORANGE LABS SENSORS API

Group Members

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Overview

As of December 12th, progress has been made into the creation of a prototype for the proof of concept involving an Arduino Mega, WRL-12576 Bluetooth and a SRF05 – Ultra-Sonic Rangefinder, a database to feed this sensor data into has also been created, along with additional documentation and a general GUI. We have also managed to gain and clarify a proper set of requirements from the client on the 8th which we have then gone on to formalise.

At present, we look towards familiarising ourselves with the data analytics that could be applied to the system, sorting out issues encountered with the prototype, implementing a method to transfer sensor data from the computer to the database and finishing the initial proof of concept.

Summary of progress so far

- As of 2nd December, contacted and arranged a meeting with Graeme McPhillips
- Had a team meeting on the 2nd December to discuss any outstanding issues, key points to note, potential sensor configurations and hardware
- Met up with Graeme McPhillips once on the 5th December for hardware advice and again on the 8th December to collect hardware
- Held a meeting with the client on the 8th December to discuss current progress into research, ascertain client requirements, clarify any doubts and discuss future plans
- Assembled the different hardware pieces together for the initial PoC
- Started programming to access data from Ultrasound sensor through the Arduino across Bluetooth to the PC
- Created new pieces of documentation (e.g. for research & formalised requirements) and collated old pieces for a re-write to be included in the PoC
- Created a general purpose GUI for the PoC
- Created a database to feed raw data into for the PoC
- Updated the website
- Had a quick check-up team meeting on the 12th to update each other on current progress and following actions

Summary of meetings

<u>Tuesday 2nd December – Outstanding issues & Hardware report</u> **[Team Meeting]**
Location: 4th floor MPEB
Time: 4.02pm
Attendees/ Absentees: Johan, Gulliver, Victoria / None

As an opening to this meeting, hardware, 'sensors' and their possible configurations to detect objects in different environments: on-street parking, indoor, multi-storey... were discussed. This was followed by a talk of the general pros and cons of each, along with considerations that would have to be made with each suggested implementation.

The second half of this meeting involved a general catch up on any outstanding issues and key areas of our project that required focus upon. Main issues of note include waiting on a response for the client to arrange a meeting as soon as possible, hardware which had been ordered but had not arrived yet from Amazon and the basic G/UI that required hashing out before the 11th at latest.

Friday 8th December – Skype call with Orange Labs **[Client Meeting]**
Location: 6th floor MPEB
Time: 5.04pm – 5.37pm
Attendees/ Absentees: Johan, Gulliver, Victoria, Kashif, Mobeen, Irene/ Leslie

An outline of our research in terms of the software and hardware implementation so far was brought up.

Focus shifted to a series of questions made with the purpose of gaining clarification in mind. These included:

- If existing solutions may pose an issue to our focal use case
- Preferences for sensors described for object detection
- Priority requirements
- The use case environment to prioritise
- Project outputs expected
- Preferences for GUI
- Preferences & expectations from API

Emphasis was placed upon the system architecture being open to other sensors so it can be used/ plugged into other use cases, not just parking. Further details regarding this client meeting can be found in our meeting minute documentation.

The meeting was wrapped up with an overview of what was clarified and a general outline of future plans agreed by both sides.

Friday 12th – Progress update report **[Team Meeting]**
Location: 4th floor MPEB Labs
Time: 2.33pm – 4.25pm
Attendees/ Absentees: Johan, Gulliver, Victoria / None

This was a general catch up meeting between the team. As of this date, the hardware prototype has been looked into: assembling and programming. A database of which the raw data collected from the hardware prototype would be sent to was also created. More documentation efforts have also been made to finish up the initial PoC.

Attempts to further look into the issues encountered with the Bluetooth device were made in this meeting. After little success, an email to Graeme McPhillips regarding a potentially faulty Bluetooth chip was sent and as of current, pending.

Next Actions

GULLIVER

Over these past two weeks I've sought a working system implementation to act as both a test and a significant element to the proof of concept. Using Window's Azure, I established an SQL database designed to store all of our sensors' data, and began the process of optimising the design. I also dedicated a significant amount of time to developing a prospective GUI mockup for developers on the network, displaying all of the necessary functionality and how the site can be used.

From this point, I aim to build a secure connection to the database such that readings received over Bluetooth can be automatically updated and added to the system. Besides this, I will be assisting with the final aggregation of the group's documentation.

I will then focus on producing an API to allow for developer access, demonstrating the capabilities with a simplistic web app.

VICTORIA

Most of my efforts in the past week have revolved around helping in the compilation of documentation for the PoC and website. Scheduling times to meet up with Graeme McPhillips to discuss and gain hardware along with Johan, assembling the pieces, beginning the programming process and client liaising is also something I have been occupied by.

In the upcoming days, I hope to continue in efforts to complete the initial PoC along with Johan and Gulliver. More specifically, completing any outstanding project management documentation, research documentation and looking into how to use data analytics to extract raw data from a database, manipulate this and feed it back in on the side. I will be helping out with the website as well.

Research we require to carry out over the winter break will also have to be discussed with the team after the initial PoC is completed. We will also require contacting the client again regarding the scope and deliverables we have decided upon – before the meeting established in the week of January 12^{th} – 16^{th}.

JOHAN

In the past two weeks, I have been focusing on creating a prototype of our system, to test out what is possible and what is not. This required a lot of research into different kinds of microprocessors and different models of sensors. It also required me to learn a lot about how Bluetooth works and how to implement it using first, the Raspberry Pi and then, the Arduino. We encountered a lot of difficulties getting Bluetooth to behave the way we intended it to, which means that more research needs to potentially be done into the reliability of Bluetooth. Additionally, I've helped write parts for our end of term report.

The next step is to help finish off the report, the video and the last part of the prototype. Over the Christmas holidays I plan to further my knowledge about networks specifically looking more into Bluetooth and Zigbee networks. I also plan to discuss and decide on final considerations about hardware specifications with my group members.