Software Engineering & Group Project (COMSM1401) - Assignment Brief

Overview

The assignment for this unit is to design and build a novel new Internet of Things (IoT) product or service. Due to the nature of the domain, such a system will be required to operate across a diverse range of devices and platforms. Due to the scale of this challenge, you are not required to fully implement all aspects of this application - you must develop your idea to a level that would be presentable as a proof-of-concept prototype to potential investors. Support will be provided in the practical labs to help teams identify and enumerate a suitable project concept.

Due to the fact that this is a significant piece of work, you will need to work in small teams in order to complete the assignment. This brief is designed to balance ambition with the challenge of technical implementation. The markers will expect to see a blend of low-fidelity / high concept design, coupled with the solid and significant implementation of certain key elements. The extent to which your team successfully achieves this balance will be reflected in the marks awarded for this assignment. Although you are not required to create a fully working system, each element that you do build and its relation to the other components of the system must be clearly explained and justified.

Essential Components

Your project ***must*** include at least the following key components:

- **IoT device**: This will be developed using the M5Stack platform - a small Arduino compatible device with in-built screen, accelerometer, gyroscope, battery, GPIO pins, buttons, Wifi and Bluetooth. We will provide one such device to each team.
- **Desktop application**: This will focus on data visualisation, management and control tasks for your application. This could be used by someone managing the service, or potentially by the end user. This element of the system must be prototyped using Processing.
- **Web application**: Some aspects of the system must be implemented as a platform independent web application. This component of the system is likely to be used by clients of your service, or end users of your concept product. We suggest implementing this element using p5.js, however you are free to use alternative technologies should you wish.
- **Data communication**: Some application data must move between components of the system (e.g. web to desktop / IoT device to web / IoT to desktop). A range of relevant data communication mechanisms will be introduced in the practical sessions to enable this.
- **Data repository**: An element of the core business data must be made persistent in some form. This can be anything from simple flat-files, all the way through to a fully-fledged relational database. Your aim should be to provide *good enough* functionality to illustrate your concept at the final product pitch.

Deliverables

The performance of your team will be assessed through the following four deliverables:

Pitch [25%]
A short 10 min presentation and technical demonstration, illustrating the work of your team (plus time for Q&A with the markers). Approach this session as though you were presenting your prototype to potential investors in the hope of gaining funding to take the project forward. The marking criteria against which you will be assessed will be as follows:

- Clarity of explanation
- Use of presentation materials
- Professionalism of demonstration
- Ability to answer questions and accept criticism

These presentation pitches will take place in the week after Easter vacation (w/c 20th April, UoB Week 22).

Product [25%]
The prototype produced as part of this project will be assessed as a demo within the above pitch. It will be evaluated against the following four components:

- Novelty and Innovation of the concept
- Successfully addressing the identified problem
- Technical ambition
- Technical achievement

Portfolio [40%]
You must use GitHub to collect together all your work as a portfolio. You must write a front-page document to clearly represent the design of your system and your use of GitHub, addressing:

- Architecture of the entire system
- Object-Oriented design of key sub-systems (e.g. Desktop Application, Web Application etc.)
- Requirements of key sub-systems (in the form of selected user stories)
- The evolution of UI wireframes for key sub-systems
- Details of the communication protocols in use (including a rational for your choice)
- Details of the data persistence mechanisms in use (including a rational for your choice)
- Details of web technologies in use (including a rational for your choice)
- Breakdown of project into sprints (showing the users stories implemented in each)
- Details of how you evaluated your designs (techniques used & awareness of their limitations)
- Discussion of Social and Ethical implications of the work
- Reflective discussion of the success of the project
- Discussion of future work (in terms of design, development and evaluation)

Your front-page document should be written in Markdown, with the various sections version controlled in a “Portfolio” folder on your GitHub repository. Marks will be awarded for the clarity and detail of each of the above sections. The deadline for completing your portfolios is the **8th May 2020 1pm**.

Practices [10%]
A short (one page) individual report describing and reflecting on the practices used in the development of your prototype. The marking criteria used to assess this deliverable will be:

- Use of Agile practices (e.g. pair programming, test-driven development etc.)
- Management of issues (i.e. stories, features, bugs etc.)
- Management of source code
- Communication mechanisms used to ensure successful collaboration
- Team collaboration and coherence and cohesion
- Overall professionalism and maturity of development process

The deadline for your practices report is the **8th May 2020 1pm, Submitted to Blackboard**.