Assignment 2 Specification

Networking for Connected Devices

Produced by: Frank Walsh

Computer Systems and Networks

HDip Computer Science 2018

Context

- 40% of your overall mark
  - Project ethos (1 overall project)
- For this assignment you are required to:
  - Propose a project.
  - Create a working project using networking/IoT standards & protocols.
  - Requires a "physical" aspect – sensors/devices
  - Present and communicate your work in a clear, correct manner.
- The project should incorporate the different layers (sensor, processing node, gateway, application) of an IoT/connected device architecture.
- Project will be assessed on it technical (e.g., features) content, complexity, applicability to domain and execution.

Requirements

"Include the different layers (sensor, processing node, gateway, application) in an IoT Project.

Design	Propose and design domain-specific solutions (e.g. health care, smart home)
Apply	Apply suitable computer networking protocols and standards.
Model/ implement	Model/implement a solution to your proposal •Use the knowledge, skills and practices from other modules •Should be scoped correctly – can't build a production standard solution in a few weeks.
Present/ curate	Present/curate your project Create a short video that demonstrates the project.

Timeline

Nov 30

Proposal document (for 30th November)

- One page document with general concept.
- Doesn't need to be exact!
- Sections: Introduction, Proposed technologies (protocols/devices/prog lang)
- Proposed Tools (IDEs, cloud platforms)

Dec 10

Project Graphics & Benchmarks

- Pictorial (block level) representation of project
- Flow chart of potential algorithm/logic
- Informational flow diagram
- Deliverable: Slides addressing the above

Jan 1-5

Presentation and interview:

- Git Repository submission(all code/resources)
- Include a 10 minute video showing your work. (perhaps Youtube video)
- Online interview via Slack.

Grade Spectrum

	Combined knowledge (15)	Networking Technologies (35)	IoT Solution (35)	Communication (15)
Base (40-49)	2 programme strands present in output. Basic knowledge of each exhibited. (e.g. programming, database, computer systems)	Physical/Data link layer solution. Minimal devices	Basic solution that may form basis of overall application. Sensor focussed	Minimal (1) communication resource used (simple read me) and video.
Good (50-64)	apply concepts from more than two modules/strands..	Wireless protocols. >1 protocol. Interconnected devices.	Solution with clear IoT and domain application. Includes processing/ gateway function	Portfolio/repository includes clear presentation, documentation.
Excellent (65-80)	>2 strands as above and including more advanced knowledge and concepts.	Lightweight messaging. Architecture that mediates between high and low level devices.	IoT Application of good prototypical standard. Used to evaluate overall suitability for a production system.	Additional communication resources (e.g. instruction video, learning resources)
Outstanding (80-100)	All above, including self-acquired knowledge over and above module content.	All previous to excellent level. Excellent Use of Cloud/IoT specific platforms	Novel solution of clear applicability to specific domain. Could result in employment offer.	All the above, accessible project platform (e.g. web site)

Sample Project Ideas

- Smart home device:
  - Access and control a home device

- Who's there?:
  - Use personal wifi-enabled devices to detect who's home(enhance Wifi lab with cloud platform, extend to gereral smart home solution...)

- The button(s) that can do stuff!:
  - A connected button that can make anything happen!

Other Considerations
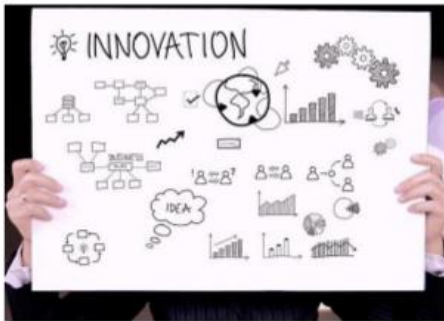
- "Permissionless Innovation"!
  - You don't have to limit yourself to SenseHAT/RPi or module technologies. You can integrate other devices/ systems
  - We used Python but you can use any other programming languages/ frameworks if you want. (Remember, the RPi can run Node/Java/JavaScript)
- Have a look at other IoT project examples for inspiration.
- It's OK to "simulate" sensors"
  - We realise you probably don't have a lab at your disposal. You can simulate data (e.g. GPS location.