SIT225 Data Capture Technologies

Pass Task: Use case design

Overview

The ability to capture data from any possible sources, then visualise, analyse, interpret data and communicate to the stakeholders offer opportunities to solve real-world problems of many different kind including software engineering problems, and data analytics problems.

Hardware Required

Any hardware module, as required.

Software Required

Any software module, as required.

Pre-requisites: You must do the following before this task

All weekly activities up to week 9 in the unit site.

Task Objective

So far, in this unit, you have equipped yourself with the ability to i) capture data from several sources including Arduino connected sensors, and smartphones, ii) process and visualise data in dashboard such as Arduino Cloud dashboard and Plotly Dash, iii) synchronise data streams (called variables) using Arduino Cloud to broadcast a variable to one or more other variables, iv) store data to the cloud and local storage and v) analyse data of different sensor types such as accelerometer, gyroscope, temperature and humidity and identify trends and patterns in data. It is time that you exploit your skill to solve a real-world problem **your own way**.

Steps:

1. Identify a problem you are passionate about solving using your learned data skills.
2. You should be aware of any existing solutions which tried to solve the same problem you have thought. You want to be innovative and want to identify the shortcomings of any existing solutions. Explore scholarly literature to find different research studies out there which tried to solve the problem you want to solve. Read through their methods and summarise so they can be compared and understood clearly and nicely. You can use tables and/or separate each of their discussions into separate paragraphs. This is going to be your literature review section where you review existing approaches to solve a given problem – the problem you want to solve using your own innovative way. The literature review section will help you identify gaps in existing methods where you are desperate to

utilise your innovative data skills to contribute. Add references with appropriate styles at the end of the report.

3. Describe your own method elaboratively without missing any tiny details, even though you have not implemented them yet. This is your very method and your plan how you want the problem to be solved using your own innovative way. Try to include every aspect of your data skills including **a)** data sources and destinations, **b)** data types, **c)** data capture protocol, **d)** data logging and storage, **e)** types of storage - cloud or memory card or mixture of cloud and local storage, **f)** data dashboard for data monitoring, **g)** data analytics involving data analysis, pattern identification, communicate to stakeholders and notifications. You can include items **h)** beyond those mentioned, making yourself in charge of sharing your story and how you would like to solve the pressing problem. Try to include visuals such as flow charts to nicely summarise your method, design of your software modules including data capture, monitoring dashboard and notification mechanism. An idea is to be able to realise your million-dollar idea to solve a problem with you, if you can afford time for a few months even after this unit completion or with other students, if you are unable to, to keep your work moving forward.

4. **i)** Plan and prepare a budget for the project. List down the required hardware (with specification and available vendors and prices) and software and the amount of programming needed where and how much such as in microcontroller board (such as Arduino), in back-end module such as a Python script collecting data and doing other processing. Use a Gantt chart to describe your development plan, how much you have done already, what is being done and will be done with an estimation in man hour (how many hours for a person) as per your current skill set. Justify your plan.

5. Discuss any **j)** ethical considerations resulting from data collection and analysis and how you plan to mitigate the risk of data breaches.

Submission details

Q1. Prepare a nicely formatted research report with separated sections including introduction, literature review, methods, results (if any), discussions and future work.

Q2. Create a PowerPoint presentation describing your problem statement, existing methods, proposed methodology and your plan for how and when you are going to solve it with no more than 10 slides.

Q3. Create a 3-minute video presentation in Panopto/CloudDeakin presenting your slides and share the video link here.

Q4. Create a subdirectory 'week-9' under directory 'SIT225_2024T2' in your drive where you copy resources including programming files, data files, report file and presentation file. Commit and push to changes to GitHub. Include the link to your repository here with a GitHub page screenshot of weekly folder content. A tutor may try to access your GitHub link, if necessary. Give access to your tutor by adding tutor's email address as a collaborator of your private repository.

Instructions

Consolidate outputs following the submission details above into a single PDF file. You should convert PowerPoint presentations as pdf and combine them with the main PDF file.

Submit your work

When you are ready, login to OnTrack and submit your pdf which consolidates all the items mentioned in the submission detail section above. Remember to save and backup your work.

Complete your work

After your submission, your OnTrack reviewer (tutor) will review your submission and give you feedback in about 5 business days. Your reviewer may further ask you some questions on the weekly topics and/or about your submissions. You are required to address your OnTrack reviewer's questions as a form of task discussions. Please frequently login to OnTrack for the task *Discuss/Demonstrate* or *Resubmit* equivalent to fix your work (if needed) based on the feedback to get your task signed as *Complete*.