1D Final Project – Open Project

Background

As part of Singapore Government nation wide campaign on building a Smart Nation, SUTD is embarking on making its campus to be the playground of Smart Nation. The President and the Provost is asking students to submit proposal for a smart campus applications that can be deployed in SUTD. The proposal should solve a real and pressing issues in SUTD either for staffs, Faculty, students, or other stake-holders in SUTD.

Grouping

Students are to complete the project in a group of 5 to 6 person. Put in your group details in this form: 1D grouping form

Starter Kits

Each group is given a starter kit, containing:

- 2 Raspberry Pi
- Wireless keyboard and mouse
- 7” LCD screen
- Wifi and bluetooth dongle
- T-Cobbler
- Ultrasonic sensor
- Basic electronic components:
- LEDs
- Switches
- Push buttons
- Resistors
- Jumper wires
- Breadboard

Part I

Tasks
Define the problem you wish to solve in making a smart campus. Propose a solution to solve the problem and how the solution make use of the “smart”-ness of technology. The proposed solution must contain the following components:

- GUI interface using Kivy
- Internet using Google Firebase
- Either Thymio or Raspberry-Pi or both.

You can also make use all the components given in the starter kit for your prototype. **It is highly recommended that the smartness of your solution should involve data analysis and prediction using regression and/or supervised classification (bonus point)**.

Research on proposed solutions and what are the components needed. Check whether it can work with the existing platform given (either Thymio or Raspberry-Pi).

Plan items to purchase besides those given in a starter kit. Each group is given a claimable budget of $50.

Deliverables
Week 6:

- Submit Powerpoint slide to eDimension before your third session. No grades will be given for the Presentation if you have not submitted the slide.
- Presentation (5 min) of the problem and proposed solutions as well as the planned budget purchase.

Grading
- Percentage out of total DW grade: 1/100
- Maximum Points given for this part: 20 points

Rubrics for Part 1.

Part II

Tasks
Build a prototype implementing your proposed solutions. Implement the GUI for the mobile components using Kivy as its GUI library. Apply some data analysis and prediction to make the solutions smarter.

Deliverables
Week 13:

- Demo prototype or proof of concept on your third session in Week 13. Venue: Respective Cohort Classrooms.
- Poster submission

Week 14:

- Return all 1D items and submit claim for extra purchase to lab technologist.

Submission
Each group is to submit the following through eDimension:

- All Python codes (Thymio, Pi, Kivy, etc)
- A0 Poster in PDF containing: -background and problems to be solved
  - proposed solutions
  - how to use the mobile application, how the system works, UI of the mobile application, etc
  - Schematics or diagram of the whole system and individual components of the system
  - Benefits of the proposed solutions

Grading
- Percentage out of total DW grade: 8/100.
- Maximum points given for this project: 25 points.

Rubrics for Part 2.

Bonus Rubrics

- Percentage out of total DW grade: 1/100.
- Maximum points given for this project: 5 points.

Criteria (Smartness):

- 0-2 pts: Solutions do not have any analysis and prediction
- 2-4 pts: Solutions contains simple analysis and no or little prediction using machine learning.
- 4-5 pts: Solutions contains analysis and able to provide smart prediction using machine learning techniques.

Claim Submission

Claim form Submission.

Points to Note for Claim:

- You need to submit the claim form with their original physical receipts. Pass it to Sarah or Zainab on the day when you return the kit.
- Paste your receipts on an A4 size paper.
- You can purchase any items related to the projects within the $50 budget. The items can be sensors, actuators, wires, etc. You can purchase these from SgBotic or RS-Online, or any other shop. You can also purchase stuffs for your prototyping purposes like styrofoam, cardboxes, etc.
- Stationaries such as papers, scissors, cutters, glues, etc are NOT claimable.

References

- Hello Smart Home: Steve
- Internet of Things