



SIT107

Software engineering 1: connecting the cyber and
physical world

[Learning Summary Report](#)

SATVIK SHARMA
218595095

Self-Assessment Details

The following checklists provide an overview of my self-assessment for this unit.

	Pass (D)	Credit (C)	Distinction (B)	High Distinction (A)
Self-Assessment				*

Self-Assessment Statement

Declaration

I declare that this portfolio is my individual work. I have not copied from any other student's work or from any other source except where due acknowledgment is made explicitly in the text, nor has any part of this submission been written for me by another person.

Signature: **satvik sharma**

Portfolio Overview

This portfolio includes all the work I did in this unit to get higher distinction grade include P task, C tasks, D tasks, and HD tasks

This unit helped me to set a base for using single board computers and sensors which can come in handy and

The grade which I am applying for is higher distinction because I made sure that everything was complete in my portfolio and includes everything and everything is working appropriately.

This portfolio consists of all the 32 tasks from the ontrack.

Reflections

The most important things I learnt:

The

I feel I learnt these topics, concepts, and/or tools really well:

I am confident about using sensors and Arduino and collecting the data associated with it

I found the following topics particularly challenging:

The higher distinction tasks, in which we had to read journals and make a report was difficult according to me.

I found the following topics particularly interesting:

All the topics which consisted of using the Arduino and sensors were really interesting and I was really keen to do them in advance

I still need to work on the following areas:

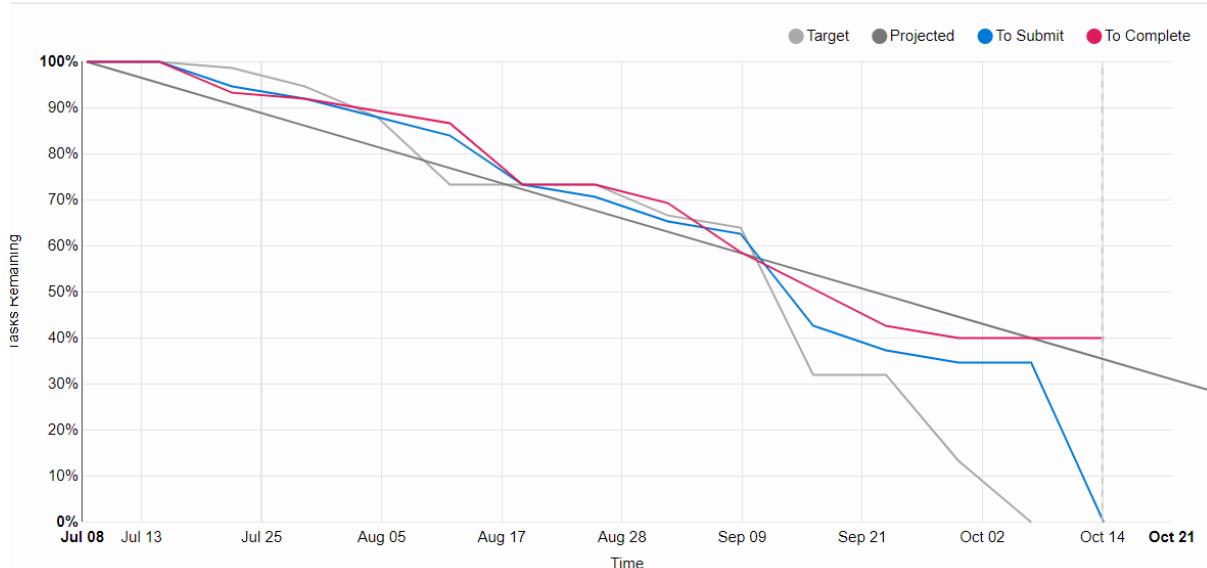
I think I need to get more confident on making visualizations on tableau and work more on interactive visualizations

The things that helped me most were:

This unit was made easier with all the things posted up in the resources. Furthermore, our tutor Mr. Mahdi Babaei helped and made sure that we understood each and every task. And the lectures delivered by the unit chair also made everything easy to understand.

My progress in this unit was ...:

I tried to keep things close and made sure everything was done on time, except for the group tasks, where I think I could've done earlier.



If I did this unit again, I would do the following things differently:

If I did this unit again, I would like to go more into the theoretical work and reading more journals and doing more research to vast my knowledge about the CPS systems

Other...:

This unit allowed me to understand how to connect the cyber and physical world using single board computer and sensors which play a crucial role in our daily life without even letting us know.

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

SHARMA SATVIK

Portfolio Submission

Submitted By:
Sharma SATVIK
sharmasat

Tutor:
Mahdi BABAEI

October 14, 2019



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2 Overall Task Status

Task	Status	Times Assessed
Arduino Blink	Complete	1
Arduino SOS	Complete	1
Help Others	Complete	1
Work breakdown for one of the ideas you introduced in week 1 (steps required)	Complete	1
Getting Started With Sensors	Complete	1
Preparing data	Complete	2
Employability Task 1	Complete	1
Using the Data Logger Shield in Arduino	Complete	1
Incorporate data from multiple sensors	Complete	1
Analyse motion sensor data	Complete	1
Project 1: Sensors & IOT	Complete	1
Do Something Awesome	Complete	1
Project 1: Project Implementation	Complete	1
Ethical issues	Complete	2
Project 1: Data Visualisation	Complete	2
Project 1: Visual Analytics	Complete	3
Visualisation Critique	Complete	2
Test Motion Sensors	Complete	1
Experiment Design	Complete	1
Error handling	Complete	1
Visual Story Telling	Complete	1
Collect GPS data using mobile apps	Complete	1
Inspector Gadget's Murder Investigation	Complete	2
Implement a Solution to 6.3	Time Exceeded	2
Literature Review	Time Exceeded	1
Interactive visual story telling	Complete	1
Team Project, Sprint 1: Pitch	Complete	1
Team Project, Sprint 1: Demo & Presentation	Time Exceeded	1
Employability Task 2	Complete	1
Team Project: Ethics Report	Time Exceeded	1
Team Project: Resolving Ethical Concerns OR Visual Analytics	Time Exceeded	1
Team Project, Sprint 2: Pitch	Time Exceeded	4
Team Project, Sprint 2: Data collection	Time Exceeded	2
Team Project, Sprint 2: Data visualisation	Time Exceeded	2

3 Learning Outcomes

3.1 ULO1

Apply professional and ethical standards to collect, analyse, and visualise data using existing cyber-physical devices and technologies to extract meaning and behaviour.

Task	Rating	Status	Times Assessed
Arduino Blink	♦◊◊◊◊	Complete	1
Work breakdown for one of the ideas you introduced in week 1 (steps required)	♦◊◊◊◊	Complete	1
Do Something Awesome	◆◆◆◊◊	Complete	1
Ethical issues	◆◆◆◆◊	Complete	2
Project 1: Data Visualisation	◆◆◊◊◊	Complete	2
Project 1: Visual Analytics	◆◆◊◊◊	Complete	3
Visual Story Telling	♦◊◊◊◊	Complete	1
Inspector Gadget's Murder Investigation	◆◆◆◊◊	Complete	2
Team Project: Ethics Report	◆◆◆◊◊	Time Exceeded	1
Team Project: Resolving Ethical Concerns OR Visual Analytics	◆◆◆◆◊	Time Exceeded	1
Team Project, Sprint 2: Data visualisation	◆◆◆◊◊	Time Exceeded	2

3.2 ULO2

Apply principles, methods, tools and techniques used in contemporary software engineering to plan and manage projects.

Task	Rating	Status	Times Assessed
Arduino Blink	♦♦◊◊◊	Complete	1
Arduino SOS	♦♦◊◊◊	Complete	1
Help Others	♦♦◊◊◊	Complete	1
Work breakdown for one of the ideas you introduced in week 1 (steps required)	♦♦◊◊◊	Complete	1
Getting Started With Sensors	♦♦◊◊◊	Complete	1
Preparing data	♦♦◊◊◊	Complete	2
Employability Task 1	♦♦◊◊◊	Complete	1
Using the Data Logger Shield in Arduino	♦♦◊◊◊	Complete	1
Incorporate data from multiple sensors	♦♦◊◊◊	Complete	1
Analyse motion sensor data	♦♦◊◊◊	Complete	1
Project 1: Sensors & IOT	♦♦◊◊◊	Complete	1
Do Something Awesome	♦♦♦◊◊	Complete	1
Project 1: Project Implementation	♦♦◊◊◊	Complete	1
Project 1: Data Visualisation	♦♦◊◊◊	Complete	2
Visualisation Critique	♦♦◊◊◊	Complete	2
Test Motion Sensors	♦♦◊◊◊	Complete	1
Experiment Design	♦♦◊◊◊	Complete	1
Error handling	♦♦♦◊◊	Complete	1
Visual Story Telling	♦♦◊◊◊	Complete	1
Collect GPS data using mobile apps	♦♦◊◊◊	Complete	1
Inspector Gadget's Murder Investigation	♦♦♦◊◊	Complete	2
Implement a Solution to 6.3	♦♦◊◊◊	Time Exceeded	2
Literature Review	♦♦♦◊◊	Time Exceeded	1
Interactive visual story telling	♦♦◊◊◊	Complete	1
Team Project, Sprint 1: Pitch	♦♦◊◊◊	Complete	1
Team Project, Sprint 1: Demo & Presentation	♦♦◊◊◊	Time Exceeded	1
Employability Task 2	♦♦◊◊◊	Complete	1
Team Project: Resolving Ethical Concerns OR Visual Analytics	♦♦♦◊◊	Time Exceeded	1
Team Project, Sprint 2: Pitch	♦♦♦◊◊	Time Exceeded	4
Team Project, Sprint 2: Data collection	♦♦♦◊◊	Time Exceeded	2
Team Project, Sprint 2: Data visualisation	♦♦♦◊◊	Time Exceeded	2

3.3 ULO3

Identify and describe suitable data capture protocols and methodologies to meet user and functional requirements for cyber-physical computing contexts.

Task	Rating	Status	Times Assessed
Arduino Blink	♦♦◊◊◊	Complete	1
Arduino SOS	♦♦◊◊◊	Complete	1
Help Others	♦♦◊◊◊	Complete	1
Work breakdown for one of the ideas you introduced in week 1 (steps required)	♦♦◊◊◊	Complete	1
Getting Started With Sensors	♦♦◊◊◊	Complete	1
Preparing data	♦♦◊◊◊	Complete	2
Employability Task 1	♦♦◊◊◊	Complete	1
Using the Data Logger Shield in Arduino	♦♦◊◊◊	Complete	1
Incorporate data from multiple sensors	♦♦◊◊◊	Complete	1
Analyse motion sensor data	♦♦◊◊◊	Complete	1
Project 1: Sensors & IOT	♦♦◊◊◊	Complete	1
Do Something Awesome	♦♦♦◊◊	Complete	1
Project 1: Project Implementation	♦♦◊◊◊	Complete	1
Visualisation Critique	♦♦◊◊◊	Complete	2
Test Motion Sensors	♦♦◊◊◊	Complete	1
Error handling	♦♦♦◊◊	Complete	1
Visual Story Telling	♦♦◊◊◊	Complete	1
Collect GPS data using mobile apps	♦♦◊◊◊	Complete	1
Inspector Gadget's Murder Investigation	♦♦♦◊◊	Complete	2
Implement a Solution to 6.3	♦♦◊◊◊	Time Exceeded	2
Literature Review	♦♦♦◊◊	Time Exceeded	1
Interactive visual story telling	♦♦◊◊◊	Complete	1
Team Project, Sprint 1: Pitch	♦♦◊◊◊	Complete	1
Team Project, Sprint 1: Demo & Presentation	♦♦◊◊◊	Time Exceeded	1
Employability Task 2	♦♦◊◊◊	Complete	1
Team Project: Resolving Ethical Concerns OR Visual Analytics	♦♦♦◊◊	Time Exceeded	1
Team Project, Sprint 2: Pitch	♦♦♦◊◊	Time Exceeded	4
Team Project, Sprint 2: Data collection	♦♦♦◊◊	Time Exceeded	2
Team Project, Sprint 2: Data visualisation	♦♦♦◊◊	Time Exceeded	2

3.4 ULO4

Justify achieved outcomes through providing relevant evidence and critiquing the quality of that evidence against given criteria.

Task	Rating	Status	Times Assessed
Arduino Blink	♦◊◊◊◊	Complete	1
Work breakdown for one of the ideas you introduced in week 1 (steps required)	♦◊◊◊◊	Complete	1
Project 1: Visual Analytics	♦♦◊◊◊	Complete	3
Visualisation Critique	♦♦♦◊◊	Complete	2
Team Project: Resolving Ethical Concerns OR Visual Analytics	♦♦♦◊◊	Time Exceeded	1

4 Arduino Blink

Get familiar with the Arduino programming environment, and test your first Arduino code to blink its in-built LED light.

Outcome	Weight
ULO1	♦◊◊◊◊

this task is the most basic task which helps one get comfortable with arduino

Outcome	Weight
ULO2	♦♦◊◊◊

this task is the most basic task which helps one get comfortable with arduino

Outcome	Weight
ULO3	♦♦◊◊◊

this task is the most basic task which helps one get comfortable with arduino

Outcome	Weight
ULO4	♦◊◊◊◊

this task is the most basic task which helps one get comfortable with arduino

Date	Author	Comment
2019/07/16 20:21	Sharma Satvik	Ready to Mark
2019/07/19 12:53	Mahdi Babaei	Discuss
2019/07/19 12:53	Mahdi Babaei	can you please share your code with me ? you may put the Url here in the chat box
2019/07/19 14:06	Sharma Satvik	will surely do
2019/07/19 14:27	Sharma Satvik	https://github.com/satviksharmase/Arduino_blink/blob/master/Blink_code.ino
2019/07/21 18:45	Mahdi Babaei	url is broken !
2019/07/22 11:04	Sharma Satvik	https://github.com/satviksharmase/Arduino_blink/blob/master/Blink_code.ino
2019/07/22 12:32	Mahdi Babaei	i was able to access it by adding underlines.
2019/07/22 12:33	Mahdi Babaei	Complete
2019/07/22 12:36	Sharma Satvik	thank you so much

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Arduino Blink

Submitted By:

Sharma SATVIK
sharmasat
2019/07/22 12:35

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO1	♦◊◊◊◊
ULO2	♦♦◊◊◊
ULO3	♦♦♦◊◊
ULO4	♦◊◊◊◊

this task is the most basic task which helps one get comfortable with arduino

July 22, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 1.1P Arduino Blink

Student Name: Satvik Sharma

Student ID: 218595095

Q1: In software development, it is important to have an understanding about the background. The TED talk given under the Pre-Lab materials, shows how Arduino is being used for interesting projects. Fill the given table below to answer the following: What are three projects that use captured data as given in the TED talk? What data do they capture? What sensors do you think they could use to capture this data?

Project name	Data captured	Sensors used to capture the data
Botanicals	Measures the well-being of plant and has also created a twitter account for it	Wi-Fi module, Arduino
Musical interface	music is played differently when the interface is touched on different places	touch sensors, sound sensors
The enough already	Muting the sound from the TV	Sound sensor, infrared detecting sensor

Q2: In this task, the client's requirements are already given to you. To understand them correctly, it is important to further analyse them. Consider how this simple system can be decomposed to 'Sense-Think-Act' as discussed in class (lecture).

a) What is the 'sensing' requirement in this system, if any?

Sensing is not required in this system as only the Arduino board is used.

b) What is the 'thinking' requirement in this system, if any?

The thinking here is to create a program which will blink the light on the Arduino Uno using the Arduino IDE

c) What is the 'acting' requirement in this system, if any?

The acting in this system is that the light on the board turned on for a second and then it turned off and repeated up to the infinite number of times in a loop

Q3: Please refer to the provided ‘Arduino Blink Activity Sheet’ and follow the steps. a) In Arduino speak, what is a “sketch”?

Sketch is a program in Arduino IDE in which the where one can write code which basically starts with two functions, that is, setup () and loop ().

b) setup () and loop () are key Arduino constructs. These are required in every Arduino sketch. I) Which of the above two, runs once at the very beginning of your program and never again (unless you reset or upload new code)?

Setup () runs at the very beginning.

ii) Which of the above two, is used to continuously run code over and over again?

Loop () allows the code to run forever and ever

c) What does pin Mode () do? Hint: <http://arduino.cc/en/Reference/HomePage>

The pin mode () basically helps to declare the input and output on Arduino genuine Uno 3. For example, if the pin mode for the 12th pin is to be output, pin mode () function will be used

d) What does the following line of code do: delay(x); Hint: <http://arduino.cc/en/Reference/HomePage>

delay (x) makes the code to delay the function for a particular period of time where x is the time period and is in milliseconds.

e) There is something you need to check before uploading your sketch. What is this?

The main thing to check before uploading the sketch is to make sure that IDE is connected to the right Arduino board. Moreover, the errors should also be checked in the code before uploading.

Q4: Testing is an important step in the software development life cycle. What is a simple strategy to test the Blink program to make sure it is working as given in the requirements?

to test the blinking activity in Arduino, IDE is to be connected to the right board. Then when the program is set in motion, the testing can be done by observing. If the light is blinking then the test is successful.

Q5: This question is exploring step 4 of software development. Now that you have built and tested your Blink program, it is time to deliver it (hand it it over). Take a five second video of your Arduino board with the LED blinking (use your phone to record) and upload it to youtube. Include the link here. Alternatively, if you are on campus, show your working project to your tutor in the lab and get it marked on OnTrack.

The link for the video is given by https://video.deakin.edu.au/media/t/0_hd94gpvb which is on Deakin air. Alternatively, if this does not work, the YouTube link is given by <https://www.youtube.com/watch?v=lwHMhHD6aVY>

The link to my code is

https://github.com/satviksharmase/Arduino_blink/blob/master/Blink_code.ino

5 Work breakdown for one of the ideas you introduced in week 1 (steps required)

When we are developing complex software systems, we often start by dividing the system to simpler and manageable steps. This process is known as Work Breakdown. In this task, you will consider the previous task 1.2P and break it down to sub-tasks.

Outcome	Weight
ULO1	◆◇◇◇

this task is the basic task which helps one get comfortable with arduino

Outcome	Weight
ULO2	◆◆◇◇

this task is the basic task which helps one get comfortable with arduino

Outcome	Weight
ULO3	◆◆◇◇

this task is the basic task which helps one get comfortable with arduino

Outcome	Weight
ULO4	◆◇◇◇

this task is the basic task which helps one get comfortable with arduino

Date	Author	Comment
2019/07/19 13:04	Sharma Satvik	Ready to Mark
2019/07/21 19:39	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Work breakdown for one of the ideas you introduced in week 1 (steps required)

Submitted By:

Sharma SATVIK
sharmasat
2019/07/19 13:04

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO1	♦◊◊◊◊
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊
ULO4	♦◊◊◊◊

this task is the basic task which helps one get comfortable with arduino

July 19, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 2.1P Work breakdown for one of the ideas you introduced in week 1 (steps required)

Student Name: Satvik Sharma

Student ID: 218595095

Requirement analysis:

1. The type of computer required for programming out -Arduino Uno R3
2. Connectivity to the source - USB cable
3. Software to write the program – Arduino IDE
4. Device to write code on – Personal Computer
5. Background knowledge – Morse code
6. Task requirement- to create a code that generates SOS signal as outcome.

Implementation

1. Open the Arduino IDE and connect the Arduino Uno to the laptop with the help of the USB cable.
2. Connect the Arduino and the IDE with the correct port
3. In the setup void write the code to get the built in LED as output.
4. Now write the code for SOS signal as in the loop void.
5. For the SOS Morse code, the pattern of dots and dashes are followed.
The Morse code for S is three dots or ...
The Morse code for O is ---
The overall Morse code is ...---...
6. The dot in the code will be represented as a blinking of LED for 500 milliseconds, the dash will be represented as the light turned 'on' for 1500 milliseconds and the gap between the adjacent dots and dash will be represented by the light turned 'off' for 1000 milliseconds.
7. Write the code in loop void for the above Morse code.

Test

1. take a stopwatch and side by side calculate the time taken to complete 1 loop of SOS.
2. In my testing, the total time was 16.5 seconds and the code worked for that long.
3. If the timings calculated and timings on stopwatch match, this means that the test is successful

Deliver

1. Take the video of the program running.
2. save the program and give it a meaningful name
3. export the video as well as code to the required place.

6 Getting Started With Sensors

Attach sensors to the Arduino board, and collect sensor data.

Outcome	Weight
ULO2	♦♦◊◊◊

this task helps the student to understand what the sensors do

Outcome	Weight
ULO3	♦♦◊◊◊

this task helps the student to understand what the sensors do

Date	Author	Comment
2019/07/18 19:38	Sharma Satvik	Ready to Mark
2019/07/21 20:26	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Getting Started With Sensors

Submitted By:

Sharma SATVIK
sharmasat
2019/07/18 19:38

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◇◇◇
ULO3	♦♦◇◇◇

this task helps the student to understand what the sensors do

July 18, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 2.2P Getting started with sensors

Student Name: Satvik Sharma

Student ID: 218595095

Q1: In this task, the client's requirements are already given to you. To understand them correctly, it is important to further analyse them.

a) What are the user stories in this system?

The user wants the engineer to create a program which detects the temperature, humidity, moisture and motion with the help of Arduino uno and sensors. The user also wants the data to be displayed on a computer screen in a real time .

b) What is the 'sensing' requirement in this system, if any?

There is a lot of sensors required in this system. For the motion detection the PIR would be required. for soil detection the moisture sensor is needed. And for the temperature and humidity the DHT22 would be required.

c) What is the 'thinking' requirement in this system, if any?

the sensors are to be connected properly. The grounding wire is to be connected to the grounding terminal, the VCC connected to be 5V terminal and the output as required or as written in the code

d) What is the 'acting' requirement in this system, if any?

the data captured by the sensors is shown on the data logger after the interval of the given duration and is shown correctly.

Q2: PIR Motion Detector Please refer to the provided 'Sensing Motion Activity Sheet' and follow the steps.

a) Refer to the given code in HCSR505motion.ino. What does the following line mean?

`Serial.begin(9600);`

Serial.begin(9600) would set the Arduino to transmit 9600 bits per second of data.

b) If the Arduino transfers data at 4800 bits per second and you're sending 12 bytes of data, how long does it take to send over this information?

8 bits make 1 byte of data

In one second 4800 bits in one second

This means that 600 bytes in one second

Total time taken to transfer 12 bytes will be = $(1/600) * 12$

Which is equal to 0.02 seconds

c) What is a simple strategy to test this program to make sure it is working as given in the requirements?

To test this program, I compiled the program and executed to the correct board . then the data logger is opened and the program is uploaded. The data logger will intitally show inactive as there is no motion. When I wave my hand over the sensor it started showing Active in the data logger. This test showed that the program is working correctly.

- d) Take a screenshot of your Serial Monitor displaying motion data logs. Add the image here. Alternatively, if you are on campus, show your working project to your tutor in the lab and get it marked on OnTrack.

The screenshot shows the Arduino IDE interface. At the top, the title bar reads "HCSR505motion | Arduino 1.8.9 (Windows Store 1.8.21.0)". Below the title bar are standard Windows-style icons for file operations. The main window has two tabs: "HCSR505motion" (selected) and "Serial Monitor". The "Serial Monitor" tab shows a list of alternating "Inactive" and "Active" status messages. The "HCSR505motion" tab displays the following code:

```

void setup() {
    // put your setup code here, to run once:
    Serial.begin(9600);
    pinMode(6, INPUT);
}

void loop() {
    // put your main code here, to run repeatedly:
    if (digitalRead(6) == HIGH) {
        Serial.println("Active");
    }
    else {
        Serial.println("Inactive");
    }
    delay(1000);
}

```

At the bottom of the screen, a progress bar indicates "Done uploading". Below the progress bar, status information is displayed: "Sketch uses 1964 bytes (6%) of program storage space. Maximum is 32256 bytes." and "Global variables use 204 bytes (5%) of dynamic memory, leaving 1844 bytes for local variables. Maximum is 2048 bytes." The taskbar at the bottom shows the Windows Start button, a search bar, and several pinned application icons. The system tray shows the date and time as "18-07-2019 16:46".

- e) Run your program for three minutes. In that time, make sure the sensor can detect 'Active' as well as 'Inactive' data by creating some movement for it to detect. Retrieve the collected data as text file and save it your computer's hard drive, naming it '2_2_motionData.txt'. Create a new Github repository named 'SensorData' and upload the saved file. Include the link to your repository here. Important: When you are finished, gently unplug the jumper cables from the Arduino pins and the sensor pins. Store the sensor carefully inside the zip lock bag and place it inside the plastic box.

The link to the repository is https://github.com/satviksharmase/sensor-data/blob/master/2_2_motionData.txt

Q3: Temperature and Humidity Sensor

- a) Please refer to the provided 'Sensing Temperature and Humidity Activity Sheet' and follow the steps. Consider the given code in the activity sheet and fill the table below. The first row is completed for you.

Term	Explanation	Example usage form code
Variable	A variable is a place to store a piece of data. It has a name, a value, and a type	Float temp;
Library	Library is basically a precompiled file that can be used by a program which are frequently used	DHT sensor library

comment	Comment or comments are used to explain the functioning of a particular line(s) in a code	Comment can be anything and usually starts with //
---------	---	--

- b) A spec of the DHT22 sensor is given in the link below. It mentions that the sampling rate is 0.5 Hz. <https://tronixlabs.com.au/sensors/humidity/dht22-temperature-and-humidity-sensor-australia/>**

i) What does the sampling rate mean?

The sampling rate means the number of reading per unit time. In the above case, the sampling rate is 0.5 Hz which means that the 1 output per 2 seconds is available.

ii) Where is this used in the Arduino code?

This is used with the help of delay(x) function which records the reading after each 'x' interval.

b) What is a simple strategy to test this program to make sure it is working as given in the requirements?

For testing, the code is compiled and executed on the right Arduino board. Then the timeline of 3 minutes is taken and the average temperature outside is check using various sources such as internet or mobile phone. When the data is checked in the data logger, if the data is around the average temperature for that particular time then the program is working successfully.

c) Take a screenshot of your Serial Monitor displaying temperature & humidity sensor data logs.

Add the image here.

The screenshot shows the Arduino IDE interface. The top menu bar includes File, Edit, Sketch, Tools, Help, and a status bar showing 'DHT22TempHum | Arduino 1.8.9 (Windows Store 1.821.0)'. The main area displays the C++ code for the DHT22TempHum sketch. Below the code is the Serial Monitor window titled 'COM4'. The monitor shows repeated data entries: 'Humidity: 38.30 %, Temp: 19.40 Celsius'. At the bottom of the monitor window, there are checkboxes for 'Autoscroll' and 'Show timestamp', and dropdown menus for 'Newline', '9600 baud', and 'Clear output'. The status bar at the bottom of the IDE window shows 'Done uploading.', 'Sketch uses 5126 bytes (15%) of program storage space. Maximum is 32256 bytes.', 'Global variables use 257 bytes (12%) of dynamic memory, leaving 1791 bytes for local variables. Maximum is 2048 bytes.', and system information like 'Windows 10', 'Type here to search', and a date/time stamp '18-07-2019 15:53'.

```

/*
 */

#include <DHT.h>

//Constants
#define DHTPIN 2 // what pin we're connected to
#define DHTTYPE DHT22 // DHT 22 (AM2302)
DHT dht(DHTPIN, DHTTYPE); // initialize DHT sensor for norm.

//Variables
float hum; //Stores humidity value
float temp; //Stores temperature value

void setup()
{
    Serial.begin(9600);
    dht.begin();
}

void loop()
{
    //Read data and store it to variables hum and temp
    hum = dht.readHumidity();
    temp= dht.readTemperature();

    //Print temp and humidity values to serial monitor
    Serial.print("Humidity: ");
    Serial.print(hum);
    Serial.print(" %, Temp: ");
    Serial.print(temp);
    Serial.println(" Celsius");
    delay(2000); //Delay 2 sec.
}

```

d) Run your program for five minutes. Retrieve the collected data as text file and save it your computer's hard drive, giving a meaningful name. Upload the saved file to the 'SensorData' Github repository created in Q2.e. Include the link to your repository here.

https://github.com/satviksharmase/sensor-data/blob/master/2_2_TempHumidityData.txt

Q4: Soil Moisture Sensor Please refer to the provided 'Sensing Soil Moisture Activity Sheet' and follow the steps.

- a) Refer to the given code in DFRobotSoilMoisture.ino. What does the following line do?

```
val = analogRead(0);
```

this functions reads the value generated by a specified analog pin.

- b) How is analogRead different than digitalRead? [Hint: we used digitalRead in the code for HCSR505 PIR Motion detector]

The digital value reads the value and displays as a binary functions, for example 0 or 1, high or low, active or inactive et cetera.

The analog value reads the value and displays a number between 0 and 1023 depending on the program and its working

- c) What is a simple strategy to test this program to make sure it is working as given in the requirements?

The most basic strategy to test this program to make sure it is working as given is to physically feel the soil and determine if the soil is dry, moist or wet.

Then the next step is to upload the code into the Arduino board and dipping the soil sensor in the soil. In my testing, the soil felt wet and moreover the outcome was around 650 which means that the sensor worked accurately and the testing procedure was alright.

- d) Take a screenshot of your Serial Monitor displaying soil moisture sensor data logs. Add the image here.

The screenshot shows the Arduino IDE interface. The top menu bar includes File, Edit, Sketch, Tools, and Help. The main window displays the code for DFRobotSoilMoisture.ino. Below the code is the Serial Monitor window titled 'COM4'. The monitor shows the following data:

```
0
0
0
309
672
689
695
696
697
681
682
665
659
658
654
652
651
```

The bottom status bar indicates 'Done uploading.' and 'Sketch uses 1912 bytes (5%) of program storage space. Maximum is 32256 bytes. Global variables use 188 bytes (5%) of dynamic memory, leaving 1860 bytes for local variables. Maximum is 2048 bytes.' The footer of the IDE says 'Arduino/Genuino Uno on COM4'.

- e) Run your program for three minutes. Retrieve the collected data as text file and save it to your computer's hard drive, giving a meaningful name. Upload the saved file to the 'SensorData' Github repository created in Q2.e . Include the link to your repository here.

https://github.com/satviksharmase/sensor-data/blob/master/2_2_SoilData.txt

7 Preparing data

Investigate a given data set, look for inconsistencies in the data and propose methods to fix them.

Outcome	Weight
ULO2	♦♦◊◊◊

this task helps the student to understand the concepts of dirty data and how to clean it

Outcome	Weight
ULO3	♦♦◊◊◊

this task helps the student to understand the concepts of dirty data and how to clean it

Date	Author	Comment
2019/07/19 15:04	Sharma Satvik	Ready to Mark
2019/07/21 20:30	Mahdi Babaei	please add row numbers where you found inconsistencies and resubmit
2019/07/21 20:30	Mahdi Babaei	Fix and Resubmit
2019/07/26 13:32	Sharma Satvik	Ready to Mark
2019/07/28 22:07	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Preparing data

Submitted By:

Sharma SATVIK
sharmasat
2019/07/26 13:32

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊

this task helps the student to understand the concepts of dirty data and how to clean it

July 26, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 2.2P Getting started with sensors

Student Name: Satvik Sharma

Student ID: 218595095

Q1: Once you have cleaned your data, upload the cleaned data file to a GitHub repository & include the link here:

https://github.com/satviksharmase/Preparing_Data/blob/master/Humidity%20Dataset.xlsx

Q2: Submit brief details on which inconsistencies you have found, what was your approach for fixing them and discuss the Pros. and Cons of your approach, using the given table below

Inconsistencies found	Approach for fixing	Pros and cons for fixing
Last row was empty	Deleted the row	Data was missing
Row ID 27249998 the stamp was in double quotes	Deleted the double quotes	Fixed the data
Row ID 8408998 the date was wrong	Changed the month from 12 to 6	Fixed the data and made it consistent
Row ID 15210000 the date was wrong	Added a/ between 7 and 6	Helped fix the date
Row ID 20563999 the humidity was 0	Deleted the row	Irrelevant data
Row ID 20562999 the humidity was 0	Deleted the row	Irrelevant data
Row ID 20561999 the humidity was 0	Deleted the row	Irrelevant data
Row ID 20560999 the humidity was 0	Deleted the row	Irrelevant data
Row ID 20560000 the humidity was 0	Deleted the row	Irrelevant data
Row ID 20559000 the humidity was 0	Deleted the row	Irrelevant data
Row ID 20557999 the humidity was 0	Deleted the row	Irrelevant data
Row ID 20556999 the humidity was 0	Deleted the row	Irrelevant data
Row ID 20555999 the humidity was 0	Deleted the row	Irrelevant data
Row ID 20554999 the humidity was 0	Deleted the row	Irrelevant data

Row ID 26905999 the humidity was Null	Deleted the row	Irrelevant data
Row ID 26904998 the humidity was null	Deleted the row	Irrelevant data
Row ID 316999	The humidity was in double quotes	Deleted the double quotes

8 Employability Task 1

This assessment has been designed to start your thinking about potential career paths and identify steps you need to undertake to get you career ready when you graduate

Outcome	Weight
ULO2	♦♦◊◊◊

this task helped me to think about what i am going to do after my degree is complete

Outcome	Weight
ULO3	♦♦◊◊◊

this task helped me to think about what i am going to do after my degree is complete

Date	Author	Comment
2019/07/19 17:35	Sharma Satvik	Ready to Mark
2019/07/21 20:34	Mahdi Babaeei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Employability Task 1

Submitted By:

Sharma SATVIK
sharmasat
2019/07/19 17:35

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊

this task helped me to think about what i am going to do after my degree is complete

July 19, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 2.2P Getting started with sensors

Student Name: Satvik Sharma

Student ID: 218595095

Q1: Please discuss the career would you like to pursue after completing your degree in software engineering? What are the three main factors that influence this choice?

I would love start up my own business with my own ideas. But that requires a lot of money that I can invest. So, initially I would like to get some experience in the big companies such as google or Microsoft as a software developer and would create technologies and softwares that cater the future generation. Since this generation is crazy about video games, there is a lot of scope for a video game developer and I would love to create horror games like resident evil or outlast. The reason I want to be employed by the big companies is that they would give me a great push from where I can start my own business. Game developer is my personal choice as I love playing video games and I spend a lot of bucks in buying a game and playing it.

Q2: Find an advertised position description (PD) in in your chosen field and discuss why you would like to apply for this role.

Q2a: Include a screenshot of your selected PD

The screenshot shows a Google Careers search results page. The search term 'Software Engineer' has returned 529 matches. The top result is for a 'Software Engineer' position at Google in San Francisco, CA, USA, posted 10 days ago. The job listing includes a note for students, a 'Share' button, and an 'Apply' button. Below the main listing, there's a note about automatic application submission to other locations and a section for 'Minimum qualifications' with several bullet points.

Software Engineer
Google - San Francisco, CA, USA + 4 more locations
10 days ago

In school or graduated within last 9 months? We encourage you to apply to openings on the Student Jobs site

Note: By applying to this position your application is automatically submitted to the following locations: San Francisco, CA, USA; Mountain View, CA, USA; San Bruno, CA, USA; Sunnyvale, CA, USA; Palo Alto, CA, USA

Minimum qualifications:

- BS degree in Computer Science, similar technical field of study or equivalent practical experience.
- Software development experience in one or more general purpose programming languages.
- Experience working with two or more from the following: web application development, Unix/Linux environments, mobile application development, distributed and parallel systems, machine learning, information retrieval, natural language processing, networking, developing large software systems, and/or security software development.
- Working proficiency and communication skills in verbal and written English.

Q2b: Please provide a brief description of the role and explain why this role matches your skills, interest and career values.

The most basic task of a software engineer that is designing, developing, testing, programming, and improving softwares is required. further, in this job I would get a good salary package which will allow me to start my own start up. Further, I will have experience in the field of software

development which I would probably get from my internship and doing freelancing over the internet.

Q3: Please list the key skills, experiences (and attributes) that are required from a graduate applying for this position and rate yourself against these by completing Table 1 below.

Table 1. Skill reflection PD details

Technical selection criteria	Current skill level
One or more general purpose programming language	I have some skills in C/C++,python and java
Experience in developing accessible technologies	Not yet experienced
Interest and ability to learn other coding language	Want to learn as many languages as possible
Non-technical skills	
Manage project	While working and making group assignments I was able to manage whatever task was required of me
Working proficiency	I deliver as good projects as I can in the minimum time possible and show my best capabilities
Communication skills	I have good communicational skills and am able to explain my ideas

9 Using the Data Logger Shield in Arduino

Learn about using an SD card to save sensor data.

Outcome	Weight
ULO2	♦♦◊◊◊

gives a basic understanding of data logging shield

Outcome	Weight
ULO3	♦♦◊◊◊

gives a basic understanding of data logging shield

Date	Author	Comment
2019/07/29 12:37	Sharma Satvik	Ready to Mark
2019/07/30 16:49	Mahdi Babaei	Complete

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Using the Data Logger Shield in Arduino

Submitted By:

Sharma SATVIK
sharmasat
2019/07/29 12:37

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊

gives a basic understanding of data logging shield

July 29, 2019



SIT102 – Introduction to Programming

Answers for 2.1P Hello User

Student Name: satvik sharma

Student ID: 218595095

Q1. Follow the steps in “Setting Up the SD Card Activity Sheet”. At the end of activity, take a screenshot of the Serial Monitor and include in the submission.

The screenshot shows the Arduino IDE interface with the following details:

- Title Bar:** Cardinfo | Arduino 1.8.9 (Windows Store 1.8.21.0)
- Sketch:** // set up variables using the SD utility library functions:
sd2card card;
sdVolume volume;
sdfile root;

const int chipSelect = 10;

void setup() {
 Serial.begin(9600);
 while (!Serial) {}

 Serial.print("\nInitializing SD card...");

 if (!card.init(SPI_HALF_SPEED, chipSelect)) {
 Serial.println("Initialization failed. Things to check:
 * is a card inserted?");
 Serial.println(" * is your wiring correct?");
 Serial.println(" * did you change the chipSelect pin to match your shield or module?");
 while (1);
 } else {
 Serial.println("Wiring is correct and a card is present.");
 }

 Serial.println();
 Serial.print("Card type: ");
 switch (card.type()) {
 case SD_CARD_TYPE_SD1:
 Serial.println("SD1");
 break;
 }

 Done uploading.
}
- Serial Monitor:** COM4
- Output:**

```
Initializing SD card...Wiring is correct and a card is present.  
Card type: SDHC  
Clusters: 405936  
Blocks x Cluster: 64  
Total Blocks: 31059904  
  
Volume type is: FA332  
Volume size (Mb): 15549952  
Volume size (Mb): 15105  
Volume size (Gb): 14.03  
  
Files found on the card (name, date and size in bytes):
```
- Bottom Status:** Newline ▾ 9600 baud ▾ Clear output
- Bottom Bar:** Arduino/Genuino Uno on COM4

Q2. Follow the steps in “Using the Real Time Clock Activity Sheet”.

- At the end of activity, take a screenshot of the Serial Monitor and include in the submission.**

The screenshot shows the Arduino IDE interface with the following details:

- Title Bar:** COM4
- Sketch:** since midnight 1/1/1970 = 1564401843s = 18106d
now + 7d + 30s: 2019/8/6 0:34:9

2019/7/29 (Monday) 12:4:6
since midnight 1/1/1970 = 1564401846s = 18106d
now + 7d + 30s: 2019/8/6 0:34:12

2019/7/29 (Monday) 12:4:9
since midnight 1/1/1970 = 1564401849s = 18106d
now + 7d + 30s: 2019/8/6 0:34:15

2019/7/29 (Monday) 12:4:12
since midnight 1/1/1970 = 1564401852s = 18106d
now + 7d + 30s: 2019/8/6 0:34:18
- Serial Monitor:** COM4
- Output:**

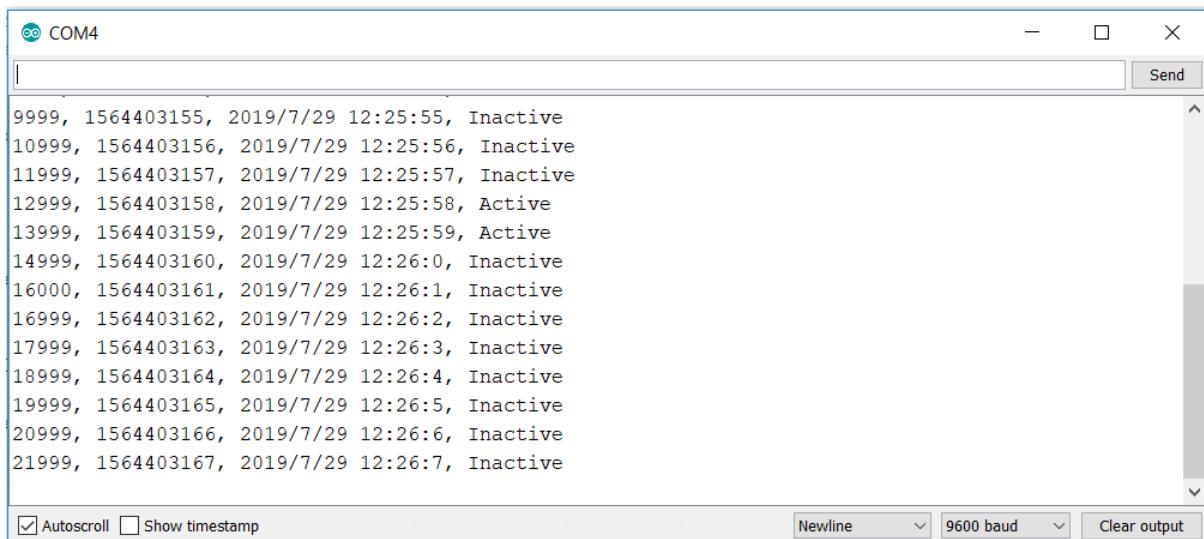
```
since midnight 1/1/1970 = 1564401843s = 18106d  
now + 7d + 30s: 2019/8/6 0:34:9  
  
2019/7/29 (Monday) 12:4:6  
since midnight 1/1/1970 = 1564401846s = 18106d  
now + 7d + 30s: 2019/8/6 0:34:12  
  
2019/7/29 (Monday) 12:4:9  
since midnight 1/1/1970 = 1564401849s = 18106d  
now + 7d + 30s: 2019/8/6 0:34:15  
  
2019/7/29 (Monday) 12:4:12  
since midnight 1/1/1970 = 1564401852s = 18106d  
now + 7d + 30s: 2019/8/6 0:34:18
```
- Bottom Status:** Autoscroll Show timestamp Newline ▾ 57600 baud ▾ Clear output

- b. Examine the code. What does the following line of code do? Date Time now = rtc.now(); (Hint: refer to <https://learn.adafruit.com/adafruit-data-logger-shield/using-the-real-time-clock>)**

the DateTime allows the ide to know what the user is asking from it. Now() tells the program that the present date and time is to be displayed. rtc.now() in which rtc stands for the real time clock, tells the program to use the real time clock at the time of upload.

Q3. Now you are ready to start logging data to file! Follow the steps in “Saving Motion Data Activity Sheet”.

- a. At the end of activity, take a screenshot of the Serial Monitor and include in the submission.**



The screenshot shows the Arduino Serial Monitor window titled "COM4". The window displays a series of data entries, each consisting of a timestamp (e.g., 9999, 1564403155), a unique ID (e.g., 2019/7/29 12:25:55), and a state (e.g., Inactive). The data is scrollable, with the last few entries visible at the bottom. The monitor includes standard controls like "Send", "Autoscroll", "Show timestamp", "Newline", "9600 baud", and "Clear output".

Timestamp	ID	State
9999, 1564403155	2019/7/29 12:25:55	Inactive
10999, 1564403156	2019/7/29 12:25:56	Inactive
11999, 1564403157	2019/7/29 12:25:57	Inactive
12999, 1564403158	2019/7/29 12:25:58	Active
13999, 1564403159	2019/7/29 12:25:59	Active
14999, 1564403160	2019/7/29 12:26:0	Inactive
16000, 1564403161	2019/7/29 12:26:1	Inactive
16999, 1564403162	2019/7/29 12:26:2	Inactive
17999, 1564403163	2019/7/29 12:26:3	Inactive
18999, 1564403164	2019/7/29 12:26:4	Inactive
19999, 1564403165	2019/7/29 12:26:5	Inactive
20999, 1564403166	2019/7/29 12:26:6	Inactive
21999, 1564403167	2019/7/29 12:26:7	Inactive

- b. Run your program. Wave your hand in front if the motion sensor and observe the ‘Active’ state, then stop and wait until you see an ‘Inactive’ state on the Serial Monitor. Keep doing this for three minutes so that you get both ‘Active’ and ‘Inactive’ data. At the end of three minutes, unplug the USB. This will switch off the Arduino board. Next, retrieve the .csv file containing motion sensor data from the SD card. Upload the .csv file to the ‘Sensor Data’ GitHub repository created in Task 2.2P. Include the link to your file here.**

<https://github.com/satviksharmase/sensor-data/blob/master/MLOG11.CSV>

10 Incorporate data from multiple sensors

In this task we will see how to integrate multiple collected dataset and analyse issues that may arise from this integration.

Outcome	Weight
ULO2	♦♦◊◊◊

this task helps to understand how to integrate data

Outcome	Weight
ULO3	♦♦◊◊◊

this task helps to understand how to integrate data

Date	Author	Comment
2019/08/02 10:22	Sharma Satvik	i am really sorry that i am not able to submit this one on time because i am not able to install the talend open studio on my laptop and i need to use the university's computer so as to complete it. i shall be very thankful
2019/08/06 13:08	Sharma Satvik	Ready to Mark
2019/08/06 15:29	Mahdi Babaei	well done Sharma !
2019/08/06 15:30	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Incorporate data from multiple sensors

Submitted By:

Sharma SATVIK
sharmasat
2019/08/06 13:08

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊

this task helps to understand how to integrate data

August 6, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 3.2P Incorporate data from multiple sensors

Student Name: Satvik Sharma

Student ID: 218595095

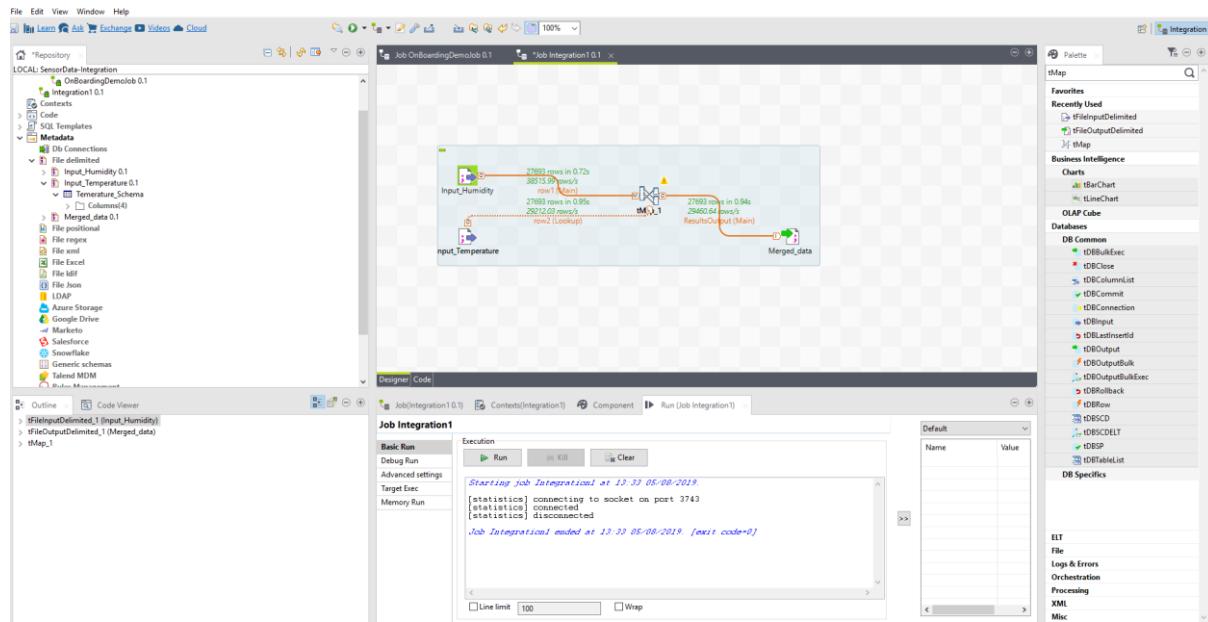
Q1 - Check the two given data sets in Humidity & Temperature Data Folder and analyse possible issues and problems with the existing datasets

1. missing rows
2. stamps were having "" and changed their numerical value into alphabetic value
3. data having 0 as a value
4. alphabetic value instead of numerical value
5. null values
6. wrong date
7. missing / in date

Q2- Analyse what problems can exist with the given data. This could include mismatched data formats, missing values, data not aligned in datasets, and other issues. Propose how you would fix these issues. Fill the given table below, giving examples. The first row has already been done for you. (Note that this question is about what problems can happen, and not necessarily what problems exist in the given data.)

Issues	Examples	solution
Some rows were missing	Empty row between 2 working rows	Deleted the row
Alphabetic values instead of numerical values	Instead of 218595095 it was written "218595095"	Deleted the ""
Data with 0 value	Its written like 0 instead of a proper value which means that the data was not logged	Deleted the row
Null values	Instead of some proper values, the output is written as Null	Deleted the rows
Wrong date	The date was 6 months ahead	Fixed the date with the matching date
/ missing in date	The date's year got wrong with this	Added a / at appropriate place

Q3 - Develop a data integration workflow for the given data sets following the steps given in TalendOpenStudio_Instructions.pdf. At the end, take a screenshot of your data integration workflow on Talend studio and include it in the submission.



Q4 - How did you test your workflow and the output it produced?

The talend open studio for data integration was used in this task. Firstly the clean data was selected and inserted in it. Then another output file is created and after this, t mapping is done and whatever the necessary data we require is selected and then the program is run. The data is integrated at every instant until the kill button is not clicked. The output file is saved as a .csv file or comma separated value file.

Q5 - Deliver the output data file your workflow generated by uploading the resulting data file to OnTrack.

https://github.com/satviksharmase/multui_data/blob/master/results.csv

Q6 - Export the project into a zip file and upload to OnTrack.

https://github.com/satviksharmase/multui_data/blob/master/test.zip

11 Analyse motion sensor data

Examine a given set of motion sensor data and calculate active and inactive times.

Outcome	Weight
ULO2	♦♦◊◊◊

learnt data analysis in the excel

Outcome	Weight
ULO3	♦♦◊◊◊

learnt data analysis in the excel

Date	Author	Comment
2019/08/02 10:54	Sharma Satvik	Ready to Mark
2019/08/05 00:20	Mahdi Babaei	Complete

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Analyse motion sensor data

Submitted By:

Sharma SATVIK
sharmasat
2019/08/02 10:54

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◇◇◇
ULO3	♦♦◇◇◇

learnt data analysis in the excel

August 2, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 1.1P Arduino Blink

Student Name: Satvik Sharma

Student ID: 218595095

Github link for the task 3.3

<https://github.com/satviksharmase/data-analysis/blob/master/dataanalysis.xlsx>

12 Project 1: Sensors & IOT

Propose a project based on sensors and IOT.

Outcome	Weight
ULO2	♦♦◊◊◊

need a little bit more discussion on this task

Outcome	Weight
ULO3	♦♦◊◊◊

need a little bit more discussion on this task

Date	Author	Comment
2019/08/02 13:45	Sharma Satvik	Ready to Mark
2019/08/11 13:52	Mahdi Babaei	Complete

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SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Project 1: Sensors & IOT

Submitted By:

Sharma SATVIK
sharmasat
2019/08/02 13:45

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◇◇◇
ULO3	♦♦◇◇◇

need a little bit more discussion on this task

August 2, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 1.1P Arduino Blink

Student Name: Satvik Sharma

Student ID: 218595095

Q1: Using your understanding of the task, answer the following.

a) What is the ‘sensing’ requirement in this system, if any?

John wants a solution to keep him reminded to water his plants on regular basis. For this a program is to be developed using the Arduino board and a sensor which senses the moisture in the plants.

b) What is the ‘thinking’ requirement in this system, if any?

Thinking in this system is to create a system using jumper cables, soil moisture sensor, Arduino uno, and LEDs and making a program on the Arduino IDE.

c) What is the ‘acting’ requirement in this system, if any?

The acting in this system would be to ensure that the LED turns ‘on’ when the moisture in the soil goes below the particular limit, thus alerting John to water his plants.

Q2: Create user stories for the given specification (under Project Specification above). Your user stories should follow the user story template below:

As < user >, I want < some goal > so that < some reason >.

As a plant lover with a really busy schedule, I want to keep my plants watered all time so that they are in good shape.

Q3: Create story points for each user story

- User- the user wants to make sure that the moisture in the plants is above a certain level given his busy schedule
- Goal- the goal here is to fulfil the needs of the customer, that is, to keep him notified when to water his plants.
- Reason- he is having a busy schedule and thus cannot keep track of time to make sure that the plants are moistured.

Q4: Identify features for each user story

- Assuming that the user needs the moisture in the soil to be above 300 as shown in the serial monitor, so as to keep the plants in good health
- The accordingly,
 $m \neq 300$
 $m > 300$
 $m < 300$

- The data would be collected on the hourly basis for upto, let's say 2days, or 48 hours.after this time the programme will begin again
- the insignificance level or the p-value in this case is going to be 0.05.
- then using the formula, values will be calculated

Q5: Create burndown chart using the provided excel template. Upload the updated excel file to a Github repo and share the link here.

https://github.com/satviksharmase/data-analysis/blob/master/burndown_template.xlsx

13 Arduino SOS

Modify the Arduino Blink code used in Task 1.1P and upload it to a Github repository

Outcome	Weight
ULO2	♦♦◊◊◊

this task helps one understand arduino with the help of morse code and how it is applicable to real world

Outcome	Weight
ULO3	♦♦◊◊◊

this task helps one understand arduino with the help of morse code and how it is applicable to real world

Date	Author	Comment
2019/07/17 12:00	Sharma Satvik	Ready to Mark
2019/07/19 13:45	Mahdi Babaei	well done!
2019/07/19 13:45	Mahdi Babaei	Complete

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Arduino SOS

Submitted By:

Sharma SATVIK
sharmasat
2019/07/17 12:00

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◇◇◇
ULO3	♦♦◇◇◇

this task helps one understand arduino with the help of morse code and how it is applicable to real world

July 17, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 1.1P Arduino Blink

Student Name: Satvik Sharma

Student ID: 218595095

Q1: How did you test your SOS code?

First using the morse code , a program is made for the Arduino in which the dot(.) is represented by the light turning on for a half second and dash(-) by one and a half seconds. For writing the morse code for SOS themorse code is written as follows

S ...

O ---

S ...

The space between the code is represented as the light turned off for the duration of a second. This means that the total time taken for the program to complete is 16.5 seconds. Now for testing, a stopwatch is taken and the program is started along with the stop watch and the program ends at 16.5 seconds, which means that the program ran successfully.

Q2: Create a repository named BlinkSOS on Github. Upload your code to the repository. Include the link to your repository here. Hint: Refer to week 1 online seminar on Github

This is the link to the Blink SOS code

https://github.com/satviksharmase/BlinkSOS/blob/master/SOS_code.ino

Q3: Take a five second video of your Arduino board with the LED blinking the SOS signal, and upload it to youtube. Include the link here.

The link for the SOS Blink is given on the link

<https://d2l.deakin.edu.au/d2l/ext/rp/755219/lti/framedlaunch/e120dab2-1355-47b4-9d02-5491b8a89ec8>. Alternatively if this does not work use the you tube link
<https://youtu.be/PyTBGkDfEXI>

14 Do Something Awesome

For top results in this unit, you need to demonstrate excellent achievement of the unit learning outcomes. This task gives you the freedom to demonstrate that in any way that you want. Please refer to the Task sheet in Task resources.

Outcome	Weight
ULO1	◆◆◆◇◇

this assessment helped me to understand the background of the CPS systems and its functioning in different things

Outcome	Weight
ULO2	◆◆◆◇◇

this assessment helped me to understand the background of the CPS systems and its functioning in different things

Outcome	Weight
ULO3	◆◆◆◇◇

this assessment helped me to understand the background of the CPS systems and its functioning in different things

Date	Author	Comment
2019/08/05 20:31	Sharma Satvik	i just need a couple of more days to clear the plagiarised content in my research essay. i will be very thankful for some extension
2019/08/13 01:01	Sharma Satvik	Ready to Mark
2019/08/19 16:11	Mahdi Babaei	this is a good research.
2019/08/19 16:11	Mahdi Babaei	Complete

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Do Something Awesome

Submitted By:

Sharma SATVIK
sharmasat
2019/08/13 01:01

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO1	♦♦♦◊◊
ULO2	♦♦♦◊◊
ULO3	♦♦♦◊◊

this assessment helped me to understand the background of the CPS systems and its functioning in different things

August 13, 2019



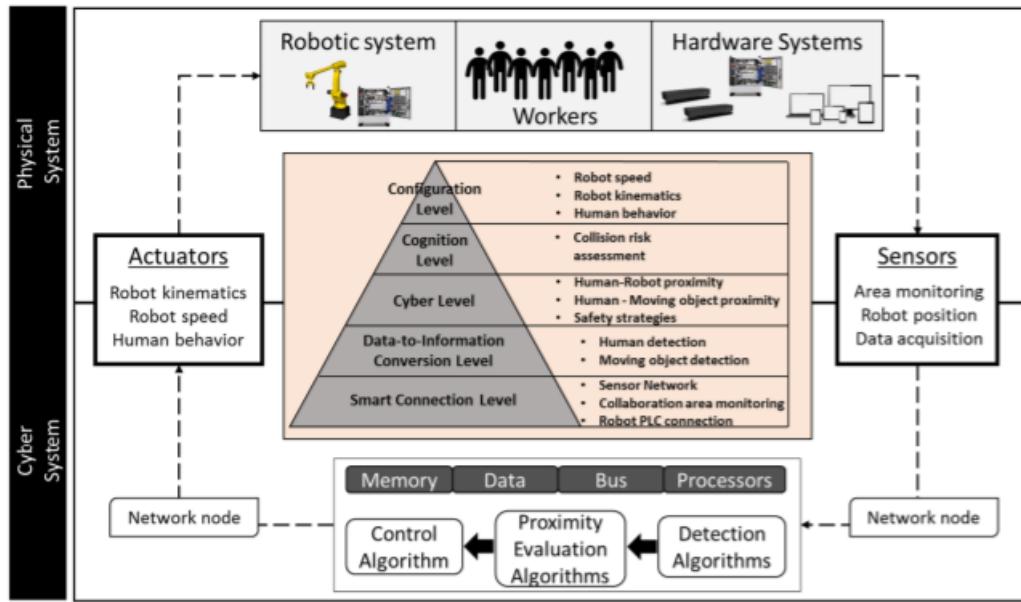
Cyber-physical systems and human-robot collaboration

Cyber physical systems or better known as CPS, is a system in which the cyber and physical world is interlinked with each other. This means that the cyber world which is the world inside the computer or the world in which all the programming and everything takes place and the physical world which is the world around us, is connected by the CPS systems. The human robot collaboration means that the area where the humans and robot work in a common place to achieve a specific goal. These workplaces include hospitals, offices, manufacturing, space exploration. The cyber physical systems in a human robot shared workplace means that the working of the robot is done according to the CPS systems in which no harm comes to the human and the workplace. This interconnection is studied in depth so as to make the shared workplace as safe as possible.

Due to modernisation, everything around is getting faster and faster and due to which the requirement of and production of things need to be much faster. This requires an increased level of automation for fast and low-cost production, with high levels of flexibility and adaptability to dynamic production requirements. The human and robot collaboration allows for closer interaction in assembly tasks that require increased productivity by combining the performance of robotic systems with the flexibility and dexterity of human workers. But when they are working in collaboration this can lead to some unsafe environments which can cause many problems.

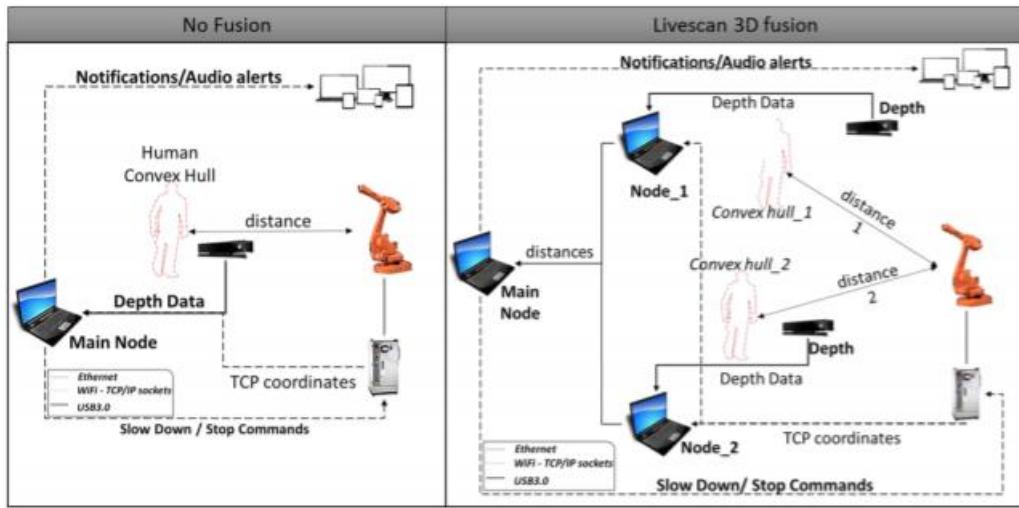
The key aspects of human-robot collaborations are mentioned further in this paragraph. The most important aspect is the specialization of roles, which means based on the skills, every task is to be given to a specialized person. The next aspect is to establish a shared goal, where both the robot and the humans are working together to achieve a same goal. Furthermore, the communication between the machines and humans is import along with the responsibility and coordination. These aspects are the basis which can lead to a safe human robot collaboration.

Safety of human workers, while working near robotic systems can be done with the help of cyber-physical systems. This CPS system should be a combination of shop floor information that captures the real-world working conditions of the workplace, the data acquisition mechanisms from operating entities, the communication services for the in-time data exchange and the software component, capable of controlling and reconfiguring the state of the CPS entities.



The basic requirements in the CPS system is depicted above in the image and described below. The lowest level includes the hardware components for retrieving and reconfiguring real-world conditions (sensor systems to monitor the operating area, human mobile devices to support a communication interface to the cyber part, the physical robot(s), and its controller). Communication services for data exchange converting field data to information required by the cyber part and towards assessing the human proximity and thus collision risk mainly to the robot and secondly to any moving object. The third and intermediate level includes all the required algorithms for data processing, evaluation, and control of the physical entities. At this point, it should be noted that to enable any reaction to the physical part and evaluation and data processing at this level should be done in low time to allow for any decision-making approach to take place on top of it, which is the focus of this paper. In the cognition level, the collision risk of the human(s) is assessed in terms of human proximity to a moving object. In the upper layer, the configuration level includes the reaction strategies and algorithms are included controlling or affecting the actions of the physical part, e.g. triggering an emergency stop to the robot or dispatching a warning signal to the mobile device of the human operator.

The implementation of the CPS system can be done using the co-ordinate system in which the sensors inside the robot detects and determines the location of the human worker. three different levels of safety are to be ensured. The first one is to be the green zone where the human and robot can work simultaneously without any disturbance. Second one to be the yellow zone where the human gets notified as well as the robot slows down its work and the third one to be the red zone where the robot stops its all work until the human moves out of the red zone. the CPS system for this functioning is presented below in the image.



Various tests that were conducted using one or more sensors to evaluate the safe human-robot collaboration. Safety zones were pre-set to 1.5, 3.0 and 4.5 metres from the robot base. The Kinect sensors were used to detect the average distance of human from the robot base. Three computers were set up with the specification given below.

1. Computer 1: intel core i7-4770, intel HD Graphics 4600, NVIDIA GeForce GTX 650 2GB, windows 10, 8gb RAM
2. Computer 2: intel core i5-5200U, intel HD graphics 5500, NVIDIA GeForce 920M 2GB, windows 10, 4gb RAM
3. Computer 3: intel core i5-5200U, intel HD Graphics 5500, NVIDIA GeForce 920 M 2GB, windows 10, 4gb RAM

When the person was in the green zone, the robot was working without slowing down or stopping. When the human got inside the yellow zone, the robot decreased its functioning to 60% of the initial functioning and when the human was in the red zone the robot stopped working. The presented method aims to provide a closed loop control CPS that enables a seamless human-robot collaboration with the industrial robots. Besides its low cost and efficient time performance, the system has also got limitations. The field view of the Kinect camera is just 1.5 to 4.5 metres and thus requires more camera for more machines. Moreover, the study ton the human conditions while working near the robots such as the heartbeat are not taken in the survey.

Further studies in future is required. the main aspects of the study should be the human emulation, which aims to enable the computers to act like humans or have human like abilities, and human complementary, which seeks to improve the human robot interaction. Moreover, the work on the pre-existing theories, like Belief desire intention model, shared cooperative activity, joint intention theories and many more, is required so as to make the workplace safer.

References:

1. Wikipedia. 2019. Human-robot Collaboration. [ONLINE] Available at: https://en.wikipedia.org/wiki/Human-robot_collaboration. [Accessed 11 August 2019].
2. Wikipedia. 2019. Cyber-Physical Systems. [ONLINE] Available at: https://en.wikipedia.org/wiki/Cyber-physical_system. [Accessed 11 August 2019].
3. Nikolaos Nikolakis, Vasilis Maratos, Sotiris Makris, (2017). Robotics and Computer Integrated Manufacturing. (), pp
4. Liu, Quan; Liu, Zhihao; Xu, Wenjun; Tang, Quan; Zhou, Zude; Pham, Duc Truong, (2019). Human-robot collaboration in disassembly for sustainable manufacturing. *International Journal of Production Research*. (), pp.
5. M.R. Pedersen, L. Allantoides, R.S. Andersen, C. Schou, S. Bøgh, V. Krüger, O. Madsen, Robot skills for manufacturing: from concept to industrial deployment, *Robot, Comput. Integrat. Manuf.* 37 (2016) 282–291, <https://doi.org/10.1016/j.rcim.2015.04.002>.

15 Project 1: Project Implementation

In this task you will be implementing the task you planned in 3.4P.

Outcome	Weight
ULO2	♦♦◊◊◊

this task allows the student to interact with the real cyber and physical systems

Outcome	Weight
ULO3	♦♦◊◊◊

this task allows the student to interact with the real cyber and physical systems

Date	Author	Comment
2019/08/09 23:39	Sharma Satvik	Ready to Mark
2019/08/13 22:14	Mahdi Babaei	Well done. thumbs up !
2019/08/13 22:14	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Project 1: Project Implementation

Submitted By:

Sharma SATVIK
sharmasat
2019/08/09 23:39

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◇◇◇
ULO3	♦♦◇◇◇

this task allows the student to interact with the real cyber and physical systems

August 9, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 4.1C Project 1: Project Implementation

Student Name: Satvik Sharma

Student ID: 218595095

Q1: Use Arduino and the provided sensor kit to develop the project.

- a. Create a repository named Smart Plant on GitHub.
- b. Upload your code to the repository. Include the link to your repository here.

<https://github.com/satviksharmase/SmartPlant/blob/master/DFRobotSoilMoisture.ino>

Q2: How did you test your code to ensure it is working?

To test the code the moisture sensor was placed in the plant soil and kept for 6 hours testing time. The output was given out after every half an hour. If the moisture in the soil was less than 300, the light turned on and if the moisture was more than 300, the soil was moist and worked accordingly. The readings were uploaded on GitHub with the extension given below

<https://github.com/satviksharmase/SmartPlant/blob/master/Book1.xlsx>

Q3: Check how your estimated user story points in task 3.4 compare to the actual used effort to develop the project.

Instead of data collection in an hour, the data was collected on the basis of half an hour due to real life short time conditions. To make sure that everything is working correctly, the plant was allowed to be kept near the heater for some time so that the moisture in the soil goes down and the LED on the Arduino board lights up. Moreover, in the estimated user story the time duration was kept as 12 hours instead of 6hours.

16 Ethical issues

In this task you will investigate ethical concerns in a given a case study.

Outcome	Weight
ULO1	♦♦♦♦◊

this task helps understand the ethical issues in the cps systems

Date	Author	Comment
2019/08/05 11:55	Sharma Satvik	Ready to Mark
2019/08/18 17:41	Mahdi Babaei	please elaborate more on Q2
2019/08/18 17:41	Mahdi Babaei	Fix and Resubmit
2019/08/19 12:27	Sharma Satvik	Ready to Mark
2019/08/19 12:27	Mahdi Babaei	Time Exceeded
2019/08/26 15:07	Sharma Satvik	this task is still showing red mark. is this fine or should i need more extension
2019/08/27 10:58	Mahdi Babaei	Ready to Mark
2019/09/01 15:04	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Ethical issues

Submitted By:

Sharma SATVIK
sharmasat
2019/08/19 12:27

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO1	♦♦♦♦◊

this task helps understand the ethical issues in the cps systems

August 19, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 4.2P Ethical Issues

Student Name: Satvik Sharma

Student ID: 218595095

Q1: What should have been explained and obtained prior to installing the sensors and recording sensor data in John's house? Why?

The data being recorded in John's house by the sensor is not accessible by John. All of the data is going into the cloud, which can be used by hackers to keep a lookout on John and perform a robbery at best time.

Q2: What are some ethical concerns in the given scenario?

Since, John is an elderly gentleman and living by himself, it is good that he is using the modern technology but all of the data is going in the cloud or the internet instead of a local place, which can be accessed by users all over the globe if followed certain steps. Moreover the data can be breached by the people working in the company and can be used by some criminals for criminal activity.

Q3: What adverse effects may arise as a result of the aforementioned ethical concern/s? Explain using examples.

the worst thing that can happen in this scenario is the breach of data or data theft which can be used for more cybercrimes. In this scenario the name and address of John is included in the data which can be used by cyber hackers.

Q4: Explain how one of the ethical concerns you mentioned can be addressed.

instead of putting all of the data in cloud, local file can be used which deletes a data after a certain period of time, let's say a week and functions on the basis of the last day's activities. In the scenario where John is himself not present at home, the smart home system can be turned off for that time and when restarted starts functioning accordingly.

17 Project 1: Visual Analytics

Use charts and visualisations to draw inferences on the data collected from Task 4.1P.

Outcome	Weight
ULO1	♦♦◊◊◊

this task allows the user to understand the visualization and the hypothesis.

Outcome	Weight
ULO4	♦♦◊◊◊

this task allows the user to understand the visualization and the hypothesis.

Date	Author	Comment
2019/08/25 00:15	Sharma Satvik	my computer was not working properly for the time being and i am really sorry that i was not able to submit this assessment
2019/09/02 12:47	Sharma Satvik	Ready to Mark
2019/09/02 13:46	Mahdi Babaei	Redo
2019/09/02 13:47	Mahdi Babaei	Your visualization does not quiet match with what we had in mind. They show a fixed line and there is no ratio, hence no increase and decrease
2019/09/06 13:34	Sharma Satvik	Ready to Mark
2019/09/08 22:29	Mahdi Babaei	image comment
2019/09/08 22:29	Mahdi Babaei	you should have ended up with a visualization like this
2019/09/08 22:29	Mahdi Babaei	Redo
2019/09/09 12:00	Sharma Satvik	need to fix this one
2019/09/09 12:45	Sharma Satvik	Ready to Mark
2019/09/09 14:06	Mahdi Babaei	Complete

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Project 1: Visual Analytics

Submitted By:

Sharma SATVIK
sharmasat
2019/09/09 12:45

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO1	♦♦◇◇◇
ULO4	♦♦◇◇◇

this task allows the user to understand the visualization and the hypothesis.

September 9, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 5.2P Visual Analytics

Student Name: Satvik Sharma

Student ID: 218595095

Q1. Using your collected data (or the data you used for the task 2.3P), come up with a hypothesis (H_0 , and H_1). Put your hypothesis below.

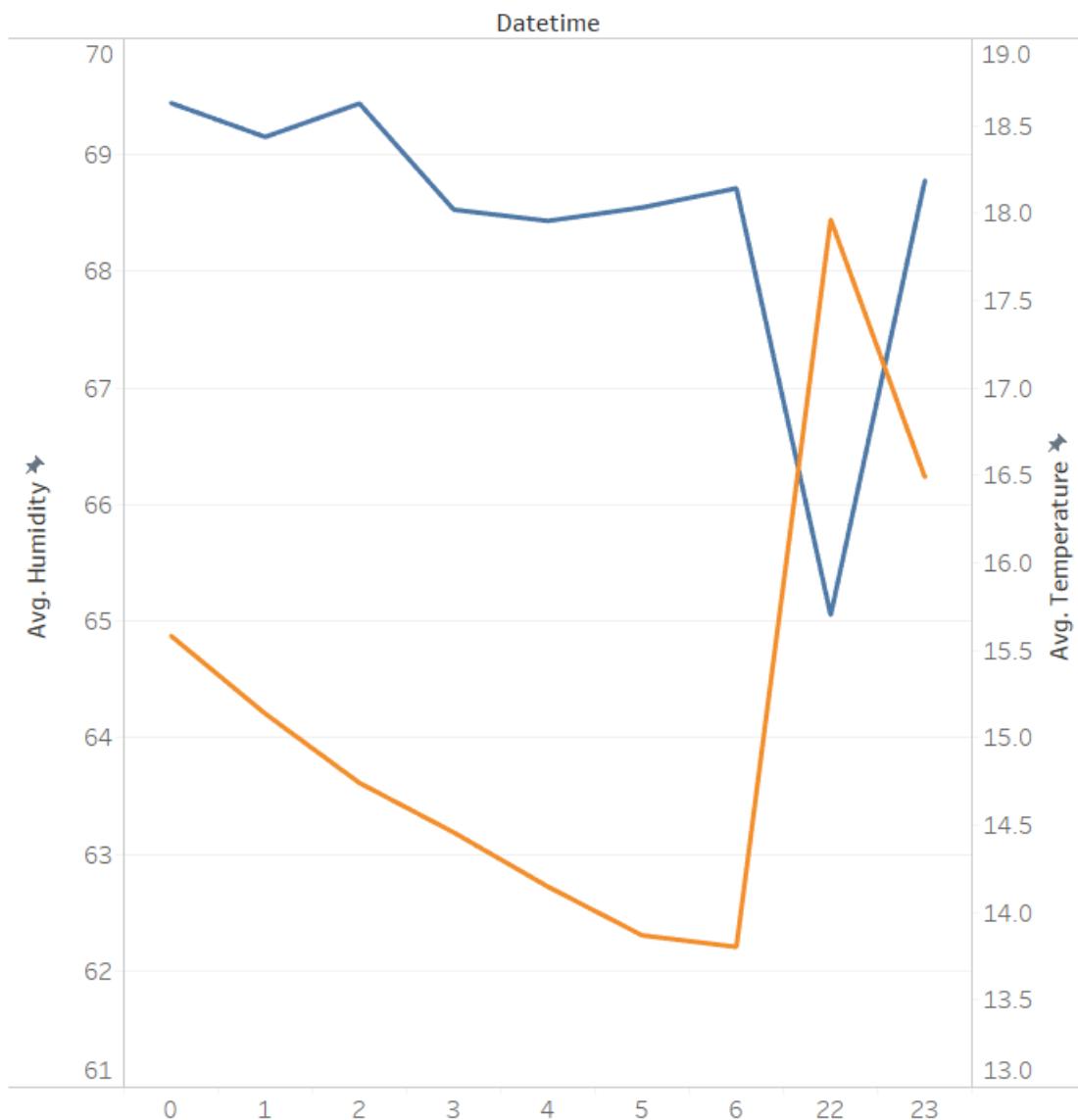
My hypothesis: the humidity will increase at night and decrease in the morning. The temperature will decrease at night and increase in the morning

Null hypothesis: time will not affect humidity and temperature

Alternate: time will affect humidity and temperature

Q2. Develop a visualisation in Tableau using the data.

Sheet 1



Q3. Use the visualisation to test your hypothesis. How does the visualisation help you prove or disprove the hypothesis? Provide the discussion below

Temperature and humidity will increase as the time progresses into night. The NULL hypothesis is incorrect and alternate hypothesis is correct, which is time affects humidity and temperature.

18 Visualisation Critique

Three visualisations have been provided by your tutors. You are required to: 1. Critique these visualisations using your understanding of the visualisation concepts 2. Propose how you can make a better depiction of the sample visualisations. 3. Submit your critique document

Outcome	Weight
ULO2	♦♦◊◊◊

this task helps the student to work as a critique and to make sure that their visual representation is good enough.

Outcome	Weight
ULO3	♦♦◊◊◊

this task helps the student to work as a critique and to make sure that their visual representation is good enough.

Outcome	Weight
ULO4	♦♦♦◊◊

this task helps the student to work as a critique and to make sure that their visual representation is good enough.

Date	Author	Comment
2019/08/17 22:58	Sharma Satvik	Ready to Mark
2019/08/22 15:46	Mahdi Babaei	wrong submission.
2019/08/22 15:46	Mahdi Babaei	Fix and Resubmit
2019/08/25 00:16	Sharma Satvik	Ready to Mark
2019/09/01 15:39	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Visualisation Critique

Submitted By:

Sharma SATVIK
sharmasat
2019/08/25 00:16

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊
ULO4	♦♦♦◊◊

this task helps the student to work as a critique and to make sure that their visual representation is good enough.

August 25, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

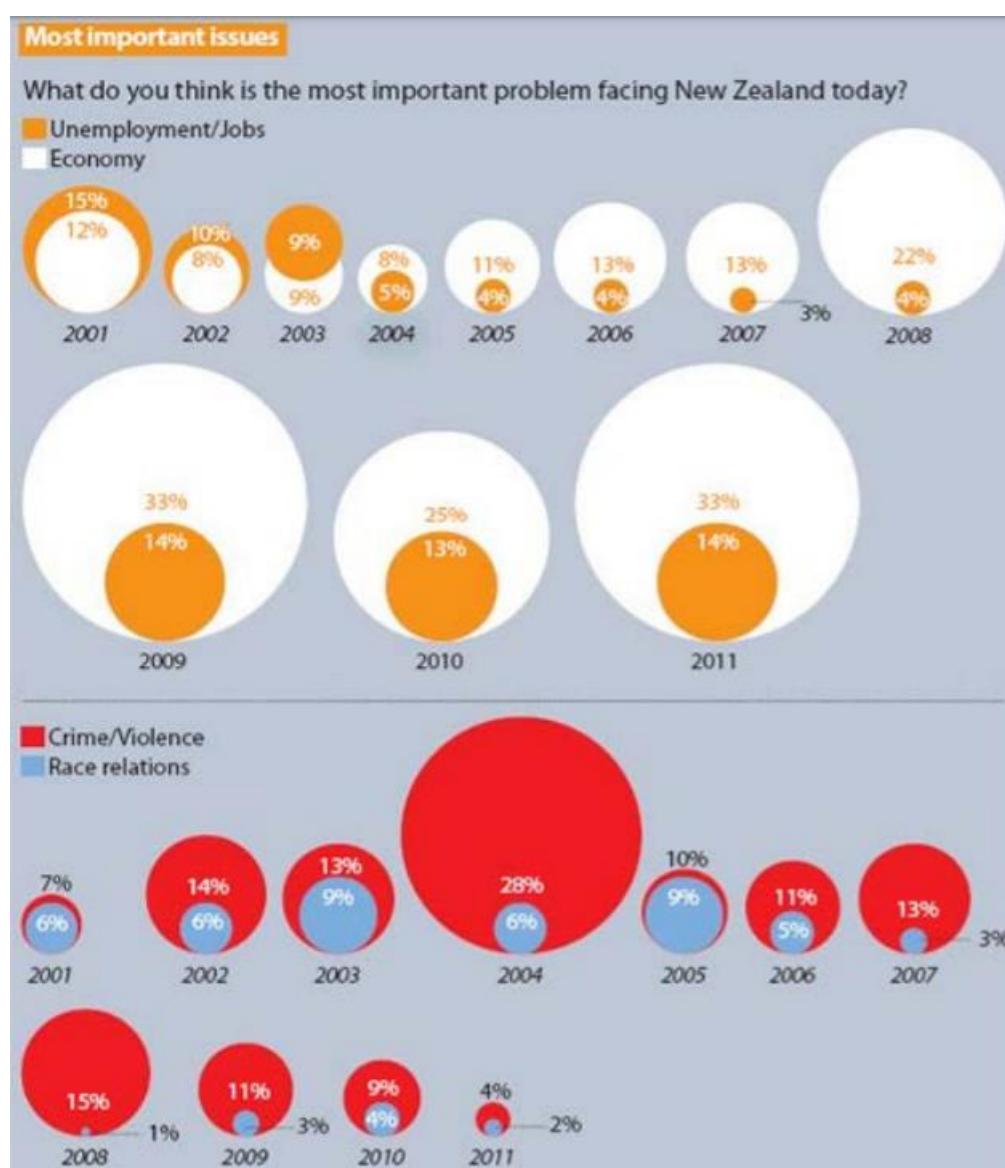
Answers for 5.3P Visualisation Critique

Student Name: Satvik Sharma

Student ID: 218595095

Data 1:

What is the most important problem facing NZ today?



1. Who is the audience? (expert? non-expert?)

Expert audience: the expert audience here is the government of New Zealand and the crime protectors of the country as the data related to jobs, economy, crime and race relations is given.

Non-expert audience- the people who are unemployed or some basic economists will study this data. Moreover, the people like tourists or international students will study the below data

2. What questions does this visualization answer?

This data answers the questions related to the percentage of economy in the country vs the unemployment and crime rate vs race related crime rate.

3. What design principles best describe why it is good / bad?

The data uses the piechart to describe the data.

The data is described on yearly basis and show different colors which makes it easy to follow the data.

4. Why do you like / dislike this visualization?

this visualization represents data as piechart but the data is made for all different years moreover the data in 2003 about the economy and unemployment is not in the same circle, which confuses the reader

5. Can you suggest any improvements?

The visualization could have been much better if the data was represented on the bar graph with 2 different lines representing the data.

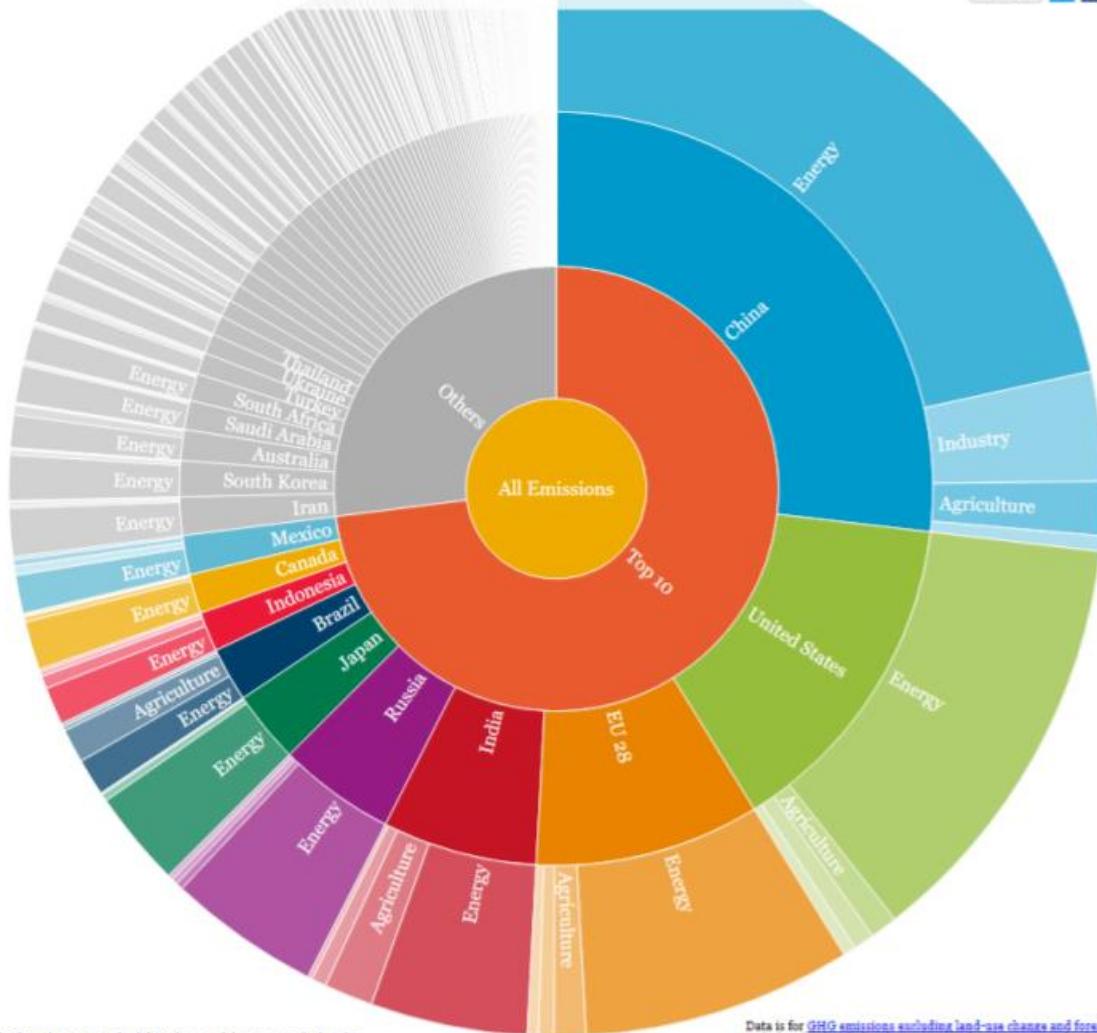
Data 2:

Explore the World's Greenhouse Gas Emissions

Find the newest data on global greenhouse gas emissions on [CAIT Climate Data Explorer](#)



Embed



Graphic by [Johannes Friedrich](#) based on work by Duncan Clark, [Mike Bostock](#) and [Jason Davies](#). Thanks also to Jamie Cotta.

Data is for GHG emissions excluding land-use change and forestry and excluding bunker fuels. The EU is considered an emitter for this graph. For more information visit our WRI blog.

1. Who is the audience? (expert? non-expert?)

Expert: environmentalists or geographers are the expert audience for this

Non-expert: the audience such as students are going to study this

2. What questions does this visualization answer?

this visualization answers the questions related to the green house emission by each country

3. What design principles best describe why it is good / bad?

the data is represented in a stepped pie chart. The representation of the countries is good, but the representation of the type of data at some places is not shown. Moreover, the data about the countries is not shown as well. Furthermore, the figures showing the number of the data is not represented.

4. Why do you like / dislike this visualization?

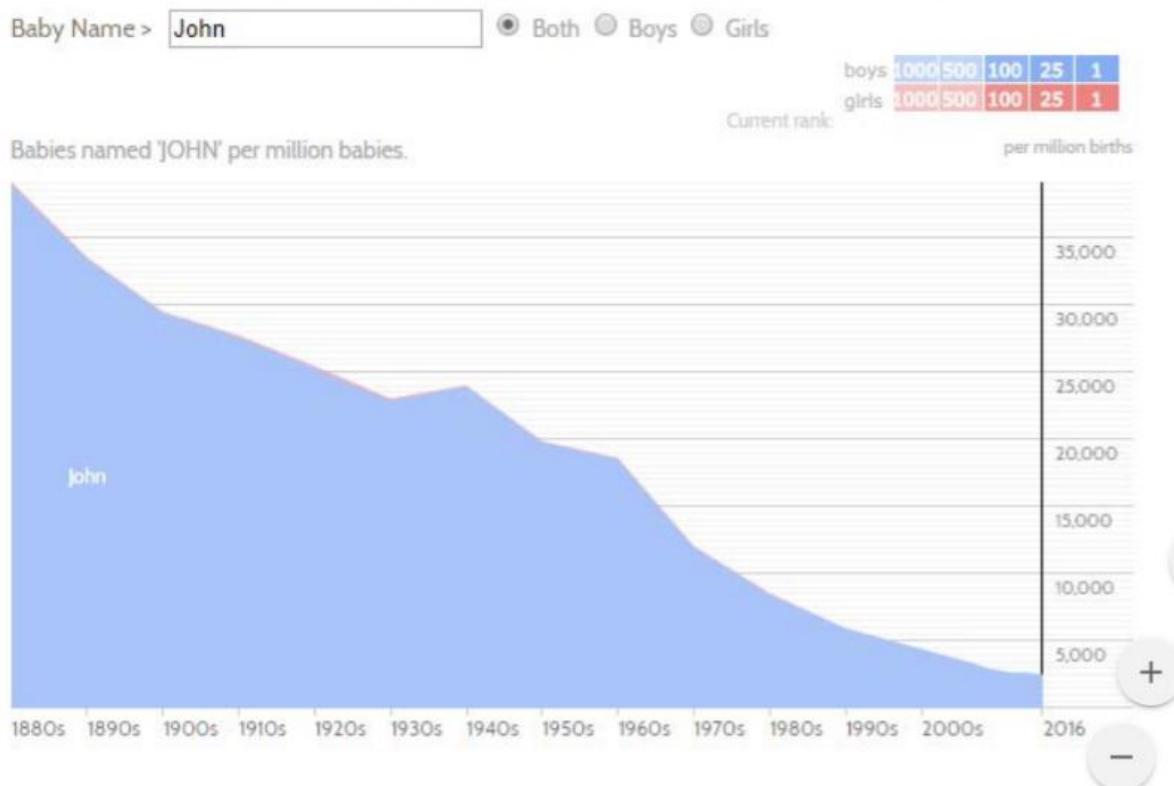
The representation is good, but the information is not fully conveyed to the audience.

5. Can you suggest any improvements?

the names of the countries as well as the the type of green house emission should be mentioned. Moreover, the figures conveying that the data also needs to be on the pie-chart.

Data 3:

NameVoyager: Explore baby names and name trends letter by letter
Looking for the perfect baby name? [Sign up for free](#) to receive access to our expert tools!



1. Who is the audience? (expert? non-expert?)

Expert: this data is concerned by the officials who are checking their census for the john named person in the world.

Non-expert: this data will be used by the soon to be parents who wants to know if the name they want their baby to have is common or not.

2. What questions does this visualization answer?

this data answers the questions related to the names of the babies and the trend of the name.

3. What design principles best describe why it is good / bad?

the design principle in this is the line graph depicting the trendline of the data ogf the particular name at a particular year. This data differentiate between the boys' and girls' names as well

4. Why do you like / dislike this visualization?

the data represented over here does not tell the exact number one will have to judge . moreover the data for the girls just start over the blue area. This representation is difficult to read

5. Can you suggest any improvements?

the timegap between 2000s and 2016 is not a consistent one. The data should be a line graph instead of area under line, which will make it easier to differentiate between the girls' names and boys' names. Lastly the numbers should be represented in the curve.

19 Test Motion Sensors

In this task, you will test the PIR Motion sensor for range and FOV (field of view) and calculate its TPR (true positive rate).

Outcome	Weight
ULO2	♦♦◊◊◊

ULO2: this task is related to the collecting the real life sensor data and its working ULO3: this task uses CPS for detection and how it can be improved

Outcome	Weight
ULO3	♦♦◊◊◊

ULO2: this task is related to the collecting the real life sensor data and its working ULO3: this task uses CPS for detection and how it can be improved

Date	Author	Comment
2019/08/30 12:09	Sharma Satvik	Ready to Mark
2019/09/02 13:48	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Test Motion Sensors

Submitted By:

Sharma SATVIK
sharmasat
2019/08/30 12:09

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◇◇◇
ULO3	♦♦◇◇◇

ULO2: this task is related to the collecting the real life sensor data and its working ULO3: this task uses CPS for detection and how it can be improved

August 30, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 6.1P Test Motion Sensors

Student Name: Satvik Sharma

Student ID: 218595095

Q1. Recording Active/Inactive States

	A	B	C
1	Active	Active	Active
2	Active	Active	Active
3	Active	Active	Active
4	Active	Active	Active
5	Active	Inactive	Active
6	Inactive	Inactive	inactive

https://github.com/satviksharmase/motion_sensor_data/blob/master/task%206.1.txt(link) to the github repository.

Q2. Calculate the True Positive Rate at .5 m Range

a) Enter the motion data you recorded from A1 to A6 in shared file

https://docs.google.com/spreadsheets/d/1xHIKAfAbODvSFBFS4jnWqunW9-bpg_B--JUJiSoit-0/edit?usp=sharing. If you did the data collection as a group, only enter one reading per group, with all of your names in the relevant cell. Copy the FoV table from the shared file and include here.

FoV	180	120	60	15
	1 1 1 1 0 1 0 1 1 0 0 1 1 1 1 1 1 1 0 1 0 0			
	1 1			22
	1 1			22

b) Use the output from the shared google sheet to calculate the true positive rates for the FoVs given in the table below. You must show the steps of your calculations in the table.

FOV	True positive rate($tpr=tp/(tp+fn)$)
180	0.68
120	1
60	1

Q3. Calculate the True Positive Rate at 1 m Range
a) Enter the motion data you recorded from B1 to B6 in shared file https://docs.google.com/spreadsheets/d/1xHIKAfAbODvSFBFS4jnWqunW9-bpg_B--JUJiSoit-0/edit?usp=sharing. If you did the data collection as a group, only enter one reading per group, with all of your names in the relevant cell. Copy the FoV table from the shared file and include here.

b) Use the output from the shared google sheet to calculate the true positive rates for the FoVs given in the table below. You must show the steps of your calculations in the table.

FOV	True positive rate($tpr=tp/(tp+fn)$)
180	0.19
120	0.52
60	0.85

Q4. Calculate the True Positive Rate at 1.5 m Range a) Enter the motion data you recorded from C1 to C6 in shared file https://docs.google.com/spreadsheets/d/1xHlKAfAbODvSFBFS4jnWqunW9-bpg_B--JUJiSoit-0/edit?usp=sharing. If you did the data collection as a group, only enter one reading per group, with all of your names in the relevant cell. Copy the FoV table from the shared file and include here.

FoV																	
180	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
120	1	1	0	1	1	1	0	0	0	1	0	0	0	0	1	1	0
60	1	1	1	1	1	1	0	0	0	1	0	0	0	0	1	1	0

b) Use the output from the shared google sheet to calculate the true positive rates for the FoVs given in the table below. You must show the steps of your calculations in the table.

FOV	True positive rate($tpr=tp/(tp+fn)$)
180	0.04
120	0.45
60	0.54

Q5. Based on the above, what can you say about the range of the motion sensor tested? Justify your answer giving reasons.

by looking at the TPR and the FOV, it can be easily seen that the sensors are working best for the range of 60° and least for 180° . Moreover, as the person is going further from the sensor, the TPR is decreasing showing that the sensor best works at the range of 0.5 metres.

20 Experiment Design

In Task 6.1P, you followed the given instructions to conduct an experiment to calculate the True Positive Rate of a given PIR motion sensor. In this task, you will design an experiment to calculate the True Negative Rate of the same sensor.

Outcome	Weight
ULO2	♦♦◊◊◊

ULO2: this task envisions on how to create experiments based on the previous knowledge

Date	Author	Comment
2019/08/30 21:58	Sharma Satvik	Ready to Mark
2019/09/08 22:52	Mahdi Babaei	Fix and Resubmit
2019/09/08 22:52	Mahdi Babaei	Complete

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Experiment Design

Submitted By:

Sharma SATVIK
sharmasat
2019/08/30 21:58

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊

ULO2: this task envisions on how to create experiments based on the previous knowledge

August 30, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 6.2C Experiment Design

Student Name: Satvik Sharma

Student ID: 218595095

Q1. Propose and describe in detail, an experiment to find the True Negative Rate (TNR) of the PIR motion sensor used in Task 6.1P. Include the following in your answer: -

What test equipment are you going to use –

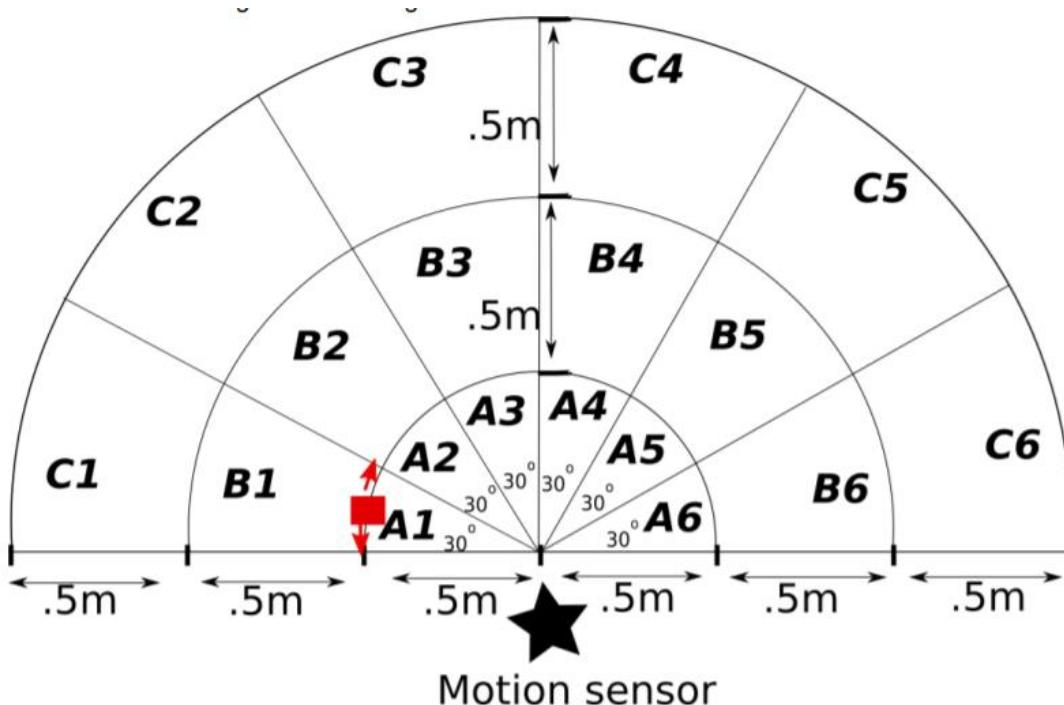
The test equipment required would be

1. PIR motion sensor
2. Arduino uno
3. Arduino IDE

And a space to test the experiment.

What is your sample size –

The test will be done using the area defined under.



Further a motion sensor will be used to detect the area covered by the person and check whether it works or not.

Experimental Procedure: Be detailed in exactly how you are going to do your experiment. Anyone should be able to duplicate your experiment from this detailed description –

1. The code relating to detect the motion will be written in the Arduino IDE, and within the code one should include a loop with an if else option, saying that if the motion is detected , the serial monitor will show active, else it will show inactive.
2. The Arduino is programmed accordingly and set in the centre as depicted above in the picture.
3. The sketch is uploaded and run.
4. The person standing will slowly move themselves in order to get active in the record.
5. Initially they will start at 0° angle and at 0.5 metres away from the sensor.
6. Slowly the angle will be increased upto 180° .
7. The experiment will be repeated for 120° and 180° .
8. The number of times, the serial monitor shows inactive in a one particular area will be the false will be the false positive.

How many times will you repeat this test .

The experiment should be repeated at least 15 times so as to get as correct value as possible. Or it can be tried with different motion sensors as some motion sensors detect motion better than others. Moreover, the experiment can be repeated with what happens if two or more people are in the area.

21 Error handling

A robust program can withstand errors and faults. Although errors may be present and occur, the program will not crash or stop functioning, or damage resources. In this task, we investigate and propose ways to prevent programs from crashing.

Outcome	Weight
ULO2	♦♦♦◊◊

ULO2: this task helps to understand how to correct the sensors working in place ULO3: this task helps to understand how to tackle problems like this in real world

Outcome	Weight
ULO3	♦♦♦◊◊

ULO2: this task helps to understand how to correct the sensors working in place ULO3: this task helps to understand how to tackle problems like this in real world

Date	Author	Comment
2019/08/30 23:22	Sharma Satvik	Ready to Mark
2019/09/08 23:06	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Error handling

Submitted By:

Sharma SATVIK
sharmasat
2019/08/30 23:22

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦♦◊◊
ULO3	♦♦♦◊◊

ULO2: this task helps to understand how to correct the sensors working in place ULO3: this task helps to understand how to tackle problems like this in real world

August 30, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 6.1P Test Motion Sensors

Student Name: Satvik Sharma

Student ID: 218595095

Q1. From your understanding of the system, what do you think is the reason behind false positive, false negative, and intermittent alarms?

False positive: this can happen when the alarm goes off on its own, when there is no one present in the area of detection. This might be due to the reason that the sensor is getting weaker or the delay in the code is so much that it is showing result of someone stepped in the area earlier.

False negative: false negative occurs when there is someone in the area, but sensor is not able to detect them. this can happen because, there is not movement involved, like one time when I was doing the practical and I was standing still, the sensor was not able to detect me. Another reason might be due to the faulty sensors or something blocking its range.

Intermittent alarms: intermittent alarms means the sounding of alarm randomly after irregular intervals. This might happen due to some coding issue. Also there can be something wrong with the sensor.

Q2. Using your understanding of the sensors' true positive rate, how would you propose to fix the hardware design, number of sensors and layout of the sensor positioning to achieve the required 75% accuracy?

the formula for true positive rate(TPR) is $\text{TRUE POSITIVE}/(\text{TRUE POSITIVE} + \text{FALSE NEGATIVE}) * 100$

given that TPR at 2 metres is 60% and for 1 metre is 80%.

To make the TPR above 75% accuracy, there are number of solutions.

1. 2 sensors can be used instead one equidistant from the centre.
2. The sensor is not placed exactly in the centre. The moving of the sensor can work out too.
3. The area where the sensor is not working effectively can be found out and then made it better.

Q3. What problems do you see in the programs pseudo code?

1. The loop is not declared properly. It is not declared whether it should continue infinitely or work till a particular time.
2. If else loop is not correct as there are no brackets after the if condition and else condition.
3. The variable alarm and alam are different. Moreover, they are not declared beforehand.
4. The semi colon after on is missing.

Q4. How do you propose to fix the pseudo code? Write your proposed pseudo code here.

```
void loop()
{
    If (motion is detected)
    {
        Alarm=on;
    }
    Else
    {
        Alarm=off;
    }
    Delay(3000);
}
```

22 Visual Story Telling

Use the data you have collected and visualised to develop and present a visual story telling scenario (e.g. dashboards, interactive visualisations). Your story should include at least three visualisations that are related to each other.

Can use Tableau, Excel, or other tools you may find useful for this task.

Outcome	Weight
ULO1	♦◊◊◊◊

this task clears the concepts related to the visualizations

Outcome	Weight
ULO2	♦♦◊◊◊

this task clears the concepts related to the visualizations

Outcome	Weight
ULO3	♦♦◊◊◊

this task clears the concepts related to the visualizations

Date	Author	Comment
2019/08/30 21:42	Sharma Satvik	i need some time to understand more about this task
2019/09/13 15:10	Sharma Satvik	Ready to Mark
2019/09/16 12:21	Mahdi Babaei	Redo
2019/09/16 12:21	Mahdi Babaei	Complete

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Visual Story Telling

Submitted By:

Sharma SATVIK
sharmasat
2019/09/13 15:10

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO1	♦◊◊◊◊
ULO2	♦♦◊◊◊
ULO3	♦♦♦◊◊

this task clears the concepts related to the visualizations

September 13, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 6.4C Visual Story Telling

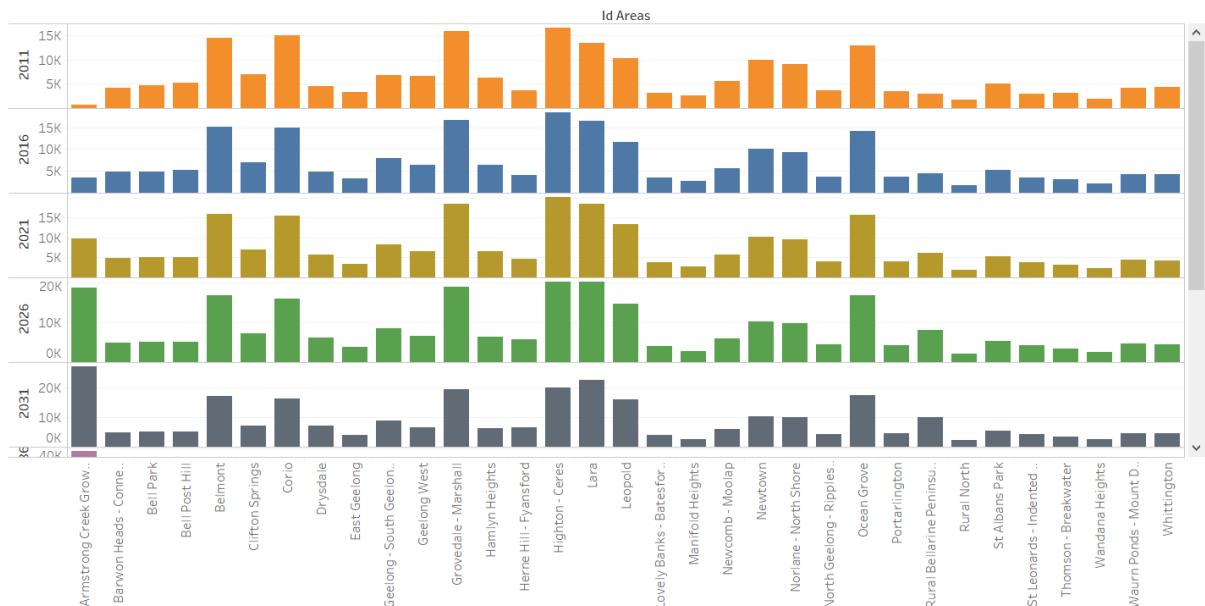
Student Name: Satvik Sharma

Student ID: 218595095

Q1. What is the story? What is the question it is trying to answer?

The data shown here tells the increment in the population in the greater geelong area from the year 2011 to 2051. Different suburbs are highlighted in the first visualization with the increase and decrease in population in the different suburbs, which can be linked to the second visualization which is basically a graph which represents the salary earned in particular fields by different kinds of people living in the geelong area and which might decide people with what kind of earnings will live in which area and thus increase population in near future. The third visualization shows the different types of schools for the upcoming youth in the geelong and what is preferred most by the people according to the salary they are earning

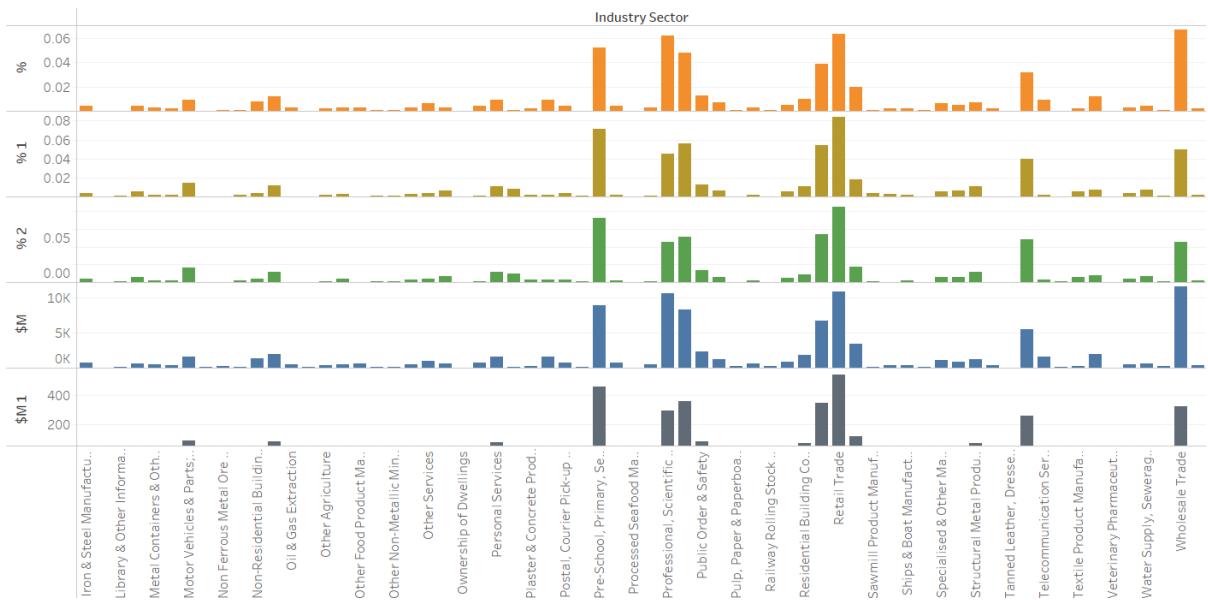
Q2. Develop your visualisations in Tableau and provide a narrative on the series of visualisations and how they relate to each other and the story.



1.

- This visualization depicts the population after every 5 years starting from 2011 in the different areas in the greater geelong area.

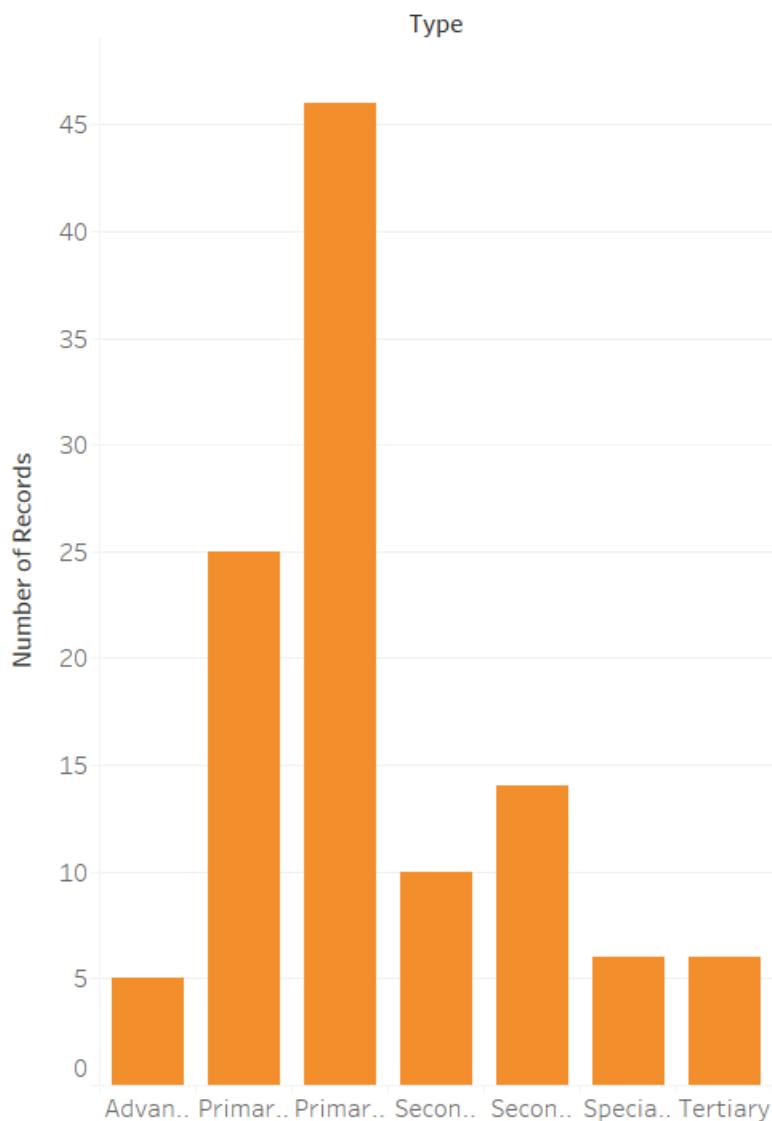
Sheet 1



2.

This visualization depicts the salary earned by people from the different fields working in greater geelong area

Sheet 1



3. The last graph shows the number of different types of school

Bibliography:

1. <https://data.gov.au/dataset/ds-dga-61c862b7-0263-4b80-a91e-ea463c931459/details?q=greater%20geelong>
2. <https://data.gov.au/dataset/ds-dga-1cb7e4a5-3789-4eef-804f-064ff9591148/details?q=population>.
3. <https://data.gov.au/dataset/ds-dga-18616881-9311-4dbd-8495-b773e5c38a4e/details?q=greater%20geelong>

23 Collect GPS data using mobile apps

Mobile phones have significant sensing capabilities such as GPS, acceleration and lux . In this task you will use existing free mobile apps to record some GPS data.

Outcome	Weight
ULO2	♦♦◊◊◊

this task applies the use of GPS in the real world

Outcome	Weight
ULO3	♦♦◊◊◊

this task applies the use of GPS in the real world

Date	Author	Comment
2019/09/06 17:36	Sharma Satvik	Ready to Mark
2019/09/08 23:49	Mahdi Babaei	Discuss
2019/09/08 23:50	Mahdi Babaei	Complete

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Collect GPS data using mobile apps

Submitted By:

Sharma SATVIK
sharmasat
2019/09/06 17:36

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊

this task applies the use of GPS in the real world

September 6, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 5.2P Visual Analytics

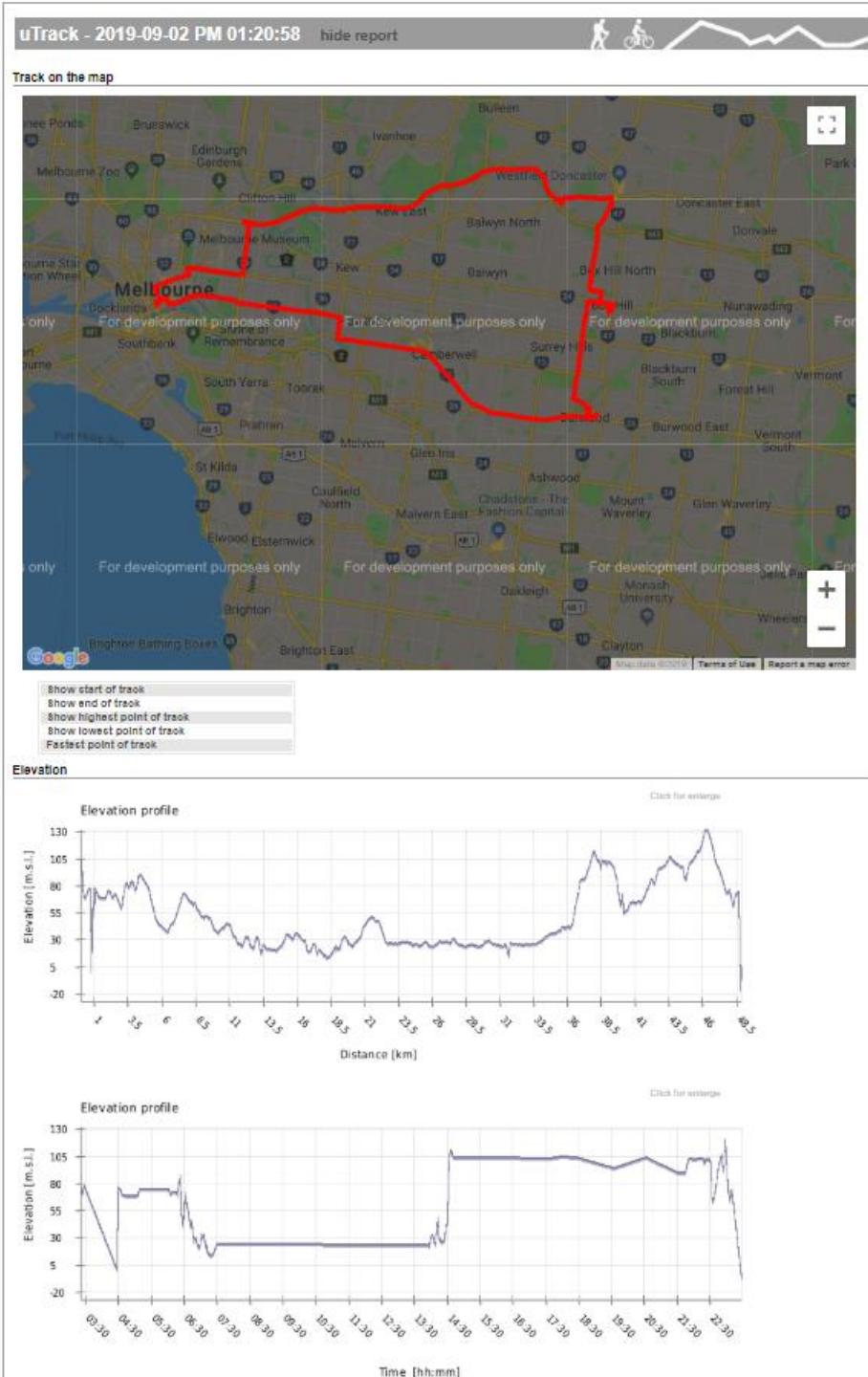
Student Name: Satvik Sharma

Student ID: 218595095

Q1: Track a journey using one of the installed mobile apps. It is best if your tracked journey spans at least 5 kilometers. Export your track to GPX format and save the file to your computer. Upload your .GPX file to Github and provide the link here.

https://github.com/satviksharmase/gps_data/blob/master/2019-09-02%20PM%2001-20-58.gpx

Q2: Open a browser on your computer and go to <http://utrack.crempa.net/>. Upload your .GPX file to the site and click ‘Generate Report’. Take a screenshot and include here.



Q3: What information can you see from the generated report?

Map: the map tracked everything, where I travelled in the whole day starting from the deakin uni, then going to city and then my back to my home and then next day back to deakin uni.

Elevation: the first graph is between the elevation in m.s.i, and the distance travelled in kilometres. Then next graph shows elevation in m.s.i .next the table giving description about everything

Speed: first graph describes speed in km per hour vs distance in km. second graph shows speed in km per hour vs time in hours. And lastly the table gives all important details about the graphs.

Time: this table gives all the details about time and everything.

Distance: the graph shows the distance depending on time, with distance in kilometres and time shown hourly. The table shows all the important details, required.

24 Inspector Gadget's Murder Investigation

In this task, you will use the knowledge you have gained in data collection and processing to investigate a murder case.

Outcome	Weight
ULO1	♦♦♦◊◊

this task allows the student to understand the reports generated by a gpx files

Outcome	Weight
ULO2	♦♦♦◊◊

this task allows the student to understand the reports generated by a gpx files

Outcome	Weight
ULO3	♦♦♦◊◊

this task allows the student to understand the reports generated by a gpx files

Date	Author	Comment
2019/09/06 19:43	Sharma Satvik	Ready to Mark
2019/09/09 00:12	Mahdi Babaei	Fix and Resubmit
2019/09/09 00:13	Mahdi Babaei	wrong answer . suspect one is the criminal
2019/09/09 11:14	Sharma Satvik	Ready to Mark
2019/09/09 11:37	Mahdi Babaei	Complete

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Inspector Gadget's Murder Investigation

Submitted By:

Sharma SATVIK
sharmasat
2019/09/09 11:14

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO1	♦♦♦◊◊
ULO2	♦♦♦◊◊
ULO3	♦♦♦◊◊

this task allows the student to understand the reports generated by a gpx files

September 9, 2019

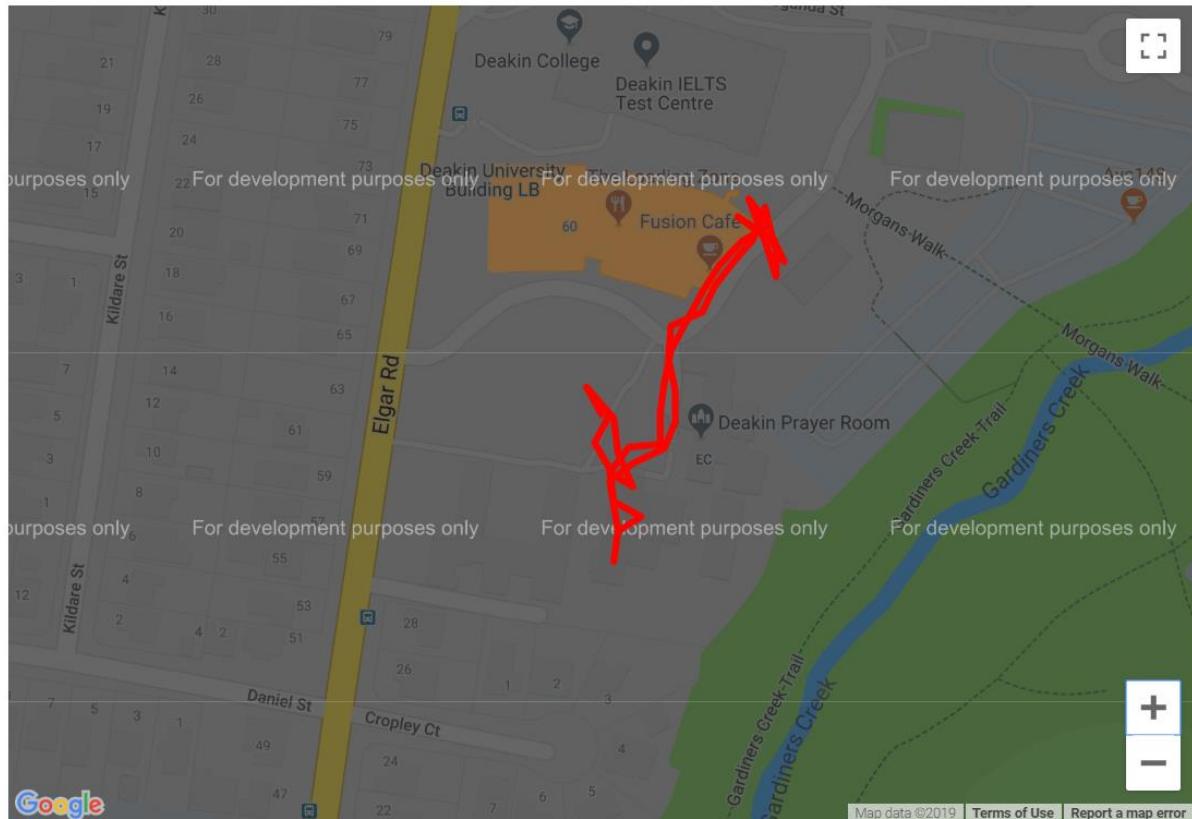


SIT107 - Software Engineering 1: Connecting the Cyber and Physical Worlds

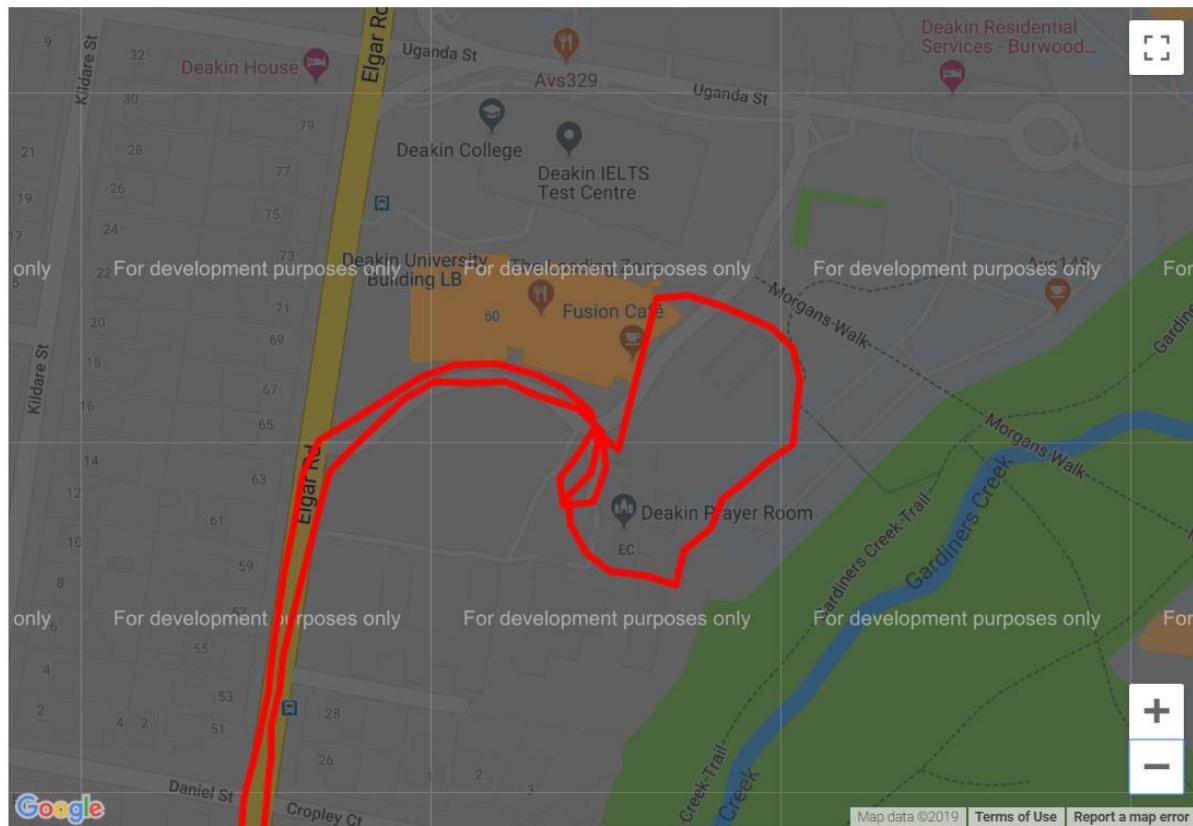
Task 7.2C Inspector Gadget's Murder Investigation

Evidence 1:

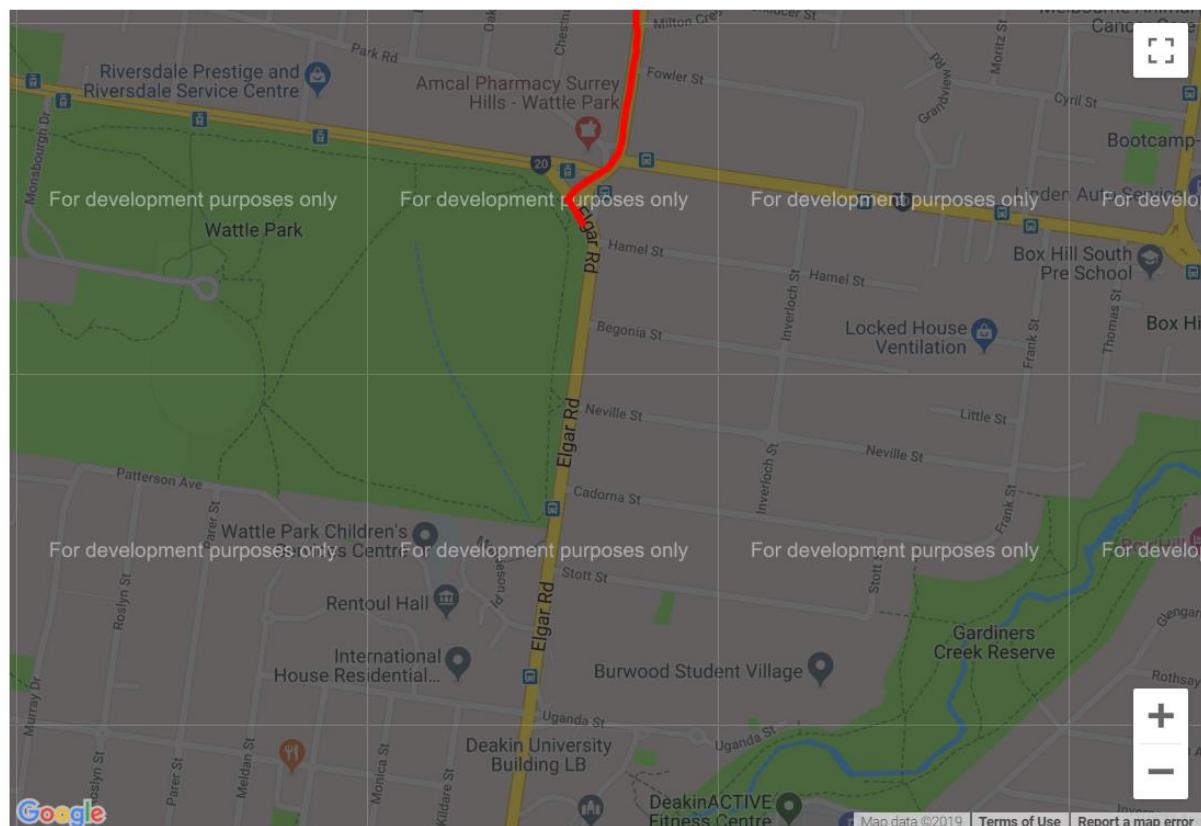
Victim:



Suspect 1:



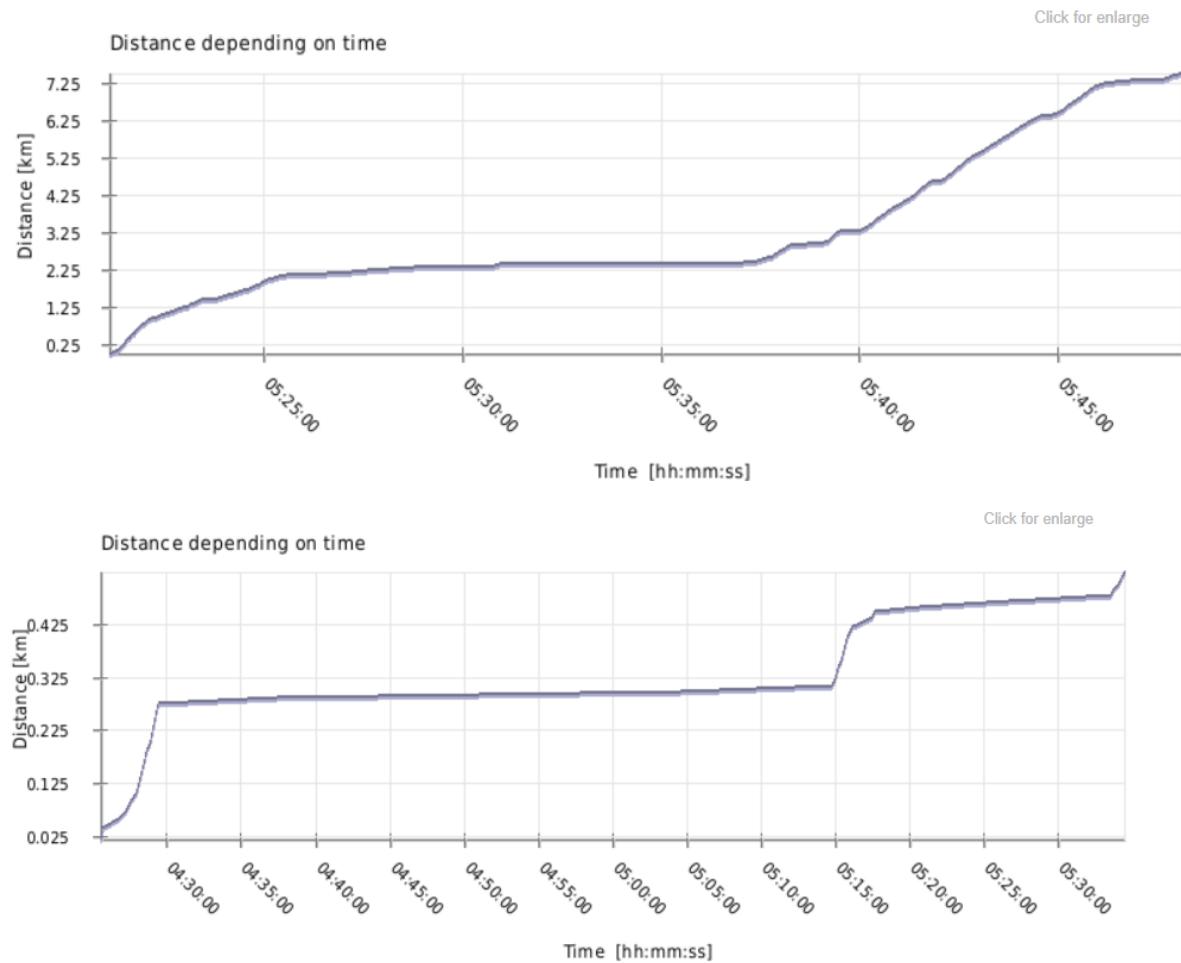
Suspect 2:



the GPS shows the location of the victim near the fusion café and prayer room in the deakin university. The suspect 2's map shows that he never arrived at the university and stopped at the riversdale road junction. The suspect two was also roaming around the fusion café and deakin prayer room

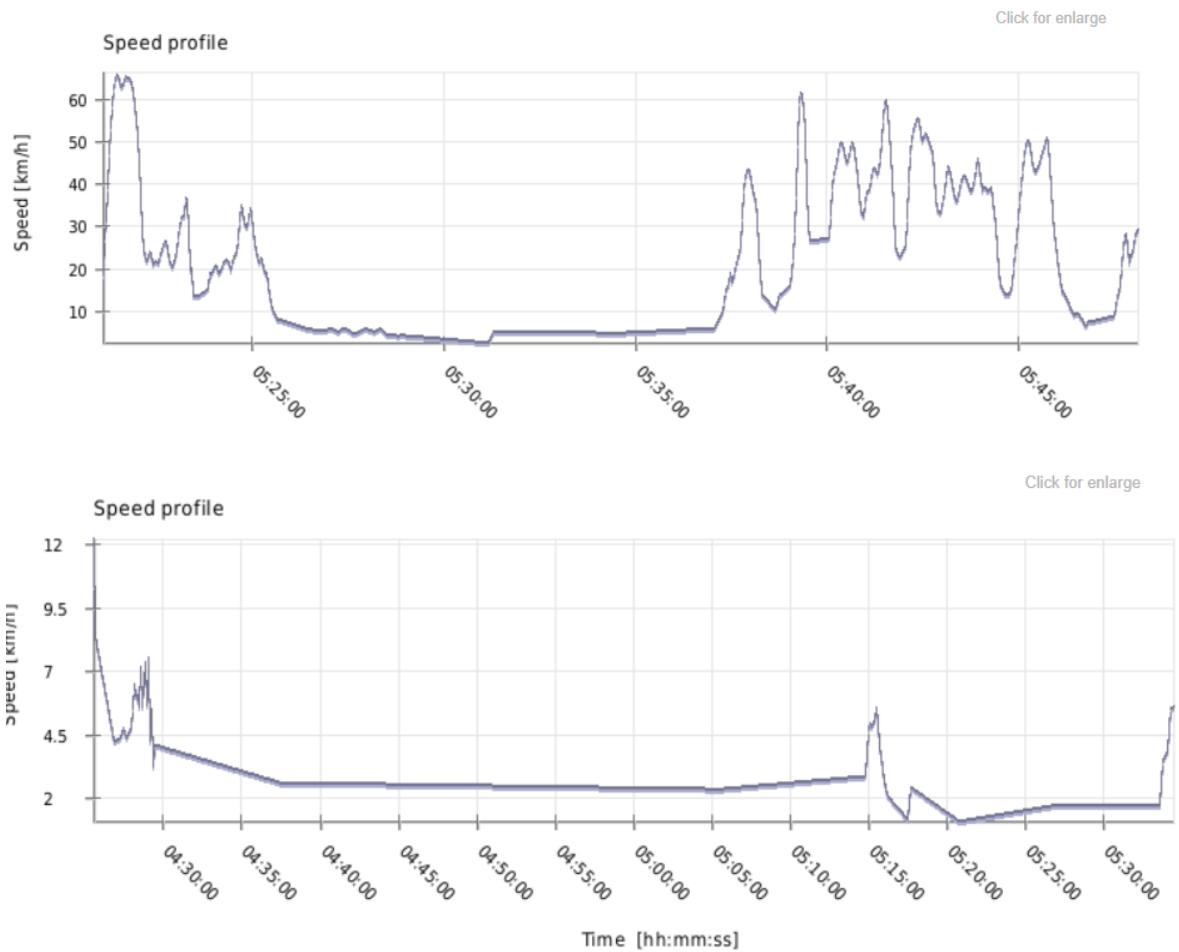
all in all, the evidence 1 suggests that the suspect 1 was behind the murder.

Evidence 2:



The graph between the suspect and the victim is similar and even the figures are same.

Evidence 3:



The speed graph at the times are also similar as well. Moreover, the speed of suspect after 5:35 increased rapidly, and the speed of victim after 5:30 is not shown.

Conclusion:

The suspect 1 is the murderer by looking at all the evidences.

25 Implement a Solution to 6.3

In task 6.3C, you were required to investigate and propose fixes to a developed solution for Louvre museum. In this task, you will be implementing a solution.

Outcome	Weight
ULO2	♦♦◊◊◊

the task allows the student to understand how to make use of CPS in real world

Outcome	Weight
ULO3	♦♦◊◊◊

the task allows the student to understand how to make use of CPS in real world

Date	Author	Comment
2019/09/06 19:53	Sharma Satvik	i am confused and need more clarity on this task
2019/09/13 13:18	Sharma Satvik	Ready to Mark
2019/09/16 12:35	Mahdi Babaei	Your code shows you have one sensor only which is different from the plan
2019/09/16 12:35	Mahdi Babaei	Redo
2019/09/16 13:04	Sharma Satvik	Ready to Mark
2019/09/16 13:04	Mahdi Babaei	Time Exceeded
2019/09/16 13:05	Sharma Satvik	need extension to get it signed off

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Implement a Solution to 6.3

Submitted By:

Sharma SATVIK
sharmasat
2019/09/16 13:04

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊

the task allows the student to understand how to make use of CPS in real world

September 16, 2019



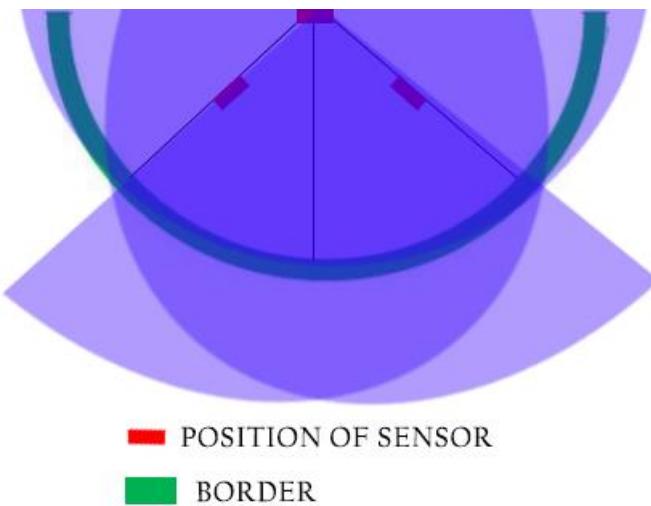
SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 7.3D Implement a Solution to 6.3

Student Name: Satvik Sharma

Student ID: 218595095

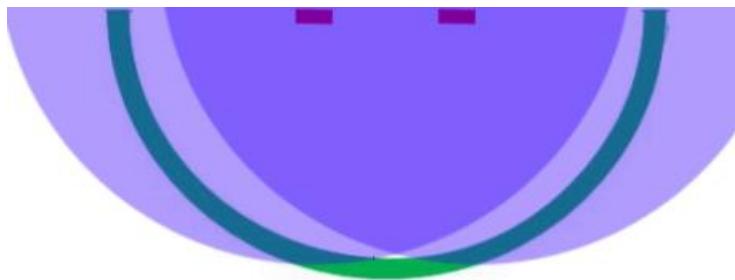
The painting can be protected in a following way as described in the picture below.



So the 3 sensors are used in this scenario. One of the sensor is placed just below the portrait. And covers most of the area. Further 2 sensors are placed at angle of 60° . The advantage of this approach will be that all the areas are covered twice and even if one of the sensor is not working, then the other 2 sensors will be able to catch the motion.

Another approach can be described with the image below

Link: https://github.com/satviksharmase/human_sensors/blob/master/3%20sensors.ino



■ POSITION OF SENSOR

■ BORDER

In this approach, two sensors are used and are placed equidistant from the centre. The areas will be covered twice and some of the area from the outside will be covered as well.

Out of both the approaches the first one will be much more useful but the second one will be cost efficient as it requires less sensors.

The link for the code is

https://github.com/satviksharmase/human_sensors/blob/master/2%20sensors.ino

26 Literature Review

In this task, you are required to write a literature report on the following topic Related Research on Using PIR Motion Sensors for Activity Detection.

Outcome	Weight
ULO2	♦♦♦◊◊

this task allowed me to go into depth about the motion sensors and what the current study is about

Outcome	Weight
ULO3	♦♦♦◊◊

this task allowed me to go into depth about the motion sensors and what the current study is about

Date	Author	Comment
2019/09/06 11:32	Sharma Satvik	need to research some more for a good report
2019/09/16 11:33	Sharma Satvik	still short of wrod limit and need to find more papers on the topic. please grant me the last extension
2019/09/16 12:38	Mahdi Babaei	no more extensions will be given for the task 7.5 and before. Please submit and it will be marked as a part of your portfolio.
2019/10/14 07:06	Sharma Satvik	Ready to Mark
2019/10/14 07:06	Mahdi Babaei	Time Exceeded

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Literature Review

Submitted By:

Sharma SATVIK
sharmasat
2019/10/14 07:06

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦♦◊◊
ULO3	♦♦♦◊◊

this task allowed me to go into depth about the motion sensors and what the current study is about

October 14, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 7.4HD Literature Review

Student Name: Satvik Sharma

Student ID: 218595095

Using PIR motion sensors for activity detection

Many different kinds of activities are put to analyse motion portrayed by living or non-living. Some of them are motion sensors or camera-surveyed environments. In this report, the detection of activity by PIR motion sensors is discussed. As written in the journal '*Detection of (In)activity Periods in Human Body Motion Using Inertial Sensors: A Comparative Study*' monitoring human motion using cameras has shown to be very effective in representing human activities, but has issues with privacy and limitation of its application to closed space [1]. Therefore, many researchers use PIR motion sensors to capture the activity. Some simple wearable sensors to measure human motion are mechanical pedometers or in layman language '*step counters*' which uses a simple spring-loaded mass or some other switch mechanism to detect the obvious impacts produced by steps during locomotion [2].

Since CPS is an upcoming field and needs a lot of research so as to get new devices to make the living much smarter, a research needs to be done on it, answering the questions related to much better working of sensors. The PIR motion sensor, the topic for this report, is a vast topic and needs a research in depth. The main focus of this report will be to analyse the challenges faced today by the motion sensors, where the researchers stand today and what kind of future research should be about. This research will also include the experimental methods used and theoretical foundations, the results and unresolved issues.

The first research to be discussed will be based on the journal '*A review of accelerometry-based wearable motion detectors for physical activity monitoring*' written by Che-Chang Yang and Yeh-Liang Hsu. In their paper they discuss the use of accelerometers, which are basically sensors which measure the accelerations of objects in motion along reference axes and it is preferred because acceleration is proportional to external force and is thus related to intensity and frequency of human movement. Some of the accelerometers widely used are sense wear, CT1, RT3, AMP331 et cetera. Sense wear armband is an activity monitor worn on upper limbs to measure physical activities. CT1 and RT3, both developed by stayhealthy.inc, can be worn on waist with a clip, in which the CT1 is the calorie tracker and RT3 is piezoelectric triaxial accelerometer. There are many more devices that are used to track human activity and are wearable devices. All in all, the accelerometers can be useful for cadence, stride length, walking speed, risk of falling and mobility level. Moreover, it can be used by elderly for detecting unusual movement or personal emergency response system.in

future, the wearable accelerometers can be integrated with the '*health smart home*' monitoring systems. Moreover, the data collected can be used to synchronize with activity of daily living and for better description of activities such as human mobility, physical activity, behavioural pattern, and parameters regarding the overall health status of an individual.[3]

In another paper '*Integrating the enriched feature with machine learning algorithms for human movement and fall detection*', the detection of movement and fall has been discussed. According to a health report in Canada, around 30% of senior citizens fall each year and which can include injuries like broken or fractured bones, tissue damage et cetera [5]. Previous studies consisted on the features, like the triaxial acceleration data, the fusion of acceleration data like relation between axes, energy and standard deviation, and features selected by selection and reduction methods [4]. Machine learning algorithms or simple comparison methods are used to classify the activities from the data acquired from sensors, in which the machine automatically learn and recognize complex patterns and make intelligent decisions based on samples. There are mainly four main types of machine learning, namely supervised learning, unsupervised learning, semi supervised learning, and reinforcement learning. The most commonly used learnings are, K nearest neighbour algorithm (KNN) and Back propagation neural net-work (BPNN) algorithm. KNN method is used to classify objects based on closed training examples in feature space. The BPNN method is a way of propagating the total loss back into the neural network to know how much of the loss every node is responsible for and subsequently updating the weights in such a way that minimizes the loss by giving the nodes and vice versa. The paper basically presents a framework for human activity recognition using machine learning algorithms with experiments designed to distinguish between active or inactive manner et cetera [5].

Use of motion sensors in healthcare can prove to be a very useful as described in the paper, '*review of cyber-physical system in healthcare*', since there are not many papers concerning the use of CPS for healthcare and it is a need for different components. The use of the sensors can be very advantageous. Some advantages include network integration, interaction between human and system, dealing with certainty, better system performance, scalability and many more. The research on CPS in healthcare is still in progress. The use of devices such as sensors and smart feedback system can help in the effective decision making. The present CPS concepts lack complete architectural frameworks. The CPS can offer assistance to hospitals, elderly people or age cares. The applications are mainly divided into two parts, assisted and controlled. The assisted applications consist of monitoring the health without the restrictions in the daily life of the patient. Computing technologies can offer interesting opportunities for in-house safety and autonomy such as ANGELAH. Controlled environment consists of medical faculty readily available at all times and the observation is high and intense and the data is collected with the help of bedside monitors, biosensors and clinical observations. The combination of the two can transform the healthcare entirely. The physical entity is performed by the sensing as the sensed values are used as input parameter to the system. the elements described are sensor type, method and parameter. The number and types of sensor can vary a lot. There can be one sensor for a group of people and there can be multiple sensors for a single person. Sometimes, the sensor can even report abnormal data and thus is required to check all the sensors from time to time. The method used for sensing can affect whole of the experiment. The parameter specification helps in the better computation and communication. Since it is an ongoing research, there are certain challenges faced today. The main challenges are lack of CPS standard, lack of verification and validation

tools, and time management in architectural design. In conclusion of this paper, the authors have said that few research efforts have been performed in this area [6].

While surfing, there was one article regarding the gesture recognition using the wearable motion sensors which was written by Jian Wu and Roozbeh Jafari. In that particular article, IMUs or the inertial measurement units are used to detect the activity. The algorithms used normally require the information or data about the orientation and placement of the IMUs and the signal processing is often designed to work with a known orientation and placement of sensors. However, different people can wear the IMUs differently, which can alter the working of the sensors due to change in orientation and placement. This can further lead to the sensor not performing as good as it should work, even if the sensor is new. The experiments conducted by the authors showed that the approach achieved 98.2% and 95.6% accuracies. According to the paper, the feature set and the signal processing algorithm have been proposed for the first time and addresses several important challenges such as sensor orientation variations, movement speed variations and the inconsistent segments present in some movements. An approach has been proposed according to which when the activity is detected the time is calculated. The movement's speed is an interesting context for pervasive computing applications as we can infer if the person is in a hurry or is tired. The limitation of the approach is that the authors used only two sensors to recognize the challenges and different subjects have different activity templates which decreases the cross-subject classification performance. Their future work will enhance the recognition accuracy of the algorithm to cover a large number of movements using only one sensor [7].

In another paper, similar to the upper one, wearable motion sensor like the smart watch to detect the figure gesture has been described. They have created an experiment, according to which the smart watch can detect five finger gestures, namely nip, press, shake, beat, and curve. The data comes from three sensors which are, accelerometer, linear accelerometer and gyroscope. The finger gesture is recognized using basic classifiers such as k-NN or k-Nearest Neighbors, naïve bayes classifier, logistic regression, random forest, discrimination analysis classifier and decision tree classifier. Even the author feels that the work needs to be improved in this journal like more and more finger gestures are needed to be gathered, now we have only 5 simple gestures, we should design some gestures that are easy to perform and easy to distinguish. We may utilize recognition results to control some electrical appliances in real world. The author concludes the article, saying that he used the data from integrated motion sensors embedded in smartwatch to study tiny finger gestures recognition [8].

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27 Interactive visual story telling

Develop an interactive visualisation dashboard, or interactive visualisations framed as an animation to demonstrate a visual story telling scenario. You may use your collected data and add other data available on open data portals to develop and form your story. Your story should include at least four visualisations that change according to the choices and selections made on each other. You can use Tableau, or other visualisation tools or programming scripts like D3js.

Outcome	Weight
ULO2	♦♦◊◊◊

this task allows the students to get into depth about visualizations

Outcome	Weight
ULO3	♦♦◊◊◊

this task allows the students to get into depth about visualizations

Date	Author	Comment
2019/09/06 20:01	Sharma Satvik	i need some clarity on this task
2019/09/13 16:42	Sharma Satvik	Ready to Mark
2019/09/22 12:08	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Interactive visual story telling

Submitted By:

Sharma SATVIK
sharmasat
2019/09/13 16:42

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊

this task allows the students to get into depth about visualizations

September 13, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 7.5D interactive visual story telling

Student Name: Satvik Sharma

Student ID: 218595095

Q1.What is the story? What is the question it is trying to answer?

The story in the visualization is about the increase of population in the greater geelong area from the year 2011 to 2051. The second one tells the financial back of the people residing in the area with their average salaries. And finally the last one shows the details about the schools and colleges the kids in the families have as their option.

Q2. Develop your visualisations in Tableau (or by other means) and provide a narrative on the series of visualisations and how they relate to each other and the story.

the first one tells the population in each of the area and how it is going to change over the course of years. The second one tells the financial conditions in the form of salary earned by people in the different fields. Last one shows the options of schools in the area. the people move from one area to the second one during the course of years due to the wages they are earning and the i=options they have to send their kids to school.

Q3. How does the interaction help you explore the data and story better?

the interaction allowed to easily understand the data and much more efficiently and not going into the figures directly. The story is intertwined with the population increase in the geelong area to salary earned by them and what kind of education their kids are going to receive. These visualizations help to make the choice easily.

Q4. Publish your visual story (if developed by Tableau) online and copy a link to it here. If you have used other means than Tableau, host your visualisation on github and give us the link below.

1. <https://github.com/satviksharmase/visualizations/blob/master/population.twb>
2. https://github.com/satviksharmase/visualizations/blob/master/school_visualization.twb
3. https://github.com/satviksharmase/visualizations/blob/master/school_visualization.twb

28 Team Project, Sprint 1: Pitch

Using your understanding of Cyber-Physical Systems Design, present a project idea in a brief presentation, or a pitch in the first day of the Sprint. Your project should solve a problem within the area of smart living.

Outcome	Weight
ULO2	♦♦◊◊◊

this task allows the students to learn about the professional presentation and how to deliver a pitch

Outcome	Weight
ULO3	♦♦◊◊◊

this task allows the students to learn about the professional presentation and how to deliver a pitch

Date	Author	Comment
2019/09/13 20:58	Sharma Satvik	still confused about the submission and need to discuss so as to submit it asap
2019/09/23 11:15	Sharma Satvik	formatting the ppt
2019/09/23 11:53	Sharma Satvik	Ready to Mark
2019/09/23 11:53	Mahdi Babaei	Time Exceeded
2019/09/27 15:56	Mahdi Babaei	Ready to Mark
2019/09/27 19:15	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Team Project, Sprint 1: Pitch

Submitted By:

Sharma SATVIK
sharmasat
2019/09/23 11:53

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◇◇◇
ULO3	♦♦◇◇◇

this task allows the students to learn about the professional presentation and how to deliver a pitch

September 23, 2019



SIT107: SOFTWARE ENGINEERING 1: CONNECTING THE CYBER AND PHYSICAL WORLDS

Task 8.1 Team Project, Sprint 1: Pitch

Name: satvik sharma

Student ID: 218595095

The link for the video is <https://youtu.be/Kl2ZU9KnwsQ>

29 Team Project, Sprint 1: Demo & Presentation

The goal of the sprint is for you to implement a proof-of-concept prototype of a project idea, as a group. You do not have to complete a fully functional system for the hackathon. At the end of the sprint you must show a prototype, and present your progress.

Outcome	Weight
ULO2	♦♦◊◊◊

ulo2: this task allowed us to learn more about coding and all that stuff that is used in professional software engineering ulo3: this task allowed us to learn about using the sensors in professional practices

Outcome	Weight
ULO3	♦♦◊◊◊

ulo2: this task allowed us to learn more about coding and all that stuff that is used in professional software engineering ulo3: this task allowed us to learn about using the sensors in professional practices

Date	Author	Comment
2019/09/12 21:00	Sharma Satvik	we are still confused about this task and need some clarification related to this
2019/09/13 20:59	Sharma Satvik	still confused and need to discuss so as to submit the task properly
2019/09/16 11:13	Mahdi Babaei	You better ask your questions and i will be more than happy to answer
2019/09/23 11:15	Sharma Satvik	formatting the ppt
2019/10/12 14:25	Sharma Satvik	Ready to Mark
2019/10/12 14:25	Mahdi Babaei	Time Exceeded

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Team Project, Sprint 1: Demo & Presentation

Submitted By:

Sharma SATVIK
sharmasat
2019/10/12 14:25

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊

ulo2: this task allowed us to learn more about coding and all that stuff that is used in professional software engineering
ulo3: this task allowed us to learn about using the sensors in professional practices

October 12, 2019



SIT107 - Software Engineering 1: Connecting The Cyber And Physical Worlds

Task 8.2C Team Project, Sprint 2: demonstration

Name: satvik sharma

Id: 218595095

<https://www.youtube.com/watch?v=uAIIewL6IYk>



30 Employability Task 2

Using the STAR technique, you are required to explain which skills you have developed in this unit and the recent Sprint, identifying 4 key skills and writing a brief statement for each of them (no more than 100-150 words each).

Outcome	Weight
ULO2	♦♦◊◊◊

this task allows the student to know about the strengths they have and what they are going to show while applying for a job

Outcome	Weight
ULO3	♦♦◊◊◊

this task allows the student to know about the strengths they have and what they are going to show while applying for a job

Date	Author	Comment
2019/09/13 20:44	Sharma Satvik	Ready to Mark
2019/09/22 13:25	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Employability Task 2

Submitted By:

Sharma SATVIK
sharmasat
2019/09/13 20:44

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◊◊◊
ULO3	♦♦◊◊◊

this task allows the student to know about the strengths they have and what they are going to show while applying for a job

September 13, 2019



SIT107: SOFTWARE ENGINEERING 1: CONNECTING THE CYBER AND PHYSICAL WORLDS

Employment in Software Engineering Task 2

Name: satvik sharma

Student ID: 218595095

s.no	Key skill		Articulating skills
1	teamwork	Trimester 1 sej101 design fundamental	this was the second assessment in this unit and I was in a group of different people with different mindset and different creative skills
		Group project to make an agriculture farm	we had to decide what kind of farm we were going to use and then decide which person was going to do what in the task
		I had to make 3D models on AutoCAD inventor	My task was to create a 3D model of the farm with all the solar panels.
		Result	Being in the group with a different kind of people with different mindsets and coming to a common conclusion taught me how to be a good member of the team
2	Working under pressure	SIT103 data and information management	The first assessment of this unit was a complex one because there were four questions and with a word limit and minimum number of citations each answer should consist of

		Assessment consisting 1900-word limit	The assignment's questions all had a word limit and consisted of reading at least 50 of journals to write the journals.
		Completing the assignment in 2 days and 1 night	The assignment was completed before the due date and helped me learn so much stuff that I had not learnt before, such as writing commands for the databases
		Submitted the assignment with 12 hours still on the clock	this was a pressure task as it was difficult to complete this one along with other units and taught me how to work under pressure and moreover how to work gradually so that the tasks are not left behind
3	Questioning/investigation	Murder mystery task	this task was made to design and test students to investigate and question the data given already in the task sheet so as to find the murderer
		Identifying the murderer	The .gap files were given and the murderer was to be identified among the 2 of the murderers given.
		Analysing the data	the data was analysed and evidences such as the map data, speed data, et cetera was evaluated
		Murderer found	The murderer was found with the help of 3 evidences and allowed me to strengthen my investigating skills.

4	written communication	SEB101 engineering physics written reports	in trimester 1, I was a new student to this university and didn't know anything about referring things and how to write a proper lab report
		Doing the experiment and writing all the lab report explaining each and every detail	the experiment was done in the lab and all the readings were marked. Then the students were given one weeks' time to write a report on the experiment conducted.
		Learnt how to write proper lab reports according to the university standards	A lab report is written in a proper format and with a proper grammatical manner so as to make the report look much better. Moreover, the report allowed to strengthen my writing
		Communicated what I wanted	Initially struggled how to write a proper report and thus gradually learnt how to write a proper report and now I am able to communicate what I want to explain with my words

31 Project 1: Data Visualisation

Use your understanding of data visualisation and the introduced tools to visualise the data you have collected so far. We will be using Tableau during the studio. You will be using Tableau to develop your data visualisation.

Outcome	Weight
ULO1	♦♦◊◊◊

ULO1: the collected data is represented as a visualization and makes it easier to understand ULO2: the collection and its representation and the types of data used, makes the user to understand about the task

Outcome	Weight
ULO2	♦♦◊◊◊

ULO1: the collected data is represented as a visualization and makes it easier to understand ULO2: the collection and its representation and the types of data used, makes the user to understand about the task

Date	Author	Comment
2019/09/02 11:47	Sharma Satvik	Ready to Mark
2019/09/02 12:36	Mahdi Babaei	Fix and Resubmit
2019/09/02 12:37	Mahdi Babaei	choose different dataset. there are no changes in these files !
2019/09/02 12:59	Sharma Satvik	Ready to Mark
2019/09/08 22:19	Mahdi Babaei	Complete

DEAKIN UNIVERSITY

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Project 1: Data Visualisation

Submitted By:

Sharma SATVIK
sharmasat
2019/09/02 12:59

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO1	♦♦◊◊◊
ULO2	♦♦◊◊◊

ULO1: the collected data is represented as a visualization and makes it easier to understand ULO2: the collection and its representation and the types of data used, makes the user to understand about the task

September 2, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for 4.1C Project 1: Project Implementation

Student Name: Satvik Sharma

Student ID: 218595095

Q1. What data types can you identify in your collected data?

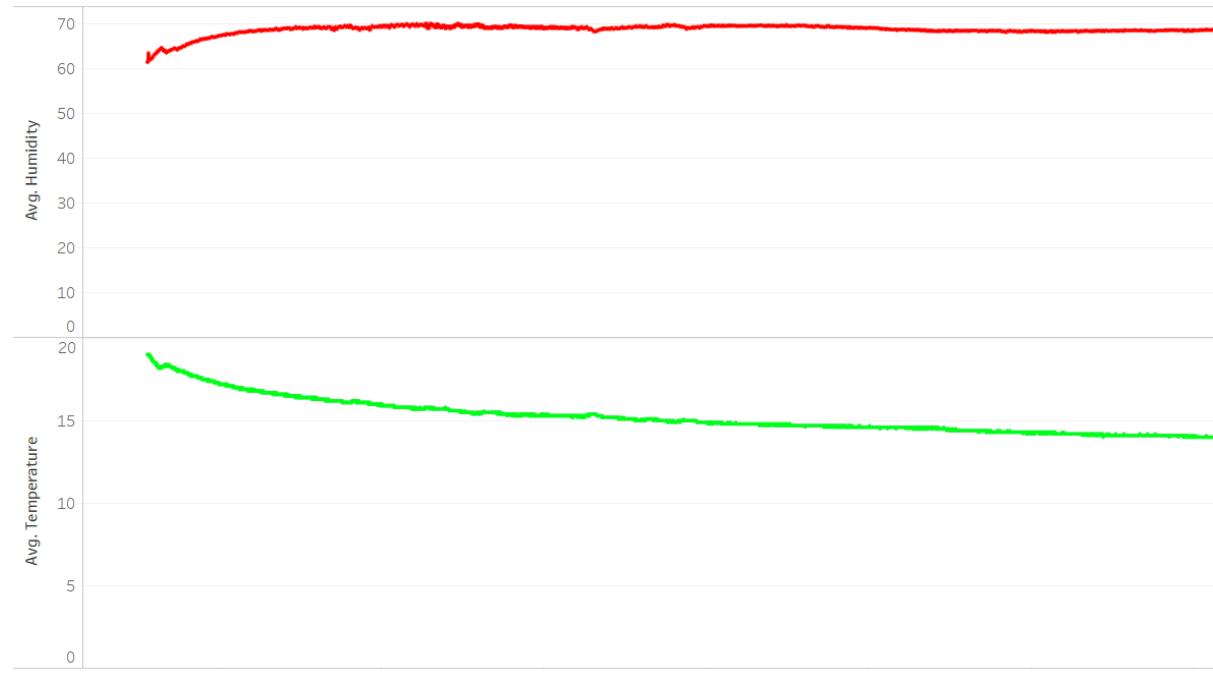
Use the information provided in the lecture, and identify the different data types available in your datasets. There were Boolean data, which was basically active or inactive status for motion sensor. There was a data type float which included the real numbers. There were foreign keys and primary keys such as row ID et cetera.

Q2. Using your understanding of the collected data (the data you have collected in weeks 2 and 3), identify which visual variables are suitable to be used with your data. Provide details of the visual variables and your justification here.

The variable will be humidity and temperature at certain points in time. The average of variables for each hour and plotted on line graph. The variables will include date/time and float data to measure both variables of temperature and humidity.

Q3. Design a visualisation in Tableau to visualise your data. Your visualisation does not necessarily need to include all the visual variables you have listed in Q2. It should however be easy to understand, and have a clear message. Provide a screenshot of your visualisation here.

Sheet 2



32 Team Project: Ethics Report

In this task you are required to analyse your project for possible ethical concerns. Assume your project has been fully implemented and is being used by the clients across the globe. In this scenario, investigate who are the stakeholders, what are the facts about your project and what ethical concerns exist.

Outcome	Weight
ULO1	♦♦♦◊◊

this task allows the student to understand how the product can be ethically appropriate

Date	Author	Comment
2019/09/23 11:15	Sharma Satvik	Formatting the ppt
2019/10/13 22:06	Sharma Satvik	Ready to Mark
2019/10/13 22:06	Mahdi Babaei	Time Exceeded

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Team Project: Ethics Report

Submitted By:

Sharma SATVIK
sharmasat
2019/10/13 22:06

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO1	◆◆◆◇◇

this task allows the student to understand how the product can be ethically appropriate

October 13, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for Team Project: Resolving Ethical Concerns OR Visual Analytics

Group members

Satvik Sharma (218595095)

Ishan Vij (219056862)

Q1. Who are the stakeholders affected?

- Employees
- Government
- Developers
- Customers

Q2. What are the facts? The facts are information about your project. Do not copy and paste your project description. Rather your facts should be a numbered list of summarized, relevant points.

1. The fact is that the prototype is energy efficient and will reduce the wastage of natural resources like water and electricity.
2. The fact is that this system upgrades the existing devices like bulbs, light and taps at homes using latest technology to make them automatic.
3. The fact is that this system is very hygienic and time saving.
4. The fact is that our system will record the data using the sensors and then upload it in the company's servers.

Q3. Which facts raise ethical concerns? Why?

The fact that the data recorded from these sensors will be uploaded directly to the company's server raised some ethical issues like:

Security: As the data is getting stored in online servers so it becomes very vulnerable to hackers and hackers can easily access that data and do frauds. Hackers can use the stored data to watch your

movement at home and create algorithms using that data to find a perfect timing to attack you or your house.

Increased Pressure on IT experts: Since the data is regular getting stored on the servers in real-time so pressure is mounted on IT experts to ensure accuracy and check any uncertain movements detected. Many IT departments work 24 hours to maintain the network and servers which can cause mental pressure and stress.

Privacy Issues: The servers can be hacked and the devices can also be hacked as they are connected to the servers. So, hackers can even tamper the devices to annoy or disturb the user. Moreover, this leads to privacy issues and privacy of many people can be leaked.

Wastage of resources: There are chances of occurrences of false alarm due to which electricity and water can be wasted. For example, if some person goes for a holiday trip and the devices detect false motion then this can cause wastage of resources.

Q4. What guidance (if any) does the Australian Computer Society's code of ethics and professional practice provide in this situation?

1. **The Primacy of the Public Interest:** The Company tries to give more importance to public's interest than any personal or business interests. The company tries to bring more innovation and tries to reduce the cost of the product without compensating the quality of product.
2. **The Enhancement of Quality of Life:** This technology tries to enhance the quality of life of the users and moreover helps people who are disabled. Automatic devices make life easier and hygienic.
3. **Professional Development:** All of our group members are regularly searching for new and various different kinds of technology to upgrade and update our model. We are finding various ways to increase relations with the users.
4. **Honesty:** The main priority of the team is to provide security to users and not let their data breach. We will never sell any data to any person or any company. Provide realistic information to the users and not provide false information to users. Credit is given to every member and even those people who gave us some kind of inspiration or knowledge.

Q5. How would you resolve the ethical issues identified in question (3) above? Justify your decision.

To prevent data getting hacked or tampered by hackers the data can be encrypted before uploading to the servers. User's permission should be asked before upload any kind of data from the sensors and the data should be deleted from the servers after every month.

Various algorithms can be made using the existing data collected from sensors which can detect any unobvious motion which will have to release pressure from the IT department.

A manual switch can be alongside with the automatic devices to switch off the whole model of smart washroom so that if someone is going for a vacation, he/she can switch off the system to make the true positive rate 100%.

Q6. How are each of the stakeholders listed in question (1) above affected by your decision?

1. **Developers:** They will be responsible for any malfunctioning or defect in their product. They are the ones who have to regularly update their servers to prevent any data breaches.
2. **Customers:** It is the customer for which companies make new products. Customers are the people who keep running all the business. After the decisions made customer which have the power to store data on servers on not and if yes then the data will be encrypted first before uploading. The customers will be affected in both ways:
 - Like if the system works then their life will become easier.
 - But if some breaches occur as nobody can give 100% assurance or protection from online attacks, so eventually they will suffer.
3. **Employees:** The life of employees depends upon the company and production of the product. Employers who work in the companies making traditional bulbs and lights may lose their jobs while people working in new companies making automatic lights and taps will get a good livelihood.
4. **Government:** Government has some rules and regulations that every company has to follow to sell their products like user's security, protection user's privacy and many more. Government also penalizes companies if they don't follow the guidelines as they can harm people's human and fundamental rights.

33 Team Project: Resolving Ethical Concerns OR Visual Analytics

For this task you have two options. You can either resolve the ethical issues you have identified in task 9.1C and integrate them into your project, OR you can implement visual analytics into your project.

Outcome	Weight
ULO1	♦♦♦♦◊

this task allowed us to create a visualization which made it much easier to understand what we were trying to create in our prototype

Outcome	Weight
ULO2	♦♦♦◊◊

this task allowed us to create a visualization which made it much easier to understand what we were trying to create in our prototype

Outcome	Weight
ULO3	♦♦♦◊◊

this task allowed us to create a visualization which made it much easier to understand what we were trying to create in our prototype

Outcome	Weight
ULO4	♦♦♦◊◊

this task allowed us to create a visualization which made it much easier to understand what we were trying to create in our prototype

Date	Author	Comment
2019/09/23 11:16	Sharma Satvik	frmatting the ppt
2019/10/13 22:08	Sharma Satvik	Ready to Mark
2019/10/13 22:08	Mahdi Babaei	Time Exceeded

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

**Team Project: Resolving Ethical Concerns OR
Visual Analytics**

Submitted By:

Sharma SATVIK
sharmasat
2019/10/13 22:08

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO1	♦♦♦♦◊
ULO2	♦♦♦◊◊
ULO3	♦♦♦◊◊
ULO4	♦♦♦◊◊

this task allowed us to create a visualization which made it much easier to understand what we were trying to create in our prototype

October 13, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for Team Project: Resolving Ethical Concerns OR Visual Analytics

Group members

Satvik Sharma (218595095)

Ishan vij (219056862)

smart washrooms

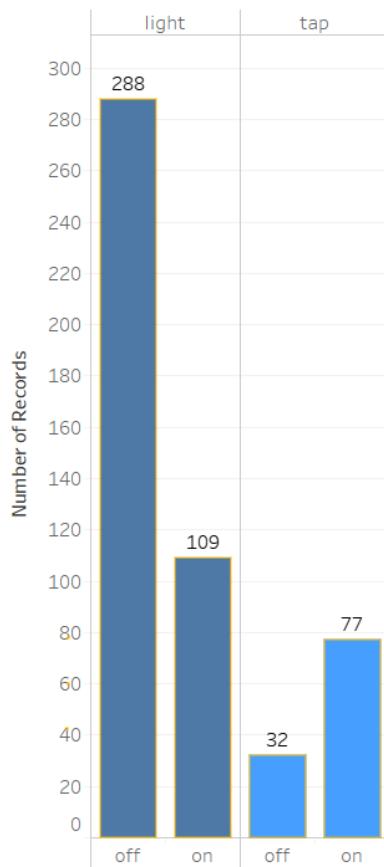
my hypothesis: the motion sensors will detect the motion and will turn the light on and the tap can only pour water only if the light is on and the sensor detects the motion

H_0 : the motion will be detected in both the sensors and the tap sensor will only start working if the motion is detected by the light sensor

H_1 : the motion will not be detected and the water can still run even if the light is not turned on

Visualization:

smart taps and smart washrooms



In the above visualization, the data showing the turning on and off the light and tap are shown. There were 288 recording where the light was turned off and 109 times the light was on. When the total number of observations in the tap bar graph are added up, it shows 109 which means that tap only worked if the light was turned on. Moreover, the tap was turned off for 32 observations and turned on for 77 observations.

The data collected for this particular task is given below in the link

<https://github.com/satviksharmase/groupproject/blob/master/data.txt>

the visualisation and collection of data showed that the idea works pretty good and everything is displayed with the prototype that we wanted it to show.

Hypothesis turned out to be true. The motion was detected properly and the tap sensors only worked when the light motion sensor detected any movement around it. The H_1 or the alternate hypothesis turned out to be false

The visualization link is given below

<https://github.com/satviksharmase/groupproject/blob/master/task%209.2.twb>

34 Help Others

Use your advanced understanding of the material in this unit to help others. This is a long running task for the duration of the unit. In this time, demonstrate ongoing support for your fellow students. You can help out on the discussion board, at the programming help hub, or in other ways.

Outcome	Weight
ULO2	♦♦◊◊◊

this task allowed me to understand how to mentor others on the tasks and also cleared some of my concepts as well

Outcome	Weight
ULO3	♦♦◊◊◊

this task allowed me to understand how to mentor others on the tasks and also cleared some of my concepts as well

Date	Author	Comment
2019/09/13 20:54	Sharma Satvik	Ready to Mark
2019/09/16 11:51	Mahdi Babaei	Complete

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Help Others

Submitted By:

Sharma SATVIK
sharmasat
2019/09/13 20:54

Tutor:

Mahdi BABAEI

Outcome	Weight
ULO2	♦♦◇◇◇
ULO3	♦♦◇◇◇

this task allowed me to understand how to mentor others on the tasks and also cleared some of my concepts as well

September 13, 2019



SIT107: Connecting the Cyber and Physical Worlds

Task 1.3D Helping Others

name: satvik sharma

ID:218595095

I helped a student Ishan vij regarding task 6.4 and cleared where to get the data from and what should the format of task be

Task 6.4 help

ISHAN VIJ,
i used <https://data.gov.au/> and <https://data.vic.gov.au/> to retrieve the data.
i explained my story and interconnected each and every detail in my visualization and then posted the screenshots of it.
i hope u find it useful.
regards
satvik sharma

Discover and access Victorian Government open data

Victoria's Developer community has a fantastic new resource available with the recent release of the Whole of Victorian Government API Design Standards that focuses on RESTful API's.

data.vic.gov.au

...



ISHAN VIJ
Fri 13/09/2019 7:56 PM
SATVIK SHARMA



Task 6.4

Can you explain the basic structure of task 6.4 and from where did you got the data

Another student I helped was eamon o'connor in the student discussion board regarding how to edit a pdf

				Editing PDF	EAMON O'CONNOR	10 July, 2019 9:30 PM
				Editing PDF	SATVIK SHARMA	11 July, 2019 8:17 AM
				Editing PDF	EAMON O'CONNOR	11 July, 2019 12:29 PM

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SATVIK SHARMA 11 July, 2019 8:17 AM

first download the task sheet and then right click on it and select 'open with' and select word and then edit it.

alternatively one can edit with google docs.

35 Team Project, Sprint 2: Pitch

Your project should solve a problem within the area of smart living by extending 8.1C

Outcome	Weight
ULO2	♦♦♦◊◊

this task tells how to deliver a pitch

Outcome	Weight
ULO3	♦♦♦◊◊

this task tells how to deliver a pitch

Date	Author	Comment
2019/10/08 23:10	Sharma Satvik	Ready to Mark
2019/10/08 23:10	Mahdi Babaei	Time Exceeded
2019/10/08 23:10	Sharma Satvik	Ready to Mark
2019/10/08 23:10	Mahdi Babaei	Time Exceeded

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Team Project, Sprint 2: Pitch

Submitted By:

Ishan VIJ
ivij

Tutor:

Mahdi BABAEI

Group Members:

sharmasat	Sharma	SATVIK	★★★
ivij	Ishan	VIJ	★★★

Outcome	Weight
ULO2	♦♦◇◇◇
ULO3	♦♦◇◇◇

this task tells how to deliver a pitch

October 13, 2019



Software Engineering Connecting the Cyber and Physical Worlds

Name Ishan Vij

Student Id: 219056862

Task 10.1

Link for Youtube video: <https://www.youtube.com/watch?v=eTeVaZEQGnw&feature=youtu.be>

36 Team Project, Sprint 2: Data collection

Implement 10.1 to collect relevant data for your project

Outcome	Weight
ULO2	♦♦♦◊◊

this task allowed us to go deeper into the project that we were working on

Outcome	Weight
ULO3	♦♦♦◊◊

this task allowed us to go deeper into the project that we were working on

Date	Author	Comment
2019/10/14 05:46	Sharma Satvik	Ready to Mark
2019/10/14 05:46	Mahdi Babaei	Time Exceeded
2019/10/14 05:46	Sharma Satvik	Ready to Mark
2019/10/14 05:46	Mahdi Babaei	Time Exceeded

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Team Project, Sprint 2: Data collection

Submitted By:

Sharma SATVIK
sharmasat

Tutor:

Mahdi BABAEI

Group Members:

sharmasat	Sharma	SATVIK	
ivij	Ishan	VIJ	

Outcome	Weight
ULO2	♦♦♦◊◊
ULO3	♦♦♦◊◊

this task allowed us to go deeper into the project that we were working on

October 14, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for task 10.2 team project sprint 2:data collection

Group members

Satvik Sharma (218595095)

Ishan vij (219056862)

You tube link

<https://www.youtube.com/watch?v=Rq1JulsvkCM>

37 Team Project, Sprint 2: Data visualisation

Analyse and visualise the data collected in 10.2 for your project

Outcome	Weight
ULO1	♦♦♦◊◊

this task allows the student to understand much more deeply about the visualizations that can be used to display the data and how to make it easier to understand, without even reading the data

Outcome	Weight
ULO2	♦♦♦◊◊

this task allows the student to understand much more deeply about the visualizations that can be used to display the data and how to make it easier to understand, without even reading the data

Outcome	Weight
ULO3	♦♦♦◊◊

this task allows the student to understand much more deeply about the visualizations that can be used to display the data and how to make it easier to understand, without even reading the data

Date	Author	Comment
2019/10/14 06:13	Sharma Satvik	Ready to Mark
2019/10/14 06:13	Mahdi Babaei	Time Exceeded
2019/10/14 06:13	Sharma Satvik	Ready to Mark
2019/10/14 06:13	Mahdi Babaei	Time Exceeded

SE1: CONNECTING THE CYBER AND PHYSICAL WORLDS

ONTRACK SUBMISSION

Team Project, Sprint 2: Data visualisation

Submitted By:

Sharma SATVIK
sharmasat

Tutor:

Mahdi BABAEI

Group Members:			
sharmasat	Sharma	SATVIK	
ivij	Ishan	VIJ	

Outcome	Weight
ULO1	♦♦♦◊◊
ULO2	♦♦♦◊◊
ULO3	♦♦♦◊◊

this task allows the student to understand much more deeply about the visualizations that can be used to display the data and how to make it easier to understand, without even reading the data

October 14, 2019



SIT107 – Software engineering 1: connecting the cyber and physical world

Answers for task 11.1D data visualization

Group members

Satvik Sharma (218595095)

Ishan vij (219056862)

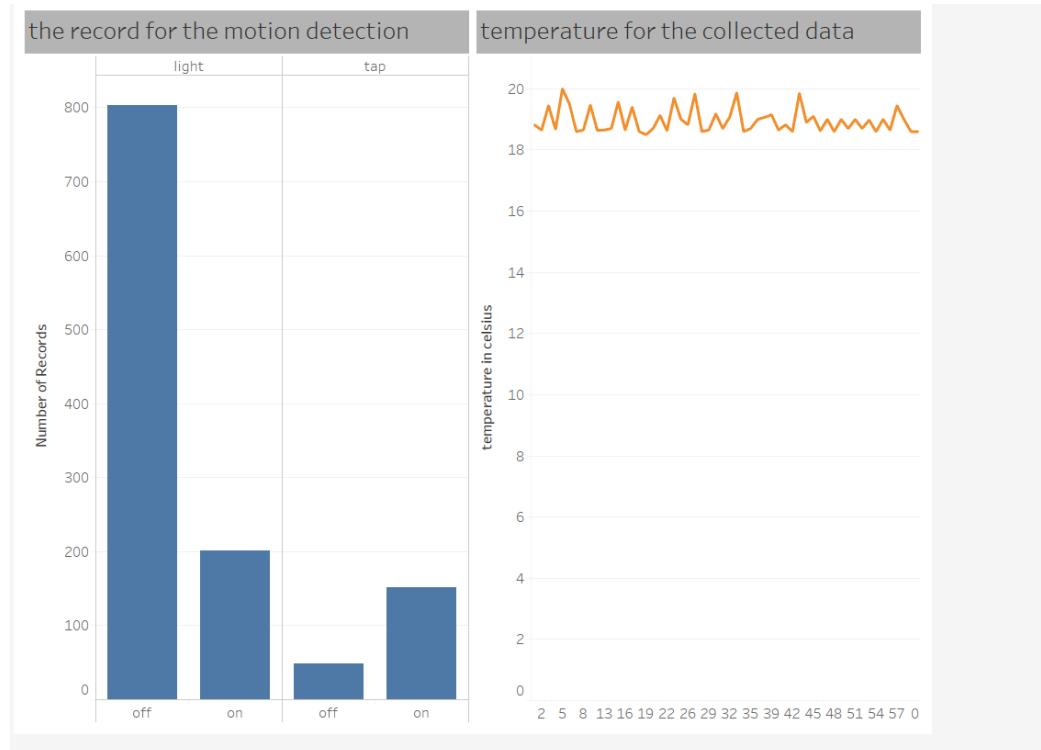
smart washrooms

my hypothesis: the motion sensors will detect the motion and will turn the light on and the tap can only pour water only if the light is on and the sensor detects the motion. Secondly the temperature of water will be displayed on the display

H0: the motion will be detected in both the sensors and the tap sensor will only start working if the motion is detected by the light sensor and the temperature will be displayed correctly

H1: the motion will not be detected and the water can still run even if the light is not turned on. Moreover, the temperature will not be displayed or will be incorrect

Visualization:



In this visualization, there were 803 off recordings for the light and 201 on recordings for the light. Further there were 49 off recordings and 152 on recordings for the tap sensor. The second graph showed the temperature average in a form of line graph and the temperature was varied between 18 and 20 degree Celsius. The total tap recording was 201, if counting both on and off records in the sensor. This means that the tap only worked when their motion sensor for the light was on which proves the hypothesis for this task. Further the temperature displayed was correct as it was checked from the mobile phone. The alternate hypothesis turned out to be false and thus show that the prototype is working fine.

This visualization allows the user to understand easily what's going on in this task without further reading the data and checking the each and every value displayed in the data

The data captured by the Arduino is given in the link below

<https://github.com/satviksharmase/groupproject/blob/master/data%20sprint%202.txt>

and the tableau worksheet where the visualization was created is given underneath

<https://github.com/satviksharmase/groupproject/blob/master/task%2011.1.twb>