Overseas Immersion Programme (OIP) 2021

Logbook

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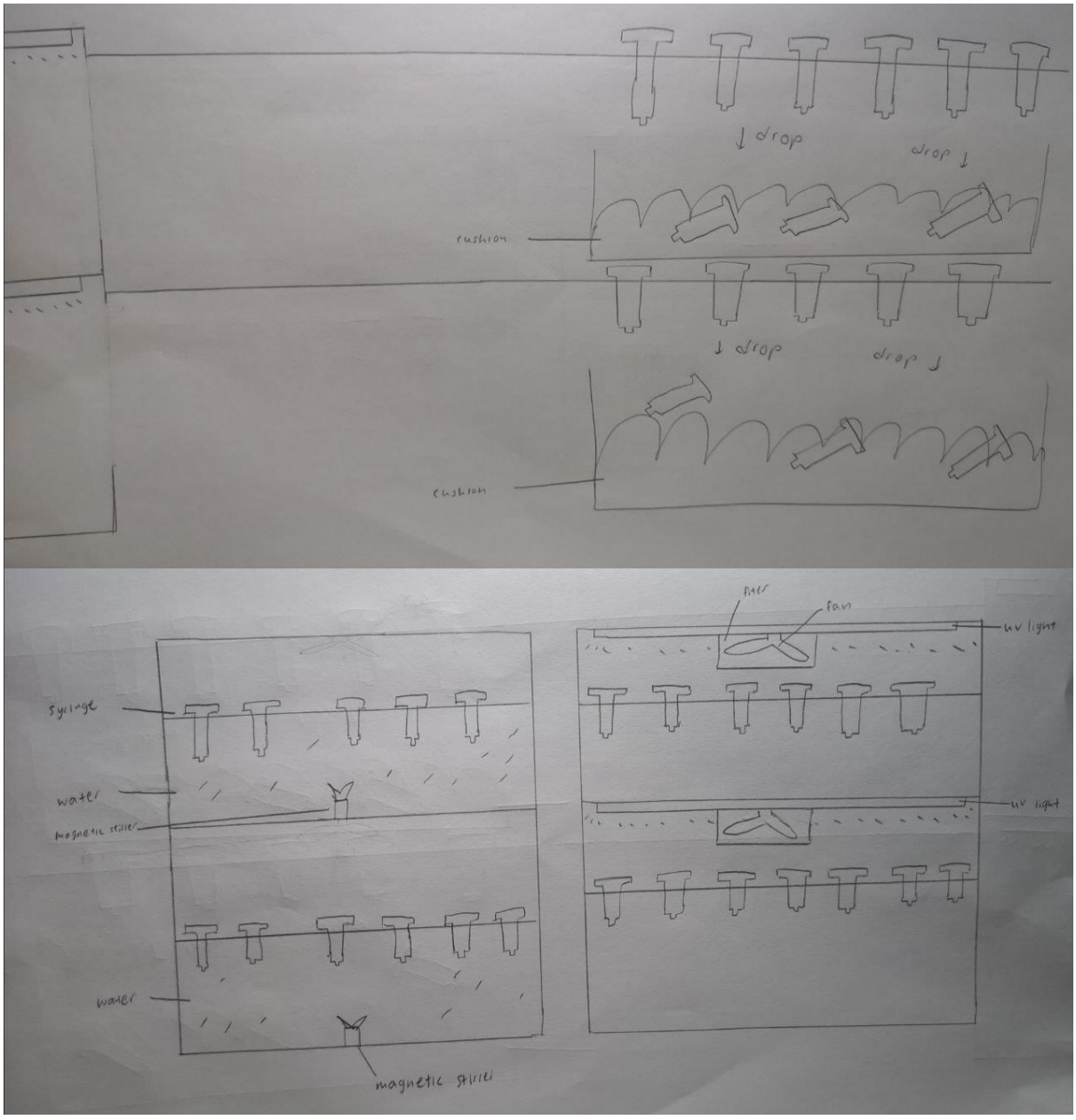
Week 1

Day 1 (16 Aug)

Deliverables

1. Researched on various kind of syringes and their properties
2. Getting started with the proposal
3. Researched on the efficiency between magnetic stirring verse ultrasonic cleaner for cleaning of syringes
4. Researched on smart features that can be adopted into the solution
5. Sketched prototype design



6. Created meeting minutes

Gathering found

1. Magnetic Stirrer is more efficient as compared to an ultrasonic cleaner for cleaning of plastic syringes as plastic syringes will tend to absorb some of the ultrasonic power, lessening the cleaning action.
2. Plastic Syringes melts at 176.667 degree celsius.

Day 2 (17 Aug)

Deliverables

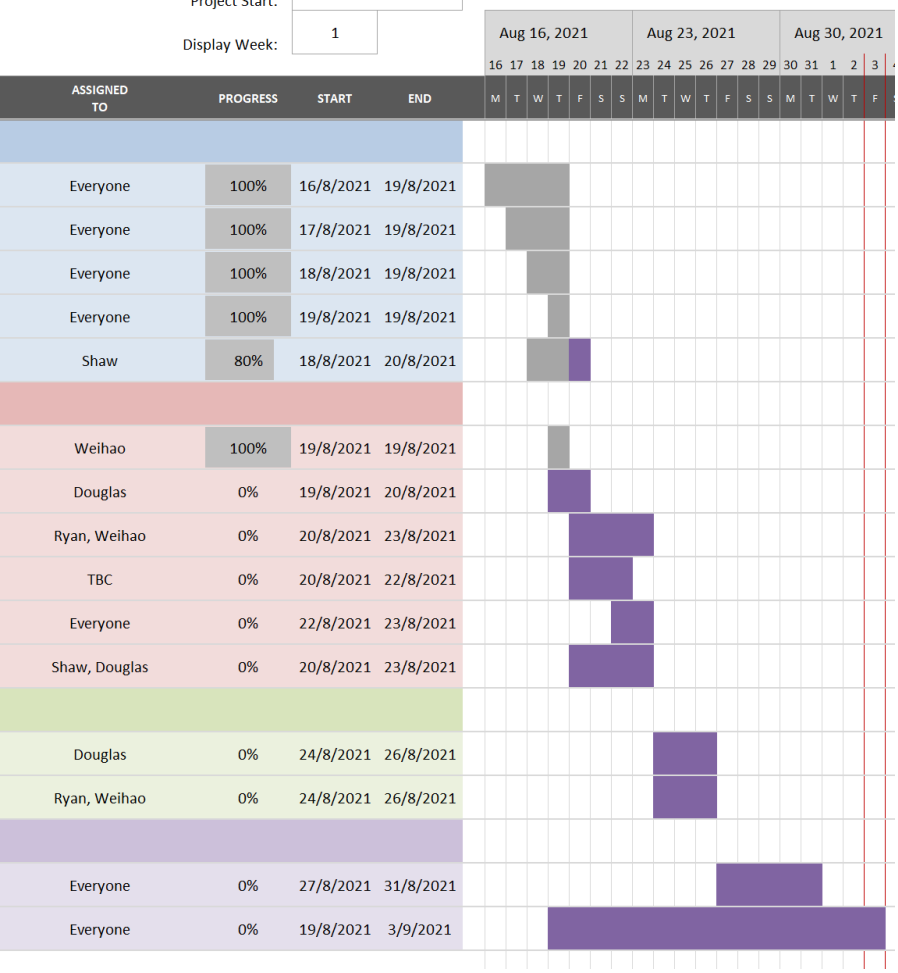
1. Drafted project schedule (Gantt Chart)

Smart 3-In-1 Santilizer

Oversea Immersion Programme
Team 27

Project Start: 16/8/2021
Display Week: 1

TASK	ASSIGNED TO	PROGRESS	START	END
Needfinding and Design Process				
Needfinding and QFD	Everyone	100%	16/8/2021	19/8/2021
Design Process Review	Everyone	100%	17/8/2021	19/8/2021
Q & A with Nursing Staff	Everyone	100%	18/8/2021	19/8/2021
Concept Evaluation	Everyone	100%	19/8/2021	19/8/2021
Drawing of Components in 3D	Shaw	80%	18/8/2021	20/8/2021
Project Development				
Telegram Notification	Weihao	100%	19/8/2021	19/8/2021
Testing of Water Pump	Douglas	0%	19/8/2021	20/8/2021
Machine Learning	Ryan, Weihao	0%	20/8/2021	23/8/2021
Program Logic	TBC	0%	20/8/2021	22/8/2021
User Interface	Everyone	0%	22/8/2021	23/8/2021
Device Compartment	Shaw, Douglas	0%	20/8/2021	23/8/2021
Project Integration				
Hardware Integration	Douglas	0%	24/8/2021	26/8/2021
Software Integration	Ryan, Weihao	0%	24/8/2021	26/8/2021
Documentation				
Production of Video	Everyone	0%	27/8/2021	31/8/2021
Production of Report	Everyone	0%	19/8/2021	3/9/2021



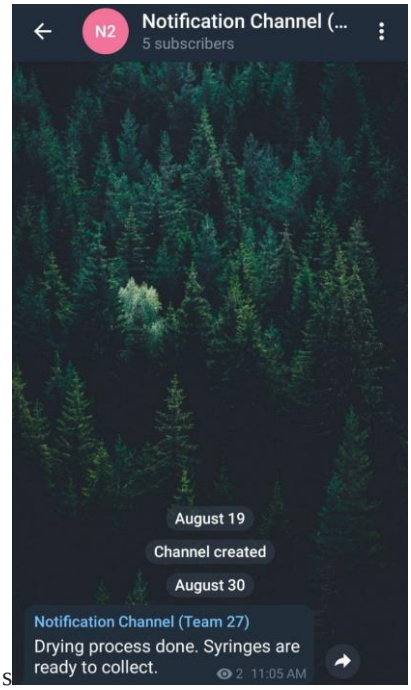
2. Presented prototype design
3. Discussion on proposal

Gathering found

1. The team internally picked the best two designs out of the five designs

Day 3 (18 Aug)

Deliverables

1. Conduct quality function deployment
2. Finalise on the selected design
3. Discussion with Professors on needfindings
4. Trying out on Telegram Notification – Python
5. s 

Gathering found

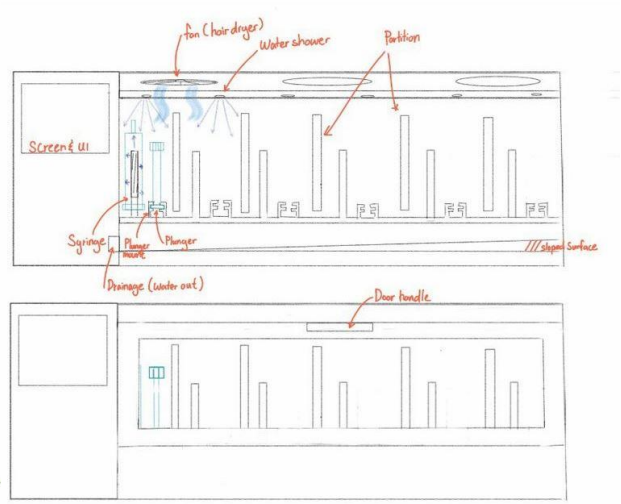
1. Device is safe to touch when temperature is below 48 degrees
2. Based on WHO (world health organisation), bacterial can be rapidly eliminated at a temperature of 65 degree celsius and above
3. There is a total of 25 patients in the nursing home from the given slides (NGT_Nursingexample_compressed.pdf)

Day 4 (19 Aug)

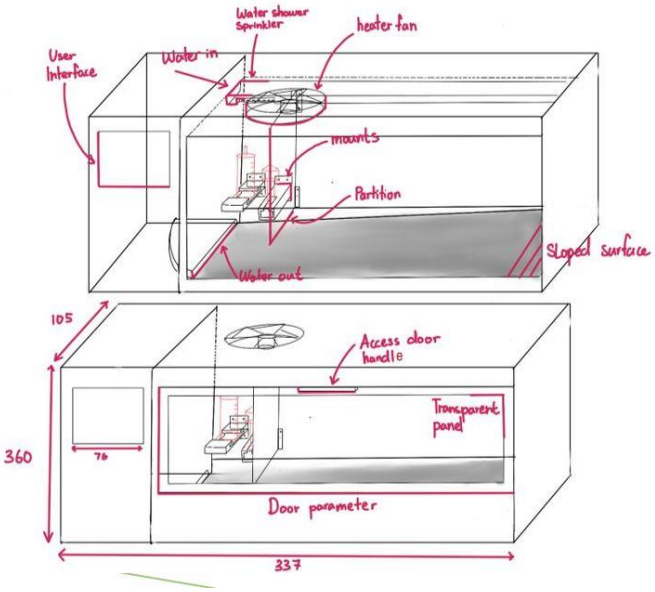
Deliverables

1. Presented findings and conducted discussion based on the answer received from the nursing staffs
2. Scrapped off ultrasonic cleaner and magnetic stirrer approach due to "Gathering Found Point 3", team decided to adopt partitioning concept with water pump
3. Crafted PowerPoint Slides for presentation on Day 05
4. Updated quality function deployment document and the user requirements
5. The team updated the 2D & 3D design of the prototype

REVAMPED DESIGN



REVAMPED DESIGN 3D



6. The team estimated the dimension of the prototype
7. The team estimated the cost of implementing the prototype between the given equipment and the ideal equipment set

Gathering found

1. Nursing staff prefer to be notified by phone text message once the washing process is completed
2. Milk feeds, crushed medications, liquids are inserted into the syringe, there are no large particles
3. Nursing staff usually wash/rinse syringes separately due to infection control practices/policies in the hospital
4. The nursing staff will want the cost to below a baby bottle sanitizer

Day 5 (20 Aug)

Deliverables

1. Market Research
2. Lit Review
3. Linked humidity sensor to RPi

Gathering found

1. After careful analysis, the team decided to drop camera component as it is good to have but not essential for a MVP product
2. Changes of touchscreen from 2.8inch model to another model. As the 2.8inch model will take up all the pins. Leaving no pins for servomotor and humidity sensor
3. Humidity sensor will give random data at times. Need remove outliners and getting the median data

Week 2

Day 6 (23 Aug)

Deliverables

1. Magnetic Reed Switch
2. Thoughts on justification for ML, Price, Safety and Figures
3. Linked up servomotor with RPi

Gathering found

1. Magnetic reed switch is a better solution in replacement for the infrared or ultrasonic sensor in detecting the door status.

Day 7 (24 Aug)

Deliverables

1. Gathered training and testing data from the initial plastic prototype
2. ML usage of three features (Humidity, Temperature and Elapsed Time) produce output of fan speed and whether if the syringes are dry.
3. Saving of machine learning model via pickle library
4. Wrap around of machine learning model to function

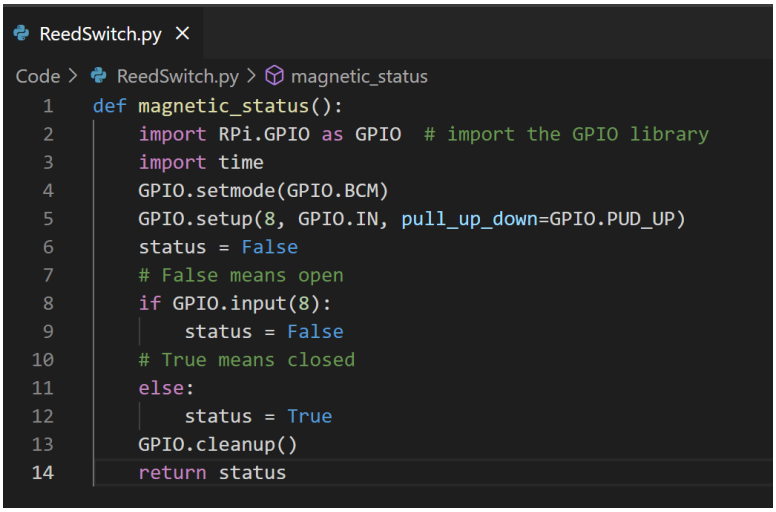
Gathering found

1. Learned linear regression and multiple regression algorithms are not suitable for our dataset
2. Learned from Professor Lawrence and scikit-learn webpage, support vector machine - SVC is the preferred algorithm to use

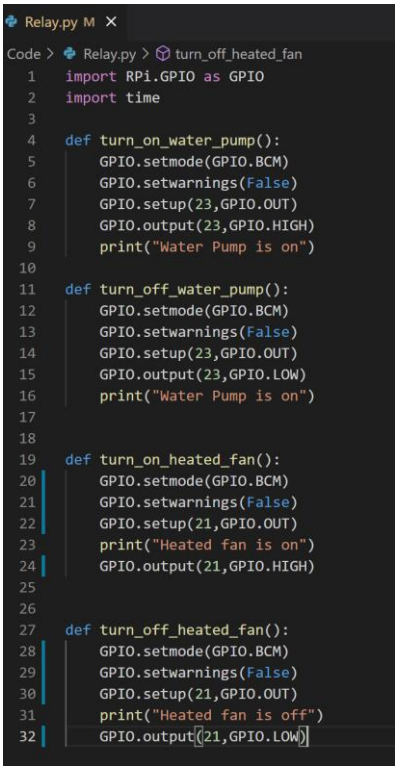
Day 8 (25 Aug)

Deliverables

1. Linked up magnetic reed switch



2. Linked up relay module (Software side)



3. Merging of software components

Gathering found

1. There is a need for usage of interruption concept with the magnetic reed switch, in the event if the user opens the door knot, it should cease all activities (Drying, washing...etc.)

Day 9 (26 Aug)

Deliverables

1. Sawing of acrylic sheets
2. Hot glue acrylic sheets to form the hard prototype
3. Touch up on main program logic

Gathering found

1. Learned the proper way of sawing acrylic sheets
2. Tkinter, GUI python library does not allow while loop as itself is already in a main loop
3. Doing loops or time.sleep will result in the graphical user interface to hang unless implements multi-threaded or multiprocessing feature

Day 10 (27 Aug)

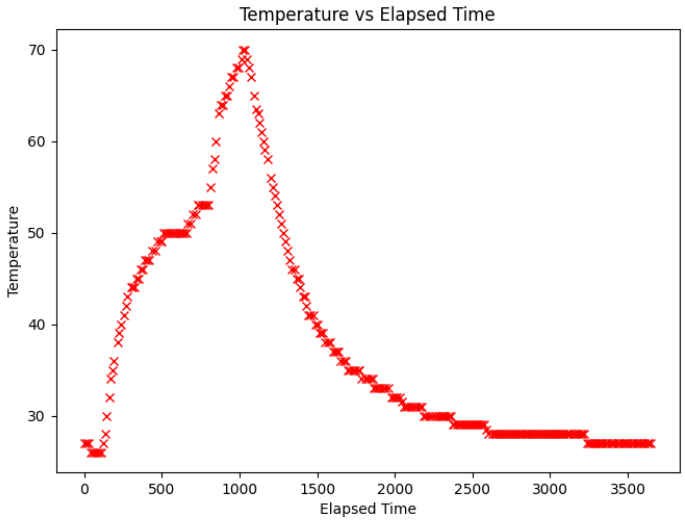
Deliverables

1. Completed testing and video recording for the hardware components
2. Gathered dataset from the hard prototype for machine learning - Support Vector Machine

	A	B	C	D	E
1	temp	humidity	fan_speed	elapsed_tir	is_dry
2	29	81	0	0	0
3	32	74	1	14	0
4	41	48.5	1	25	0
5	48.5	30.5	1	38	0
6	54	18	1	52	0
7	57	13	1	65	0
8	59	11	1	76	0
9	59	9	1	97	0
10	62	6	1	121	0
11	63	5	1	142	0
12	64	4	1	153	0
13	64	3	1	171	0
14	64	3	1	190	0
15	64	2	1	208	0
16	63	1.5	1	224	0
17	61	3	1	240	0

```python
def generate_save_is_dry_model():
    scikit_ver = sklearn.__version__
    # print(scikit_ver)
    #Load dataset
    dryness = pd.read_csv('Filtered.csv', delimiter=',')
    x = dryness[['temp', 'humidity', 'fan_speed','elapsed_time']]
    y = dryness['is_dry']

    # Split dataset into training set and test set
    X_train, X_test, y_train, y_test = train_test_split(x,y,  test_size=0.3,random_state=109)

    #Create a svm Classifier
    clf = svm.SVC(kernel='linear') # Linear Kernel

    #Train the model using the training sets
    clf.fit(X_train, y_train)

    #Predict the response for test dataset
    y_pred = clf.predict(X_test)

    # Model Accuracy: how often is the classifier correct?
    print("Accuracy:",metrics.accuracy_score(y_test, y_pred))

    # Model Precision: what percentage of positive tuples are labeled as such?
    print("Precision:",metrics.precision_score(y_test, y_pred))

    # Model Recall: what percentage of positive tuples are labelled as such?
    print("Recall:",metrics.recall_score(y_test, y_pred))

    print("Saving model...")

    # Save the model
    with open('model_svm_' + scikit_ver, 'wb') as f:
        pickle.dump(clf, f)

    print("Model saved successfully!")
```

3. Worked on data visualization created various scatter plots (Temp vs Humidity), (Humidity vs Elapsed Time), (Temp vs Elapsed Time)...etc.



Gathering found

1. Learned the timing to wash, dry and sterilise syringes in an acrylic compartment

Week 3

Day 11 (30 Aug)

Deliverables

1. Filmed videos for Machine Learning, Graphical User Interface, Notifications and Safety Mechanism
2. Getting started on video editing

3. Familiarise with HD Movie Maker software

Gathering found

1. Our team machine learning prediction is capable to produce the correct classification in less than a split second.

Day 12 (31 Aug)

Deliverables

1. Getting started on Report writing for CS portion
2. Filming powerpoint presentation video
3. Video edits for powerpoint presentation video

Gathering found

1. Team thought of a slogan for the video - 'iSplash, you rest'

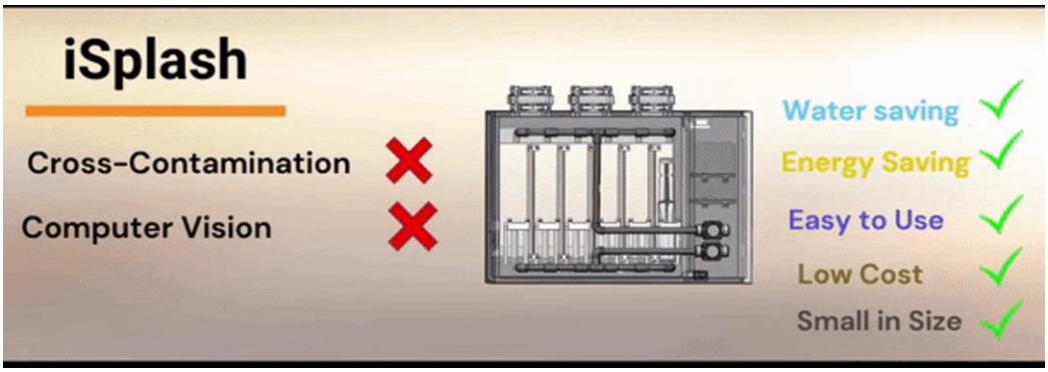
Day 13 (1 Sept)

Deliverables

1. Revamped GUI and ML Video
2. Report writing - Budget Overview
3. Report writing - Computer Specification
4. Dismantled prototype and return of equipment to engineering teammate

Gathering found

1. Important key points need to be presence in the demonstration video (E.g. Safety, Space, Time, Ease of Usage...etc.)



2. Gained further insights from Professor James on the report writing

Day 14 (2 Sept)

Deliverables

1. Wrapping up on report writing and logbook

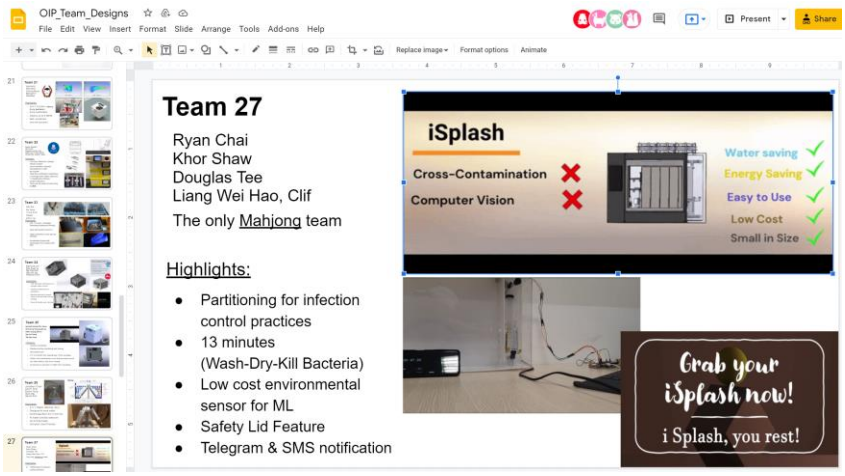
Day 15 (3 Sept)

Deliverables

1. Return of hardware components
2. Report and logbook submission

Gathering found

1. Understand the pros and cons of other team prototypes



2. Inspired by other team prototypes and learned ways of improving the team's prototype