FACULTY OF COMPUTING

STATUS DOCUMENT 1

"TeaBot" – Tea plantation preservation using an intelligent robot.

STUDENT NAME: Perera P.V.Y.

STUDENT NUMBER: IT20382476

GROUP ID:2023-044

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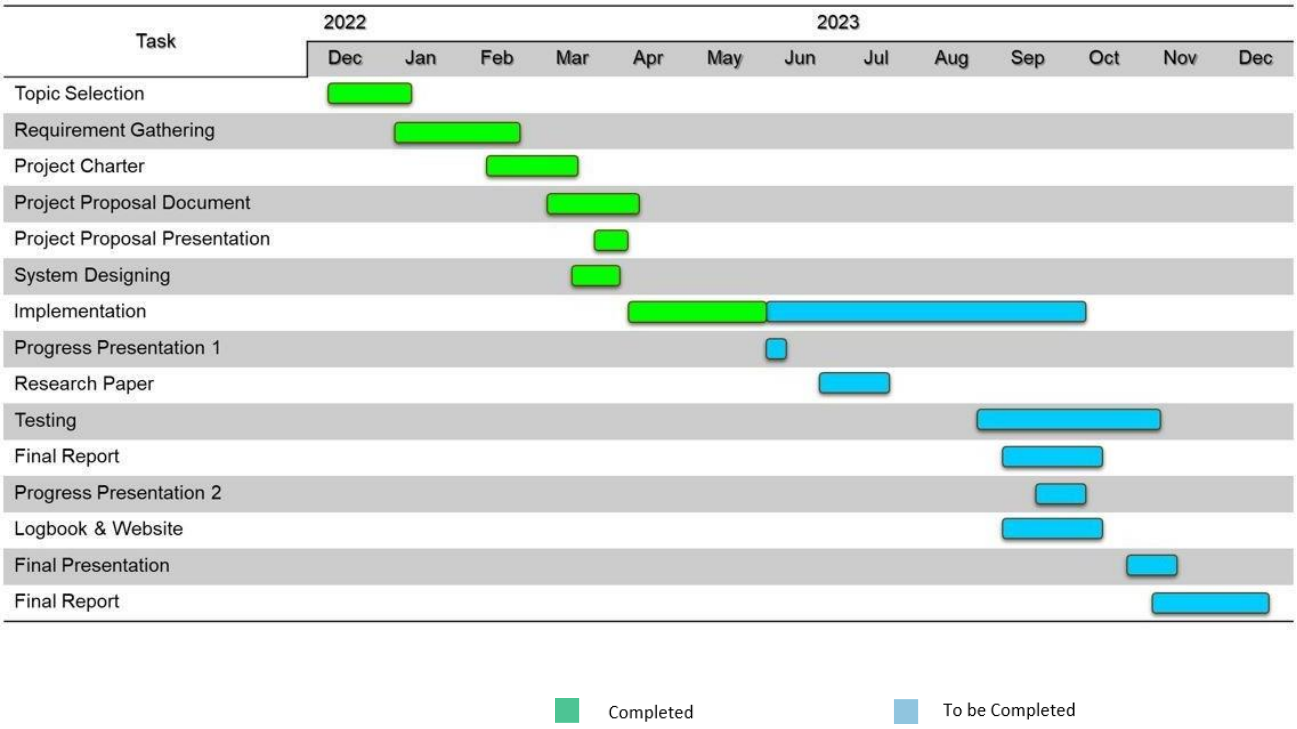
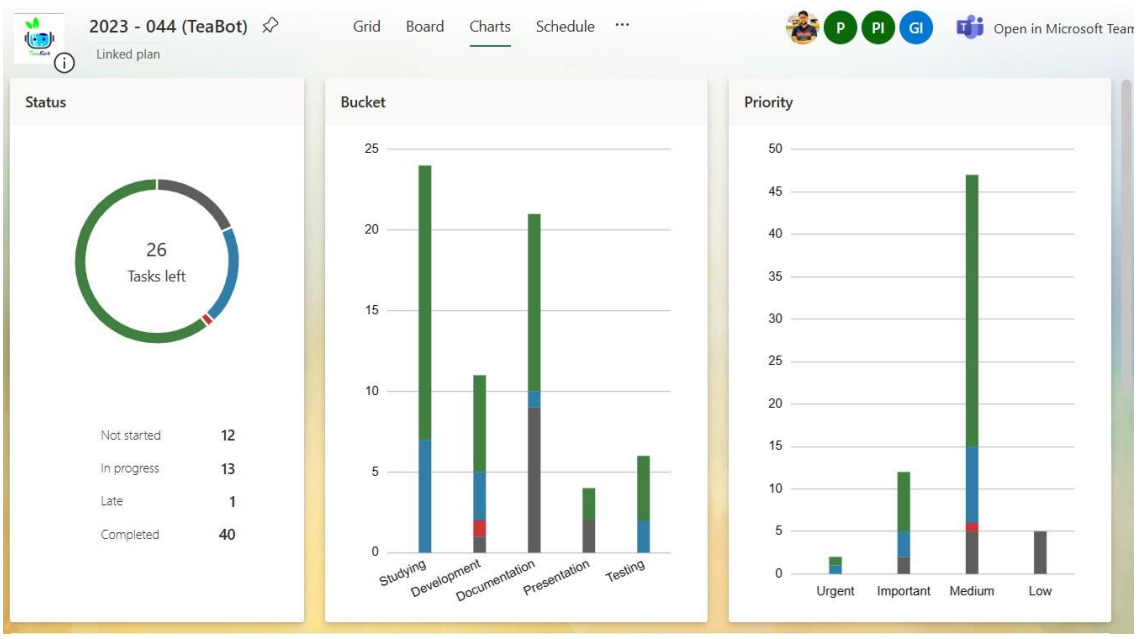
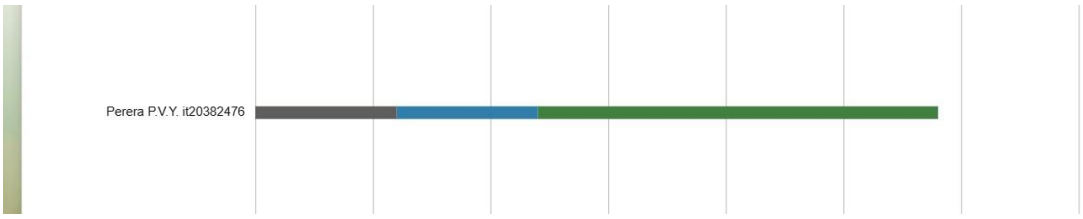
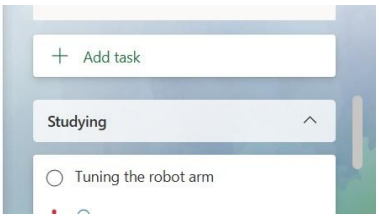
1 GANNT CHART



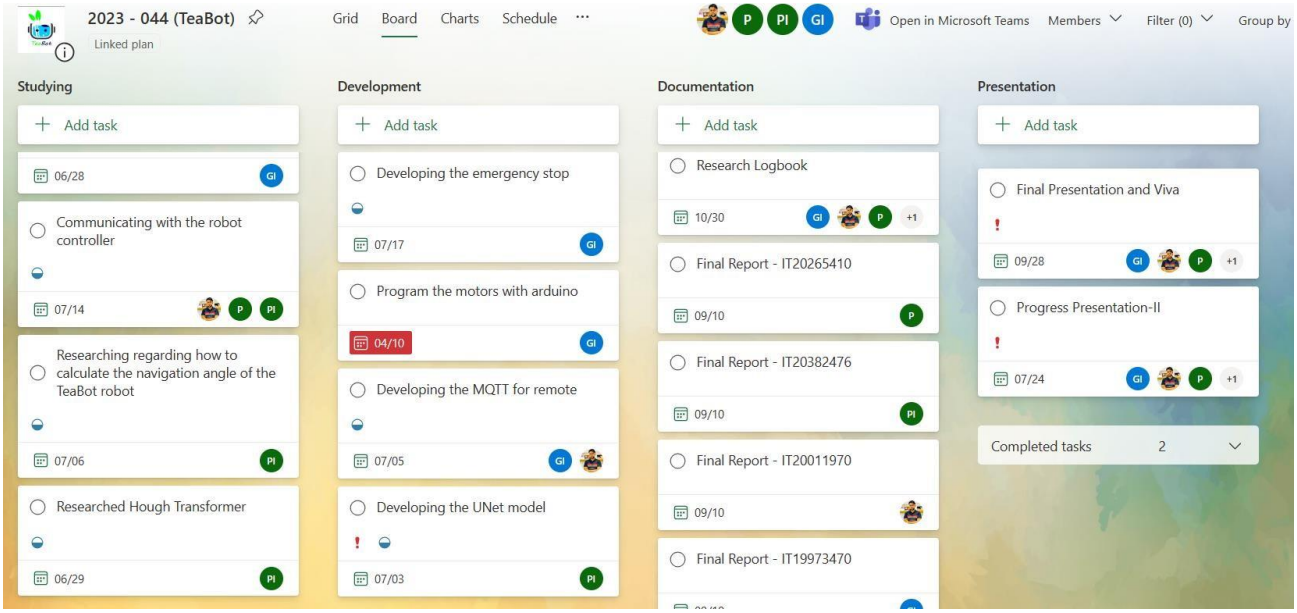
2 PROJECT VIEWS MS PLANNER

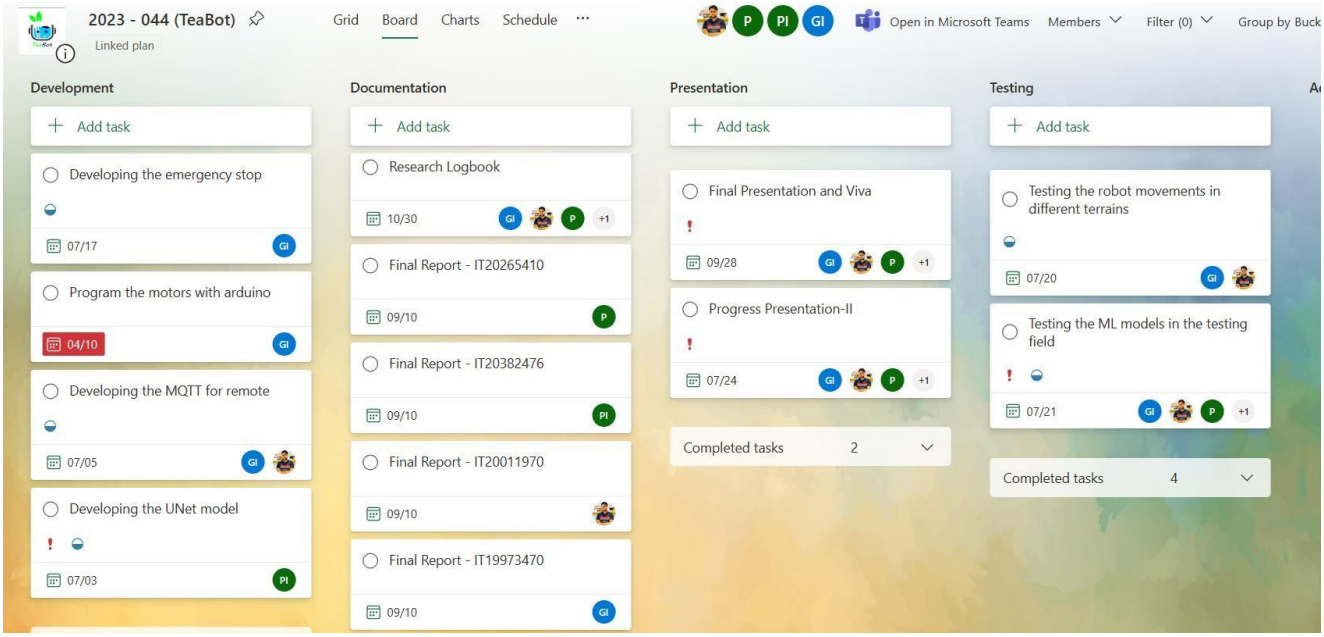




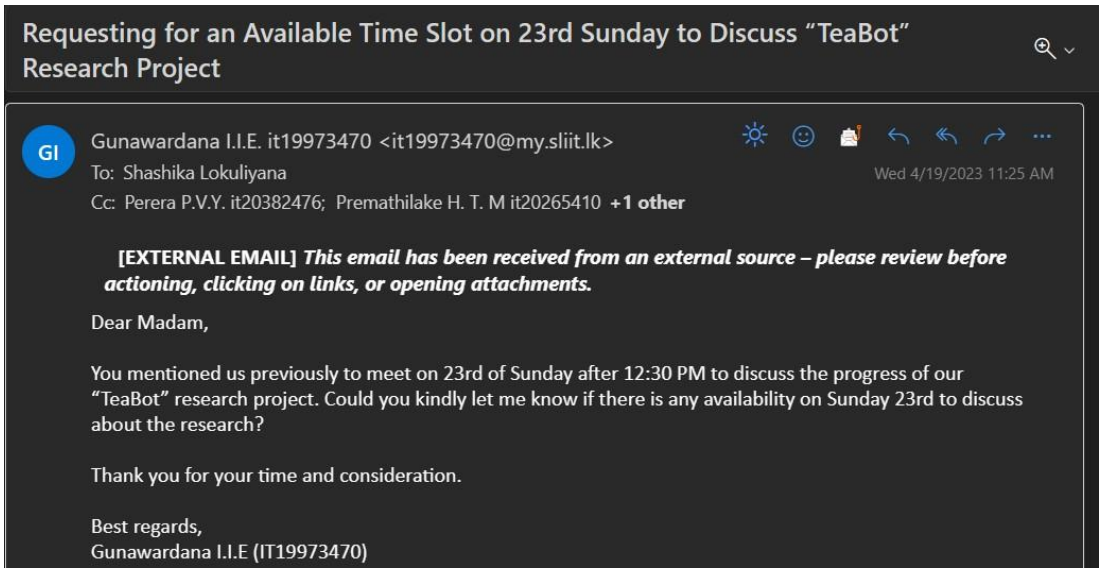


3 Work Break Down Structure Ms Planner





4 EMAILS, MEETINGS WITH SUPERVISOR, CO-SUPERVISOR



Requesting for an Available Time Slot on 23rd Sunday to Discuss "TeaBot" Research Project

GI Gunawardana I.I.E. it19973470 <it19973470@my.sliit.lk>

To: Shashika Lokuliyana

Wed 4/19/2023 11:25 AM

Cc: Perera P.V.Y. it20382476; Premathilake H. T. M it20265410 **+1 other**

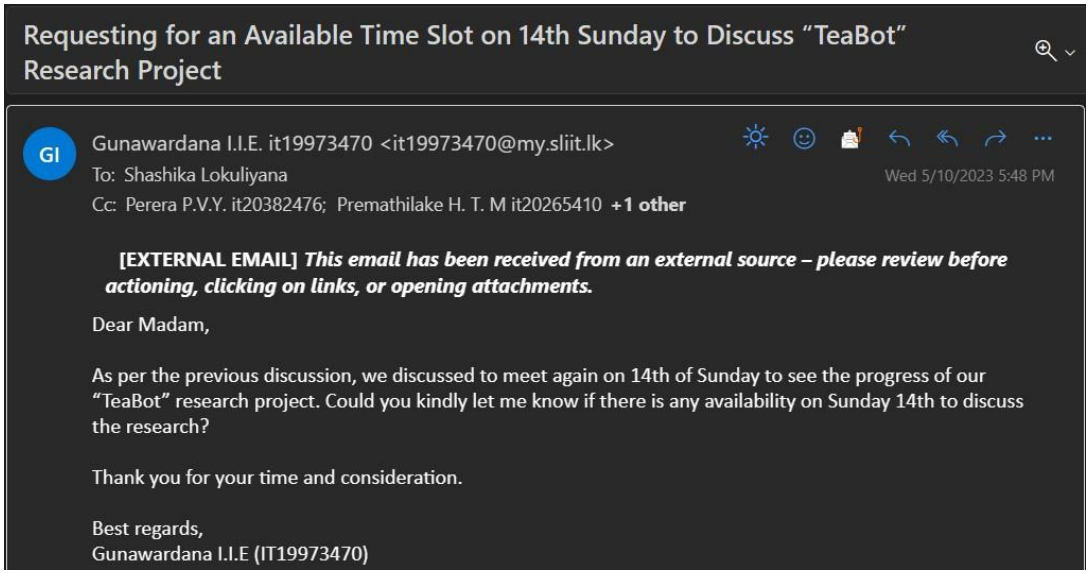
[EXTERNAL EMAIL] ***This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.***

Dear Madam,

You mentioned us previously to meet on 23rd of Sunday after 12:30 PM to discuss the progress of our "TeaBot" research project. Could you kindly let me know if there is any availability on Sunday 23rd to discuss about the research?

Thank you for your time and consideration.

Best regards,
Gunawardana I.I.E (IT19973470)



Requesting for an Available Time Slot on 14th Sunday to Discuss "TeaBot" Research Project

GI Gunawardana I.I.E. it19973470 <it19973470@my.sliit.lk>

To: Shashika Lokuliyana

Wed 5/10/2023 5:48 PM

Cc: Perera P.V.Y. it20382476; Premathilake H. T. M it20265410 **+1 other**

[EXTERNAL EMAIL] ***This email has been received from an external source – please review before actioning, clicking on links, or opening attachments.***

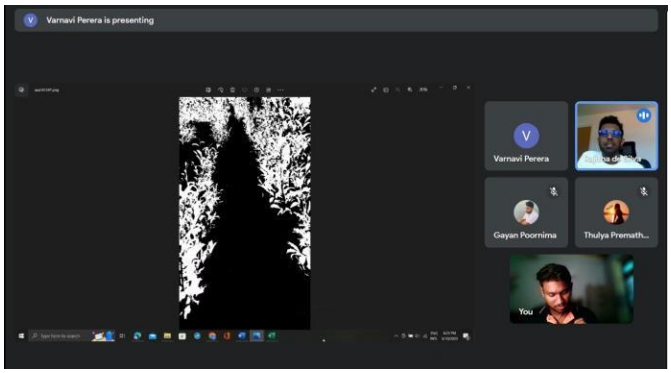
Dear Madam,

As per the previous discussion, we discussed to meet again on 14th of Sunday to see the progress of our "TeaBot" research project. Could you kindly let me know if there is any availability on Sunday 14th to discuss the research?

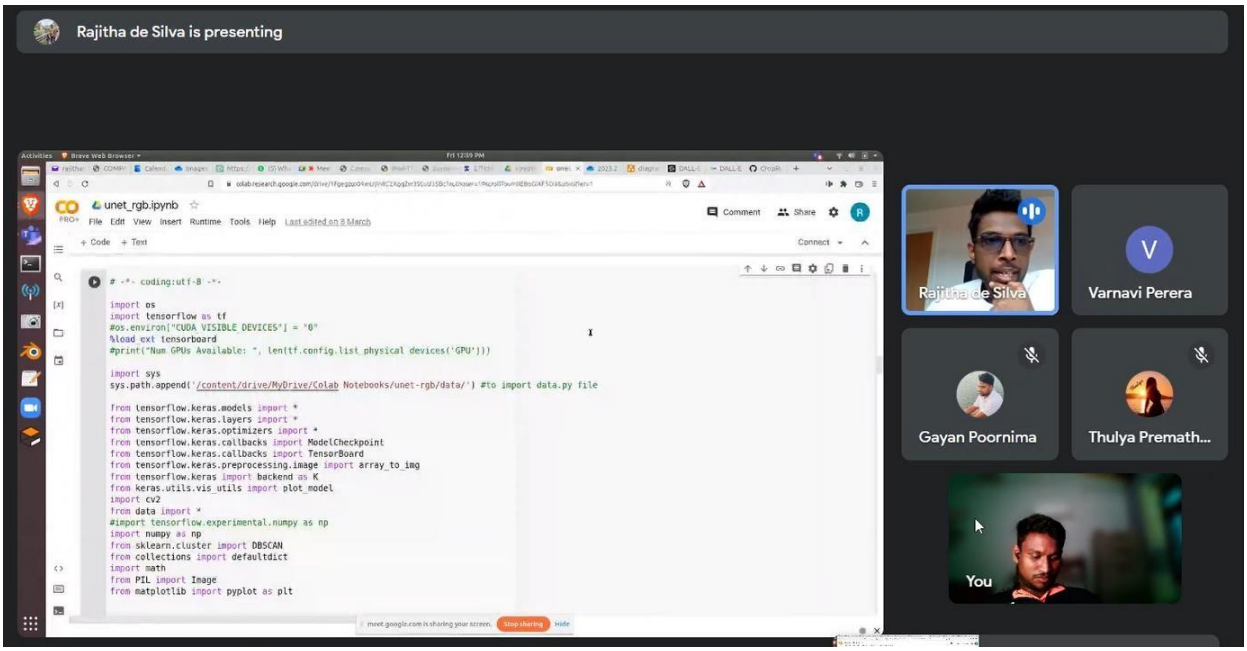
Thank you for your time and consideration.

Best regards,
Gunawardana I.I.E (IT19973470)

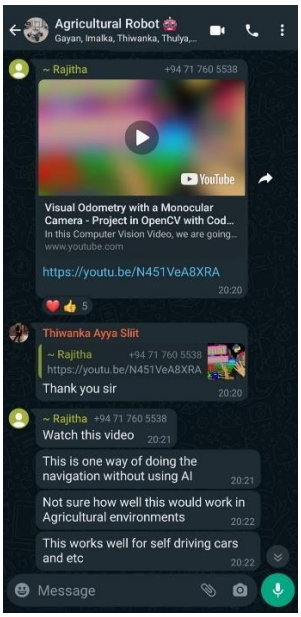
Screenshots of meetings about dataset collection, and data labeling methods for automatic navigation & spraying with external supervisor Dr Rajitha De Silva



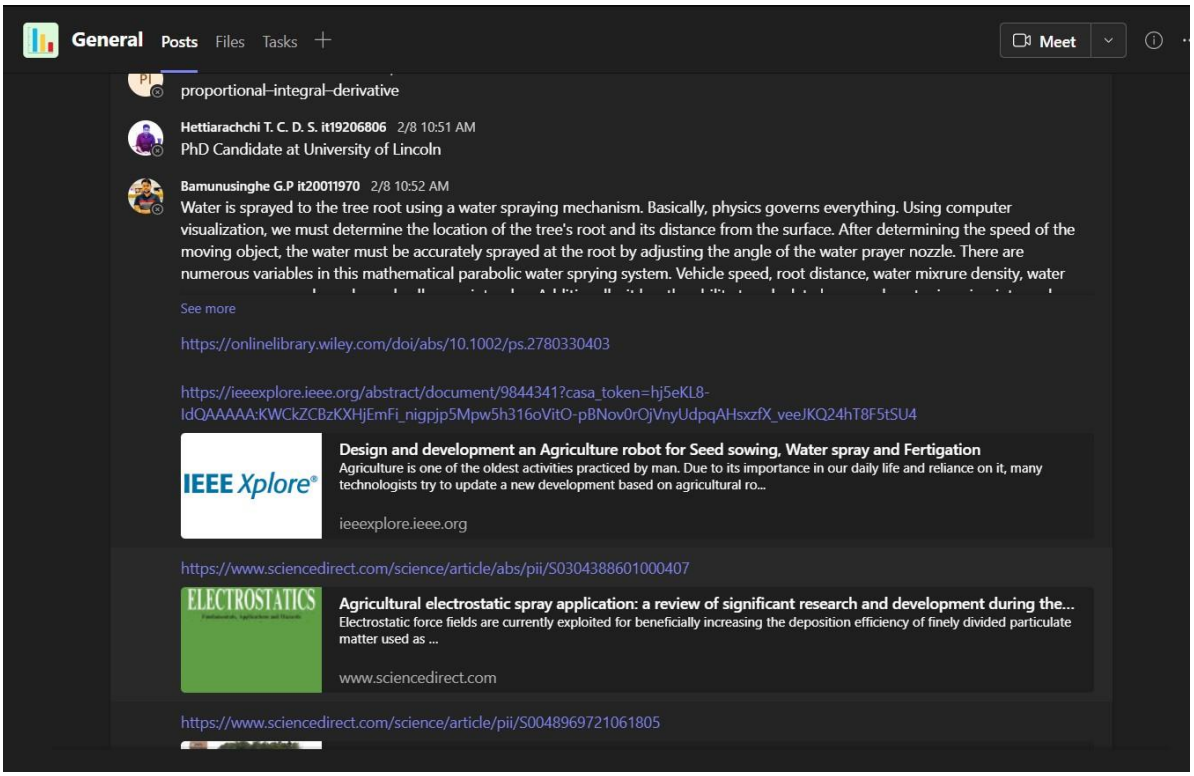
Discussions regarding Model Development.

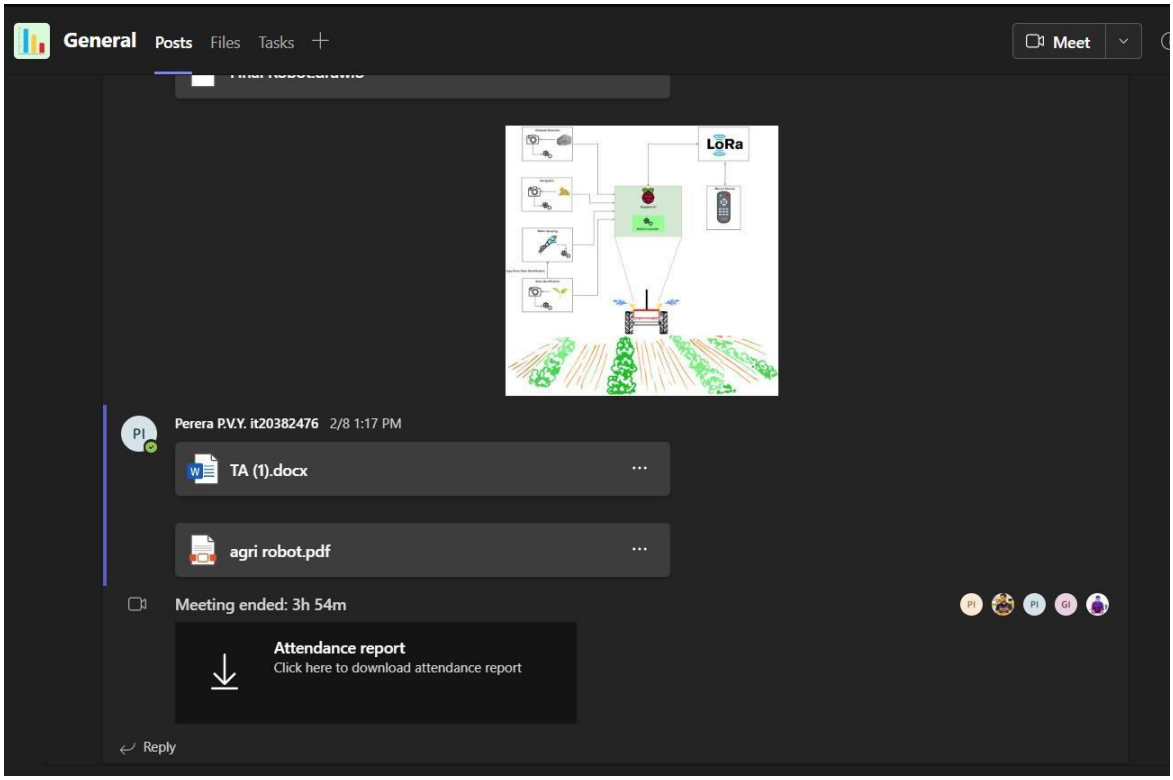


Whatsapp conversations with the external supervisor.



5 MS TEAMS AND CALLS





6 Prototype

Screenshot for the development of the mask

```
Creating training images...
['/content/drive/MyDrive/TeaBot Research Dataset/TEABOT/model/train/image/145.jpg', '/content/dri
Done: 0/614 images
Done: 100/614 images
Done: 200/614 images
Done: 300/614 images
Done: 400/614 images
Done: 500/614 images
Done: 600/614 images
loading done
Saving to .npy files done.
Creating testall images...
loading done
Saving to .npy files done.
Creating test images...
loading done
Saving to imgs_test.npy files done.
Creating validation images...
loading done
Saving to .npy files done.
```

Model Development

```
KerasTensor(type_spec=TensorSpec(shape=(None, 32, 32, 64), dtype=tf.float32, name=None), name='conv2d_21/Relu
conv9 shape: (None, 32, 32, 2)
KerasTensor(type_spec=TensorSpec(shape=(None, 32, 32, 1), dtype=tf.float32, name=None), name='conv2d_23/Sigmoi
Model: "model"
```

Layer (type)	Output Shape	Param #	Connected to
input_1 (InputLayer)	[(None, 32, 32, 3)]	0	[]
conv2d (Conv2D)	(None, 32, 32, 64)	1792	['input_1[0][0]']
conv2d_1 (Conv2D)	(None, 32, 32, 64)	36928	['conv2d[0][0]']
max_pooling2d (MaxPooling2D)	(None, 16, 16, 64)	0	['conv2d_1[0][0]']
conv2d_2 (Conv2D)	(None, 16, 16, 128)	73856	['max_pooling2d[0][0]']
conv2d_3 (Conv2D)	(None, 16, 16, 128)	147584	['conv2d_2[0][0]']
max_pooling2d_1 (MaxPooling2D)	(None, 8, 8, 128)	0	['conv2d_3[0][0]']
conv2d_4 (Conv2D)	(None, 8, 8, 256)	295168	['max_pooling2d_1[0][0]']
conv2d_5 (Conv2D)	(None, 8, 8, 256)	590080	['conv2d_4[0][0]']
max_pooling2d_2 (MaxPooling2D)	(None, 4, 4, 256)	0	['conv2d_5[0][0]']
conv2d_6 (Conv2D)	(None, 4, 4, 32)	73760	['max_pooling2d_2[0][0]']
conv2d_7 (Conv2D)	(None, 4, 4, 32)	9248	['conv2d_6[0][0]']
dropout (Dropout)	(None, 4, 4, 32)	0	['conv2d_7[0][0]']
max_pooling2d_3 (MaxPooling2D)	(None, 2, 2, 32)	0	['dropout[0][0]']

conv2d_6 (Conv2D)	(None, 4, 4, 32)	73760	['max_pooling2d_2[0][0]']
conv2d_7 (Conv2D)	(None, 4, 4, 32)	9248	['conv2d_6[0][0]']
dropout (Dropout)	(None, 4, 4, 32)	0	['conv2d_7[0][0]']
max_pooling2d_3 (MaxPooling2D)	(None, 2, 2, 32)	0	['dropout[0][0]']
conv2d_8 (Conv2D)	(None, 2, 2, 1024)	295936	['max_pooling2d_3[0][0]']
conv2d_9 (Conv2D)	(None, 2, 2, 1024)	9438208	['conv2d_8[0][0]']
dropout_1 (Dropout)	(None, 2, 2, 1024)	0	['conv2d_9[0][0]']
up_sampling2d (UpSampling2D)	(None, 4, 4, 1024)	0	['dropout_1[0][0]']
conv2d_10 (Conv2D)	(None, 4, 4, 32)	131104	['up_sampling2d[0][0]']
concatenate (Concatenate)	(None, 4, 4, 64)	0	['dropout[0][0]', 'conv2d_10[0][0]']
conv2d_11 (Conv2D)	(None, 4, 4, 32)	18464	['concatenate[0][0]']
conv2d_12 (Conv2D)	(None, 4, 4, 32)	9248	['conv2d_11[0][0]']
up_sampling2d_1 (UpSampling2D)	(None, 8, 8, 32)	0	['conv2d_12[0][0]']
conv2d_13 (Conv2D)	(None, 8, 8, 256)	33024	['up_sampling2d_1[0][0]']
concatenate_1 (Concatenate)	(None, 8, 8, 512)	0	['conv2d_5[0][0]', 'conv2d_13[0][0]']
conv2d_14 (Conv2D)	(None, 8, 8, 256)	1179904	['concatenate_1[0][0]']

```
 concatenate_3 (Concatenate)    (None, 32, 32, 128)  0           ['conv2d_1[0][0]',
                                                                  'conv2d_19[0][0]']

 conv2d_20 (Conv2D)             (None, 32, 32, 64)   73792       ['concatenate_3[0][0]']

 conv2d_21 (Conv2D)             (None, 32, 32, 64)   36928       ['conv2d_20[0][0]']

 conv2d_22 (Conv2D)             (None, 32, 32, 2)    1154        ['conv2d_21[0][0]']

 conv2d_23 (Conv2D)             (None, 32, 32, 1)    3           ['conv2d_22[0][0]']

==================================================================================================
Total params: 13,642,917
Trainable params: 13,642,917
Non-trainable params: 0
__________________________________________________________________________________________________
loading data
load train images...
------------------------------
load test images...
------------------------------
------------------------------
load test label images...
------------------------------
load train images...
loading data done
conv1 shape: (None, 32, 32, 64)
conv1 shape: (None, 32, 32, 64)
pool1 shape: (None, 16, 16, 64)
conv2 shape: (None, 16, 16, 128)
conv2 shape: (None, 16, 16, 128)
pool2 shape: (None, 8, 8, 128)
conv3 shape: (None, 8, 8, 256)
```

```
KerasTensor(type_spec=TensorSpec(shape=(None, 8, 8, 512), dtype=tf.float32, name=None), name='concatenate_5/concat:0', description="create
KerasTensor(type_spec=TensorSpec(shape=(None, 8, 8, 256), dtype=tf.float32, name=None), name='conv2d_38/Relu:0', description="created by l
KerasTensor(type_spec=TensorSpec(shape=(None, 8, 8, 256), dtype=tf.float32, name=None), name='conv2d_39/Relu:0', description="created by l
KerasTensor(type_spec=TensorSpec(shape=(None, 32, 32, 64), dtype=tf.float32, name=None), name='conv2d_43/Relu:0', description="created by
KerasTensor(type_spec=TensorSpec(shape=(None, 32, 32, 128), dtype=tf.float32, name=None), name='concatenate_7/concat:0', description="crea
KerasTensor(type_spec=TensorSpec(shape=(None, 32, 32, 64), dtype=tf.float32, name=None), name='conv2d_44/Relu:0', description="created by
KerasTensor(type_spec=TensorSpec(shape=(None, 32, 32, 64), dtype=tf.float32, name=None), name='conv2d_45/Relu:0', description="created by
conv9 shape: (None, 32, 32, 2)
KerasTensor(type_spec=TensorSpec(shape=(None, 32, 32, 1), dtype=tf.float32, name=None), name='conv2d_47/Sigmoid:0', description="created b
got unet
Fitting model...
Epoch 1/2
WARNING:tensorflow:5 out of the last 5 calls to <function _BaseOptimizer._update_step_xla at 0x7faa502ddcf0> triggered tf.function retraci
WARNING:tensorflow:6 out of the last 6 calls to <function _BaseOptimizer._update_step_xla at 0x7faa502ddcf0> triggered tf.function retraci
491/491 [==============================] - ETA: 0s - loss: 0.3750 - accuracy: 0.7989 - iou: 0.2100
Epoch 1: iou improved from -inf to 0.21002, saving model to /content/drive/MyDrive/TeaBot Research Dataset/TEABOT/model/model.hdf5
491/491 [==============================] - 79s 126ms/step - loss: 0.3750 - accuracy: 0.7989 - iou: 0.2100 - val_loss: 0.4103 - val_accurac
Epoch 2/2
491/491 [==============================] - ETA: 0s - loss: 0.3490 - accuracy: 0.8245 - iou: 0.2227
Epoch 2: iou improved from 0.21002 to 0.22273, saving model to /content/drive/MyDrive/TeaBot Research Dataset/TEABOT/model/model.hdf5
491/491 [==============================] - 60s 122ms/step - loss: 0.3490 - accuracy: 0.8245 - iou: 0.2227 - val_loss: 0.4126 - val_accurac
Epoch 1/4
307/307 [==============================] - ETA: 0s - loss: 0.3463 - accuracy: 0.8389 - iou: 0.2614
Epoch 1: iou improved from 0.22273 to 0.26144, saving model to /content/drive/MyDrive/TeaBot Research Dataset/TEABOT/model/model.hdf5
307/307 [==============================] - 38s 119ms/step - loss: 0.3463 - accuracy: 0.8389 - iou: 0.2614
Epoch 2/4
307/307 [==============================] - ETA: 0s - loss: 0.3410 - accuracy: 0.8428 - iou: 0.2651
Epoch 2: iou improved from 0.26144 to 0.26513, saving model to /content/drive/MyDrive/TeaBot Research Dataset/TEABOT/model/model.hdf5
307/307 [==============================] - 35s 116ms/step - loss: 0.3410 - accuracy: 0.8428 - iou: 0.2651
Epoch 3/4
307/307 [==============================] - ETA: 0s - loss: 0.3380 - accuracy: 0.8439 - iou: 0.2673
Epoch 3: iou improved from 0.26513 to 0.26734, saving model to /content/drive/MyDrive/TeaBot Research Dataset/TEABOT/model/model.hdf5
307/307 [==============================] - 35s 115ms/step - loss: 0.3380 - accuracy: 0.8439 - iou: 0.2673
Epoch 4/4
```