AI-Powered Solutions for Breakdown Challenges with Electric Vehicles

MECHANIC FINDING SERVICE FOR EV BREAKDOWN EMERGENCIES

Project Id: 2023-24-117

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BSc (Hons) in Information Technology Specializing in Information Technology

Department of Information Technology

Sri Lanka Institute of Information Technology Sri Lanka

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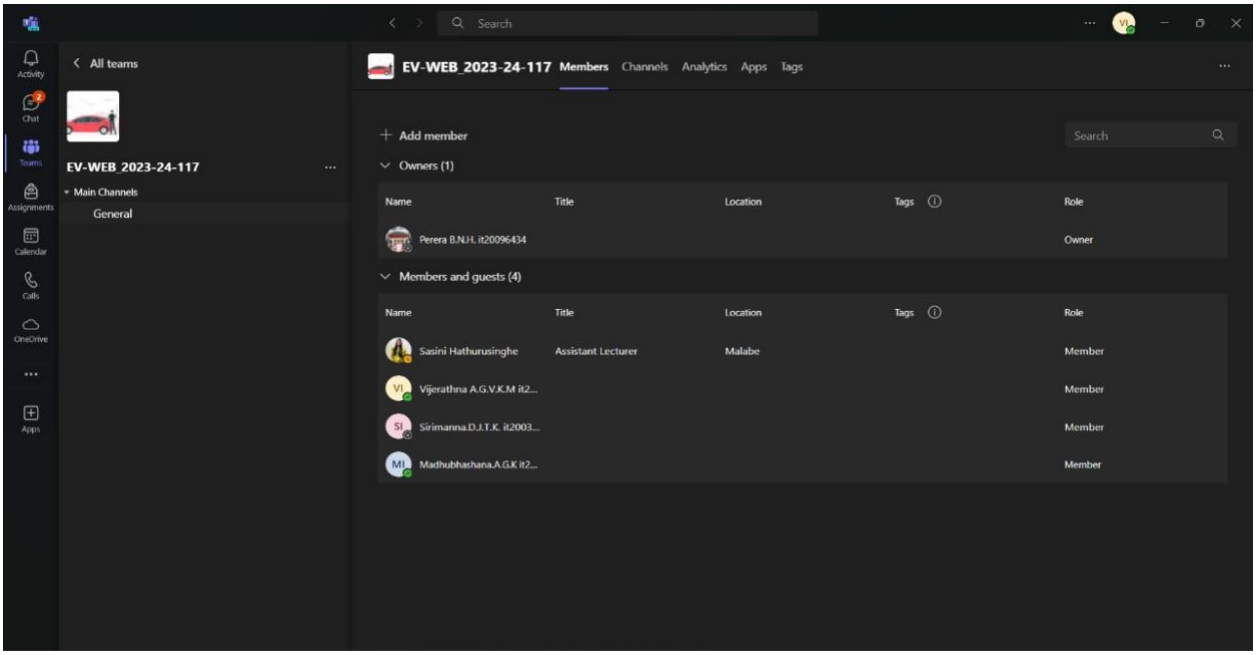
1. Group Gatherings

1.1 Meetings with Supervisor

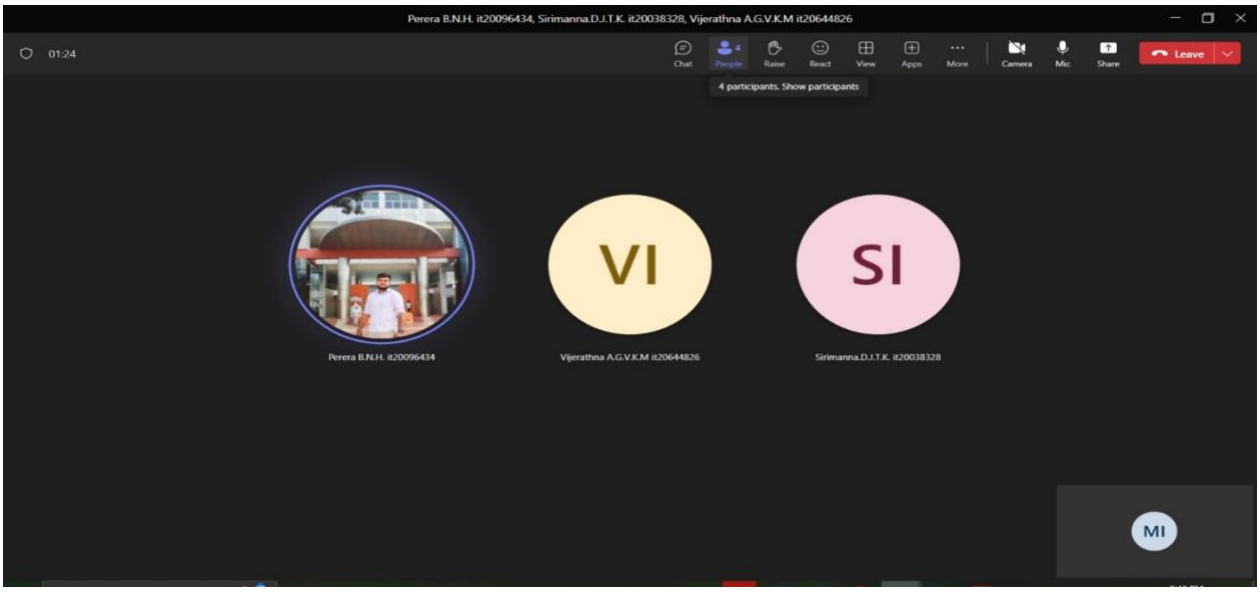
1.2 Group Members

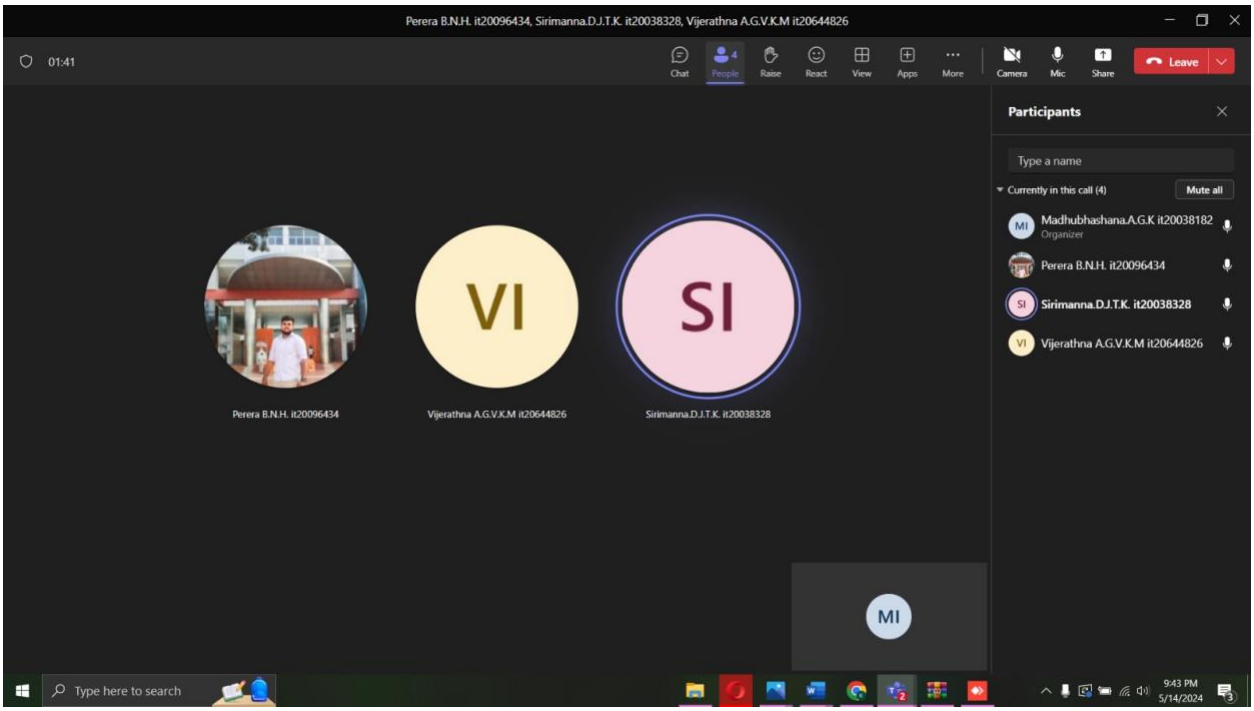
2. MS Teams Details

2.1 Team and Team Members

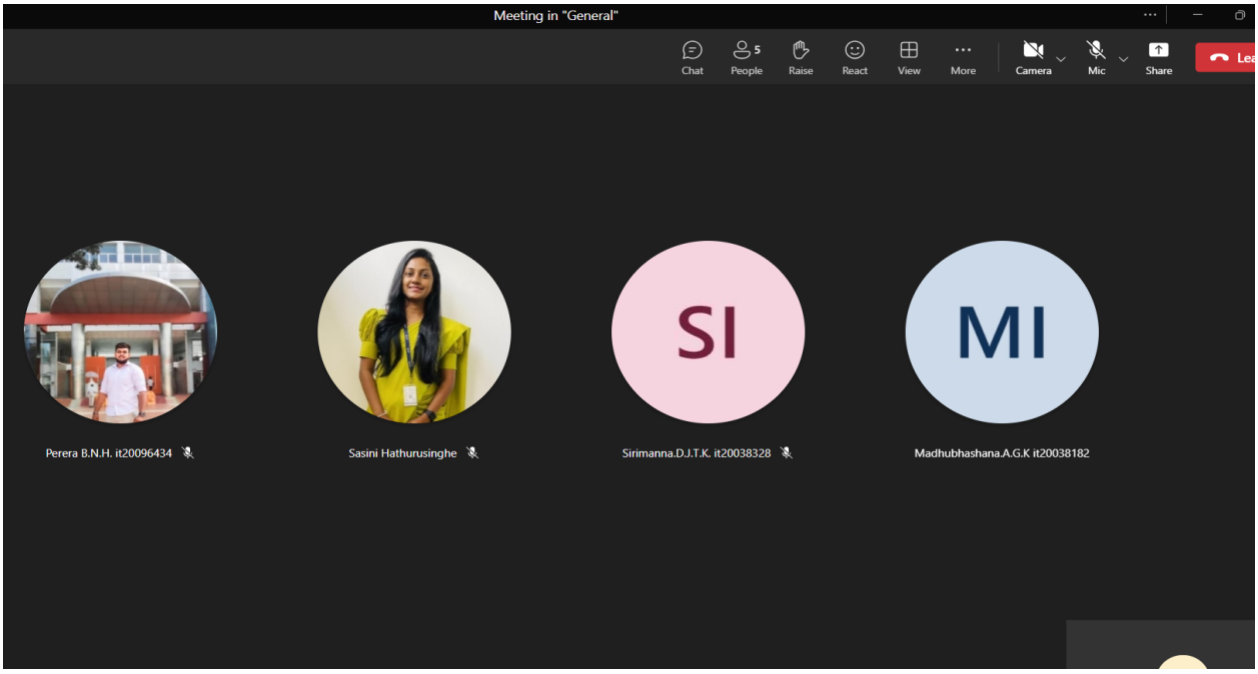


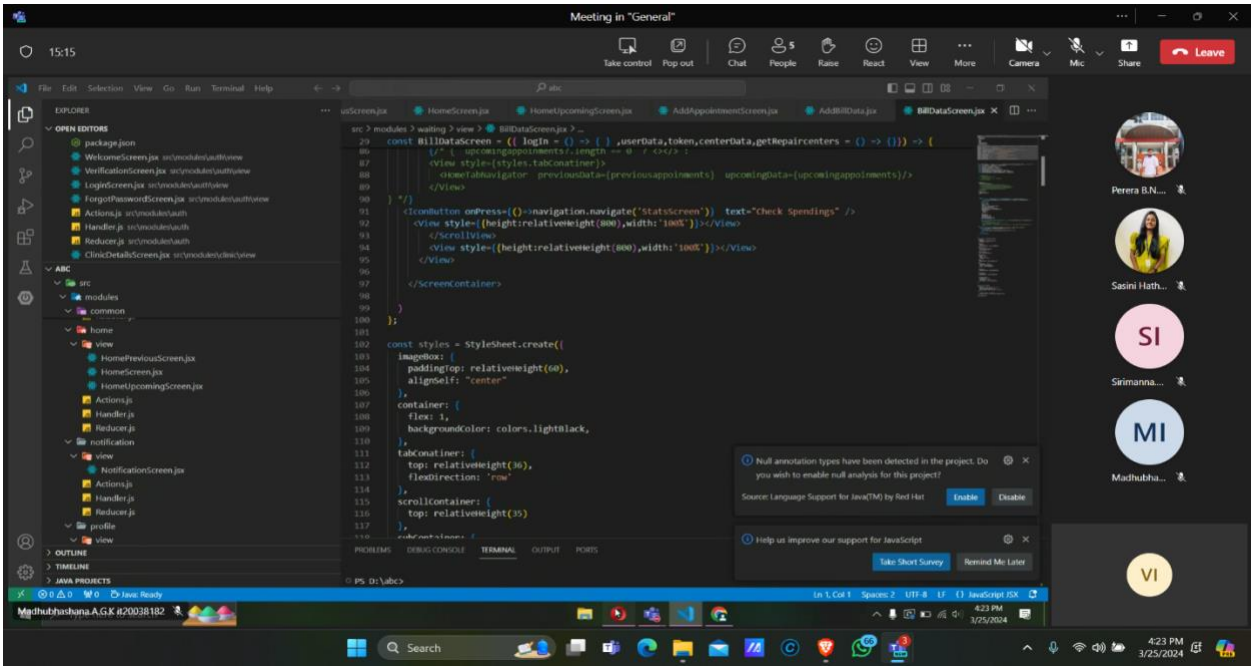
2.2 Teams Calls with Research Team



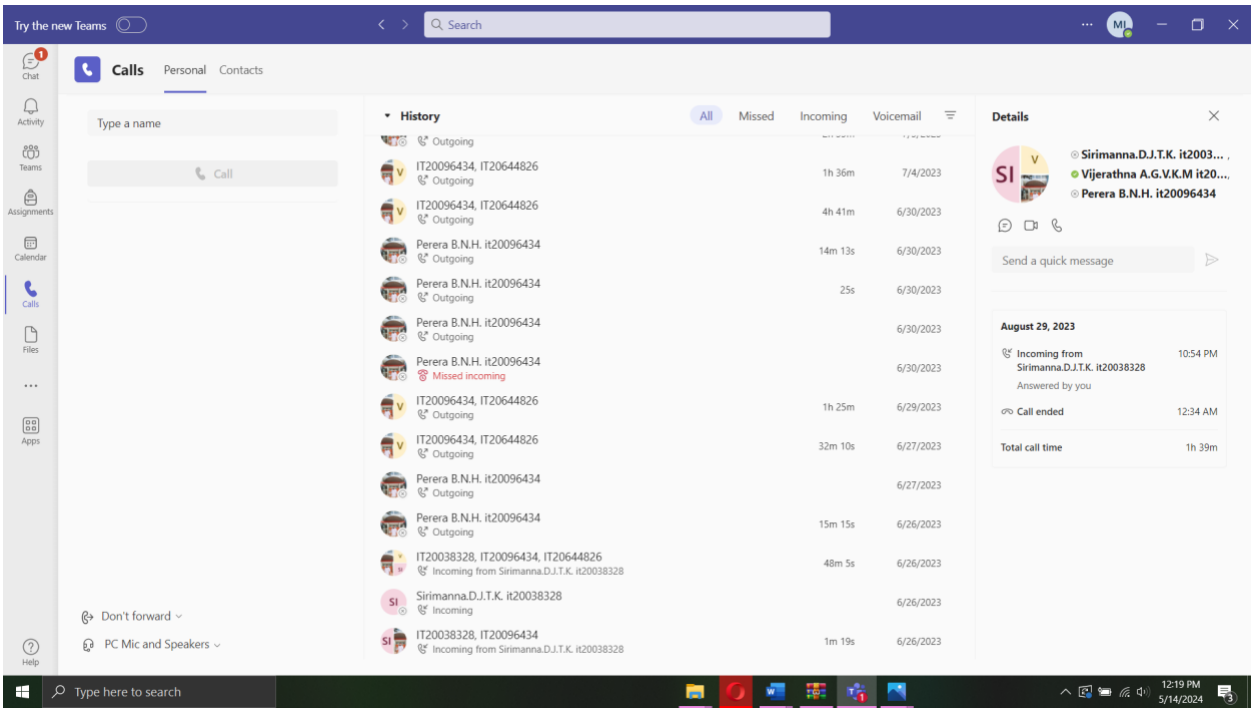


2.3 Teams calls with co supervisor

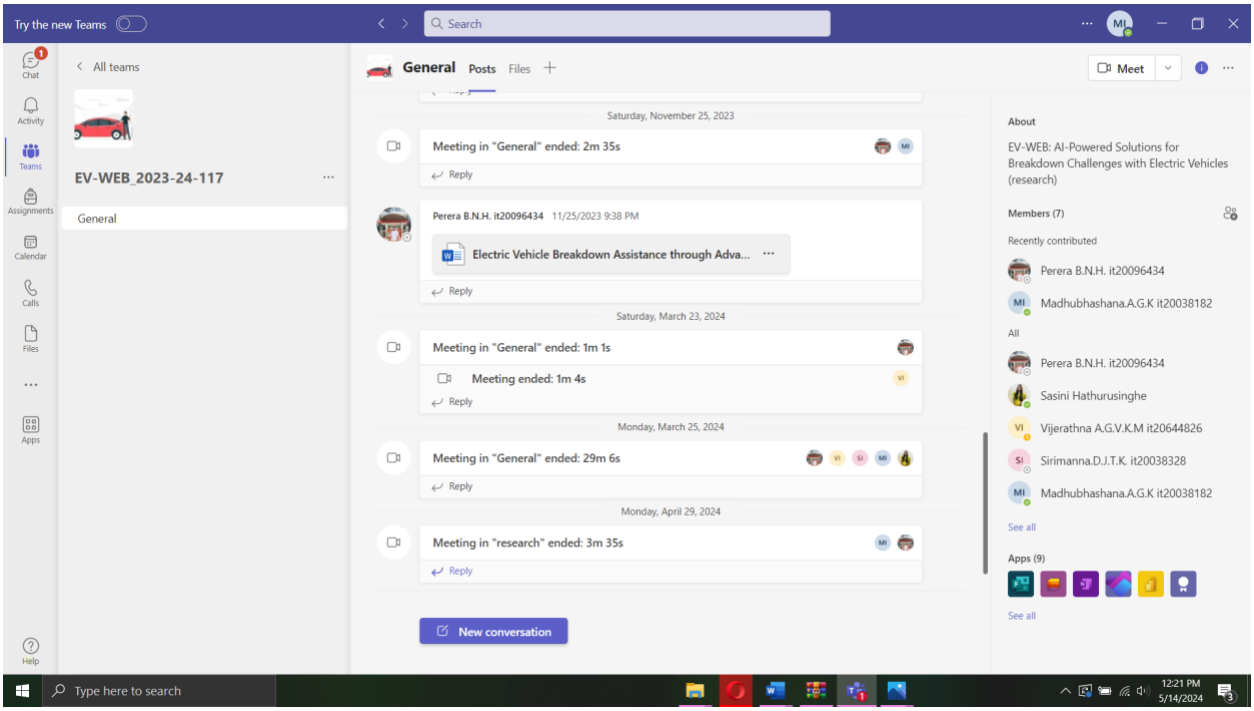




2.4 Teams Calls with Group members

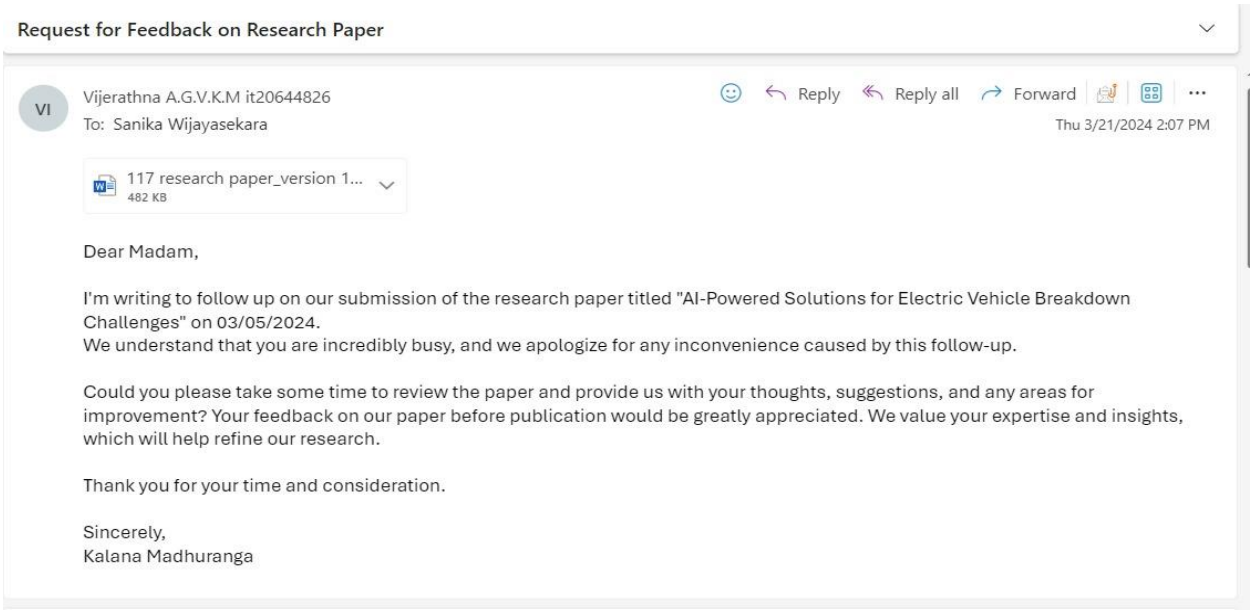


2.5 Teams Group Chat



3. Emails on Outlook

3.1 Outlook Mails with Supervisor



Request for Feedback on Research Paper

VI

Vijerathna A.G.V.K.M it20644826
To: Sanika Wijayasekara

Reply Reply all Forward

Thu 3/21/2024 2:07 PM

117 research paper_version 1...
482 KB

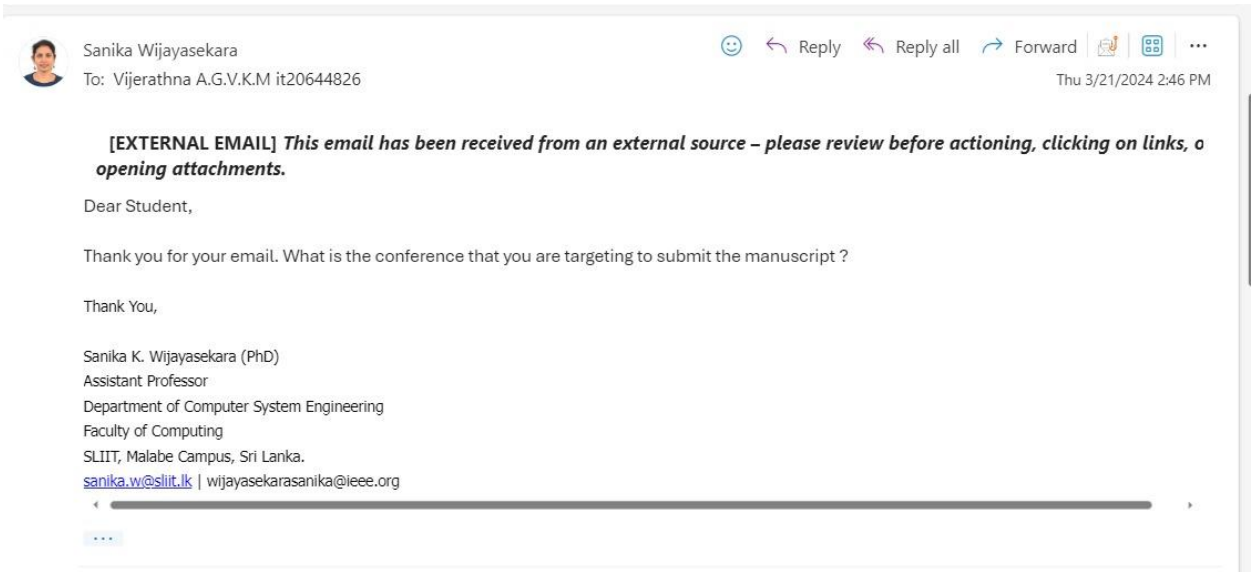
Dear Madam,

I'm writing to follow up on our submission of the research paper titled "AI-Powered Solutions for Electric Vehicle Breakdown Challenges" on 03/05/2024.
We understand that you are incredibly busy, and we apologize for any inconvenience caused by this follow-up.

Could you please take some time to review the paper and provide us with your thoughts, suggestions, and any areas for improvement? Your feedback on our paper before publication would be greatly appreciated. We value your expertise and insights, which will help refine our research.

Thank you for your time and consideration.

Sincerely,
Kalana Madhuranga



Sanika Wijayasekara
To: Vijerathna A.G.V.K.M it20644826

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Thu 3/21/2024 2:46 PM

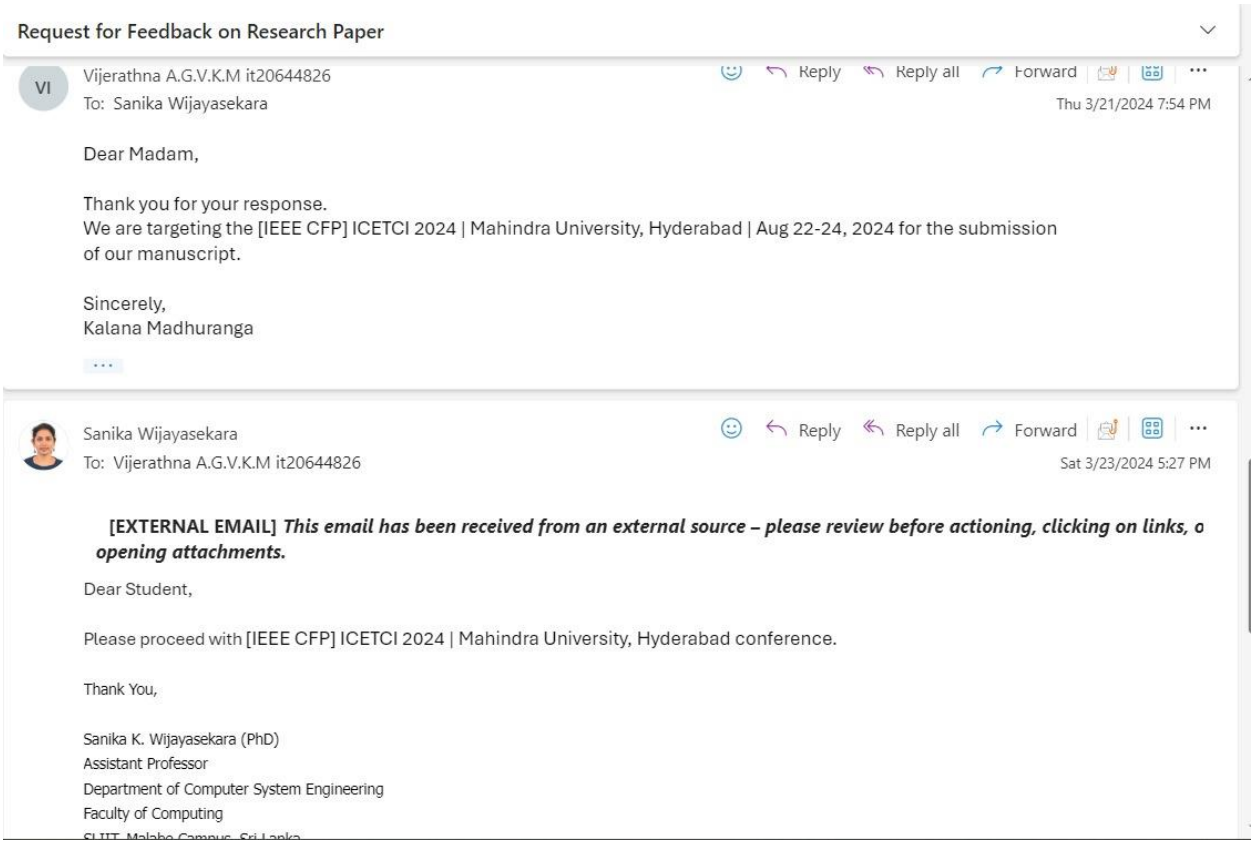
[EXTERNAL EMAIL] ***This email has been received from an external source – please review before actioning, clicking on links, o opening attachments.***

Dear Student,

Thank you for your email. What is the conference that you are targeting to submit the manuscript ?

Thank You,

Sanika K. Wijayasekara (PhD)
Assistant Professor
Department of Computer System Engineering
Faculty of Computing
SLIIT, Malabe Campus, Sri Lanka.
sanika.w@sliit.lk | wijayasekarasanika@ieee.org



Request for Feedback on Research Paper

VI

Vijerathna A.G.V.K.M it20644826
To: Sanika Wijayasekara

Reply | Reply all | Forward

Thu 3/21/2024 7:54 PM

Dear Madam,

Thank you for your response.
We are targeting the [IEEE CFP] ICETCI 2024 | Mahindra University, Hyderabad | Aug 22-24, 2024 for the submission of our manuscript.

Sincerely,
Kalana Madhuranga

Sanika Wijayasekara
To: Vijerathna A.G.V.K.M it20644826

Reply | Reply all | Forward

Sat 3/23/2024 5:27 PM

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

Dear Student,

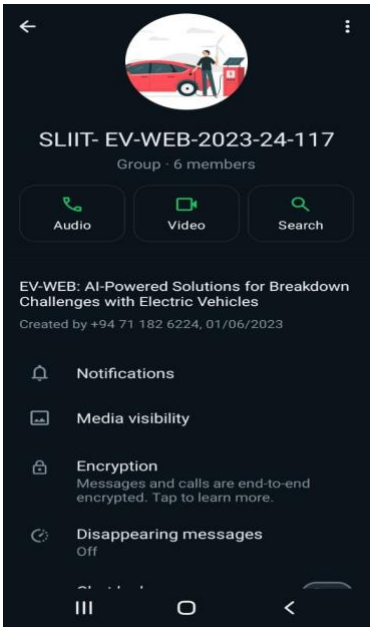
Please proceed with [IEEE CFP] ICETCI 2024 | Mahindra University, Hyderabad conference.

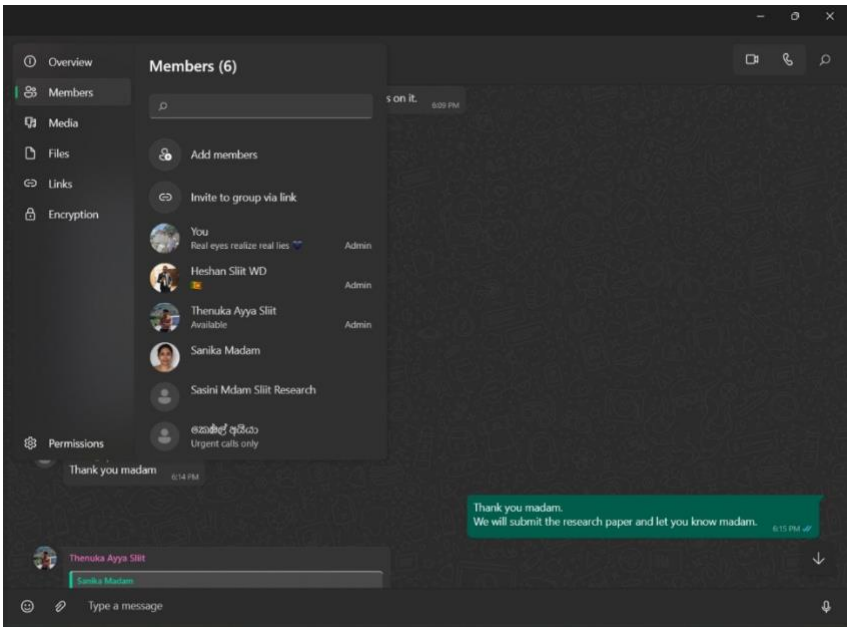
Thank You,

Sanika K. Wijayasekara (PhD)
Assistant Professor
Department of Computer System Engineering
Faculty of Computing
SLIIT, Malabe Campus, Sri Lanka

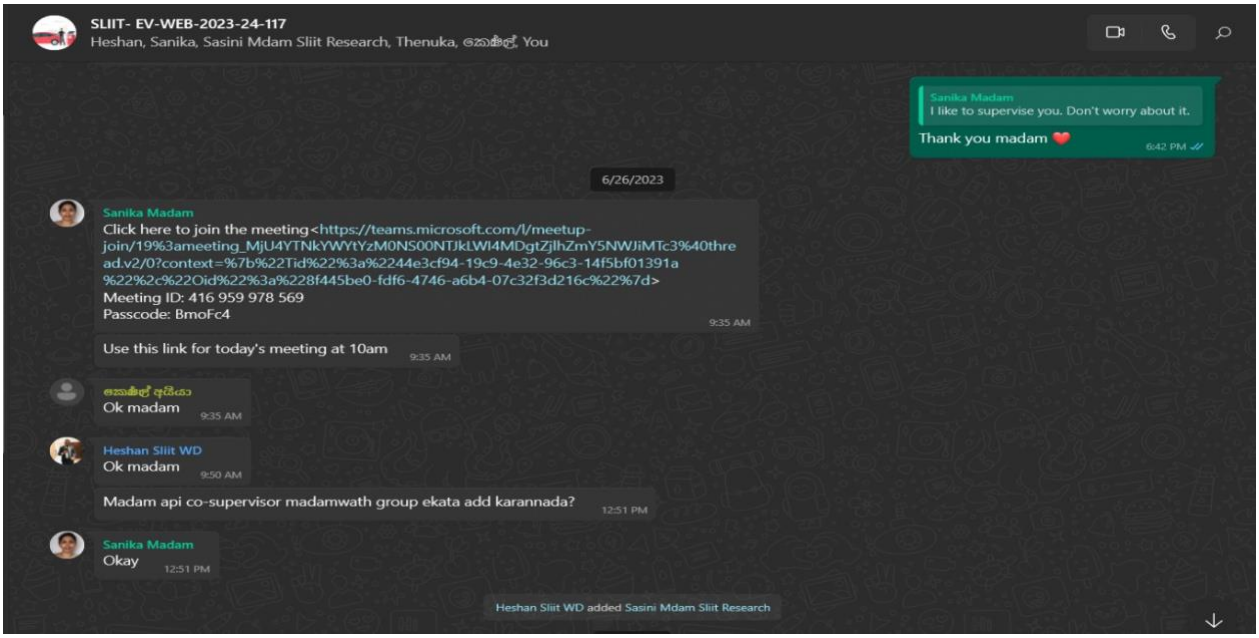
4. Maintain the WhatsApp Group

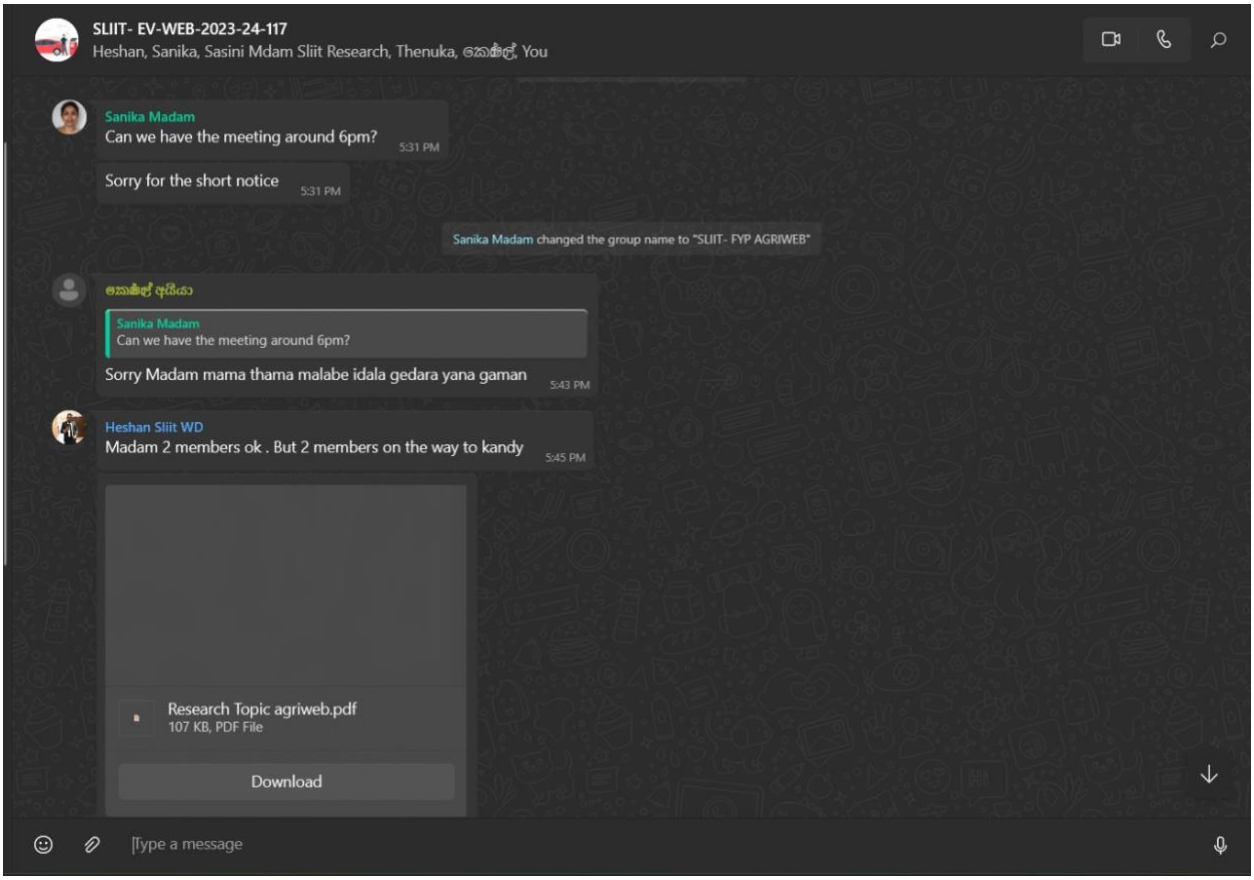
4.1 WhatsApp Group Details





4.2 WhatsApp Group Chats




SLIIT- EV-WEB-2023-24-117
Heshan, Sanika, Sasini Mdam Sliit Research, Thenuka, ශකෂිල්, You
Sanika Madam
Can we have the meeting around 6pm?
5:31 PM
Sorry for the short notice
5:31 PM
Sanika Madam changed the group name to "SLIIT- FYP AGRIWEB"
ශකෂිල් ඇයියා
Sanika Madam
Can we have the meeting around 6pm?
Sorry Madam mama thama malabe idala gedara yana gaman
5:43 PM
Heshan Sliit WD
Madam 2 members ok . But 2 members on the way to kandy
5:45 PM
Research Topic agriweb.pdf
107 KB, PDF File
Download
Type a message

5. Test Results

5.1 Datasets

Sheet 1

EV Dataset

Description	Breakdown Type
Car won't start due to battery not charging to full capacity.	Battery Issue
Touchscreen is unresponsive and can't access vehicle settings.	Software Issue
Vehicle makes unusual noise when accelerating.	Motor Issue
Charging station disconnects frequently during charge cycle.	Charging Infrastructure
Dashboard displays error code related to the propulsion system.	Motor Issue
User unable to initiate charging session via app.	User Error
Regenerative braking not working as expected.	Software Issue
Battery drains faster than estimated range.	Battery Issue
Fast charging causes error message on dashboard.	Charging Infrastructure
Driver inputs incorrect charging settings, causing failure.	User Error
Headlights flicker intermittently while driving at night.	Electrical Issue
Navigation system fails to provide accurate directions.	Software Issue
Vehicle emits a burning smell after extended use.	Mechanical Issue
Unable to engage cruise control despite repeated attempts.	User Error
Air conditioning system blows warm air instead of cold.	Mechanical Issue
Infotainment system freezes when accessing music library.	Software Issue
Steering wheel vibrates at high speeds on the highway.	Mechanical Issue
Backup camera displays distorted image with static lines.	Hardware Issue
Car alarm goes off randomly without any apparent cause.	Electrical Issue
Sunroof doesn't close completely, leaving a small gap.	Mechanical Issue
Horn doesn't sound when pressed.	Electrical Issue
Engine stalls when idling for extended periods.	Mechanical Issue
Smartphone integration fails to connect with the vehicle.	Software Issue
Windshield wipers operate erratically during rain.	Electrical Issue
Parking sensors malfunction, giving false alerts.	Hardware Issue
Power windows are slow to roll up or down.	Mechanical Issue
Steering feels loose and unresponsive while turning.	Mechanical Issue
Climate control system only blows air on one side of the car.	Mechanical Issue
Engine misfires sporadically, causing loss of power.	Mechanical Issue
Key fob doesn't unlock or lock the car remotely.	Hardware Issue
Fuel gauge shows incorrect fuel level readings.	Electrical Issue
Brake pedal feels spongy and requires excessive pressure.	Mechanical Issue
Dashboard lights dim or flicker while driving.	Electrical Issue
Gear shift lever gets stuck in a specific position.	Mechanical Issue
Remote start feature fails to activate the engine.	Hardware Issue
Engine overheats after prolonged use in heavy traffic.	Mechanical Issue
Radio emits static noise with poor reception.	Electrical Issue
Automatic transmission shifts erratically between gears.	Mechanical Issue
Windshield wipers don't retract fully when turned off.	Mechanical Issue
Climate control system blows hot air instead of cold.	Mechanical Issue

5.2 Model Training and Evaluation

```
# Model training
model = LogisticRegression(max_iter=1000)
model.fit(X_train, y_train)
```

```
LogisticRegression(max_iter=1000)
```

```
# Model prediction
y_pred = model.predict(X_test)
```

```
# Model evaluation
report = classification_report(y_test, y_pred)
print(report)
```

```
                                precision    recall  f1-score   support

      Electrical and Software Issues       0.58      1.00      0.74        25
Infrastructure and Operational Issues       1.00      0.22      0.36         9
                  Mechanical Issues       0.95      0.72      0.82        25
          Safety and Hardware Issues       1.00      0.17      0.29         6
```

5.3 Classification Reports

Support Vector Machine Classification Report:

	precision	recall	f1-score	support
Electrical and Software Issues	0.64	0.92	0.75	25
Infrastructure and Operational Issues	0.50	0.22	0.31	9
Mechanical Issues	0.95	0.80	0.87	25
Safety and Hardware Issues	1.00	0.67	0.80	6
accuracy			0.75	65
macro avg	0.77	0.65	0.68	65
weighted avg	0.77	0.75	0.74	65

XGBoost Classification Report:

	precision	recall	f1-score	support
Electrical and Software Issues	0.63	0.88	0.73	25
Infrastructure and Operational Issues	0.44	0.44	0.44	9
Mechanical Issues	0.88	0.60	0.71	25
Safety and Hardware Issues	1.00	0.67	0.80	6
accuracy			0.69	65
macro avg	0.74	0.65	0.67	65
weighted avg	0.73	0.69	0.69	65

Random Forest Classification Report:

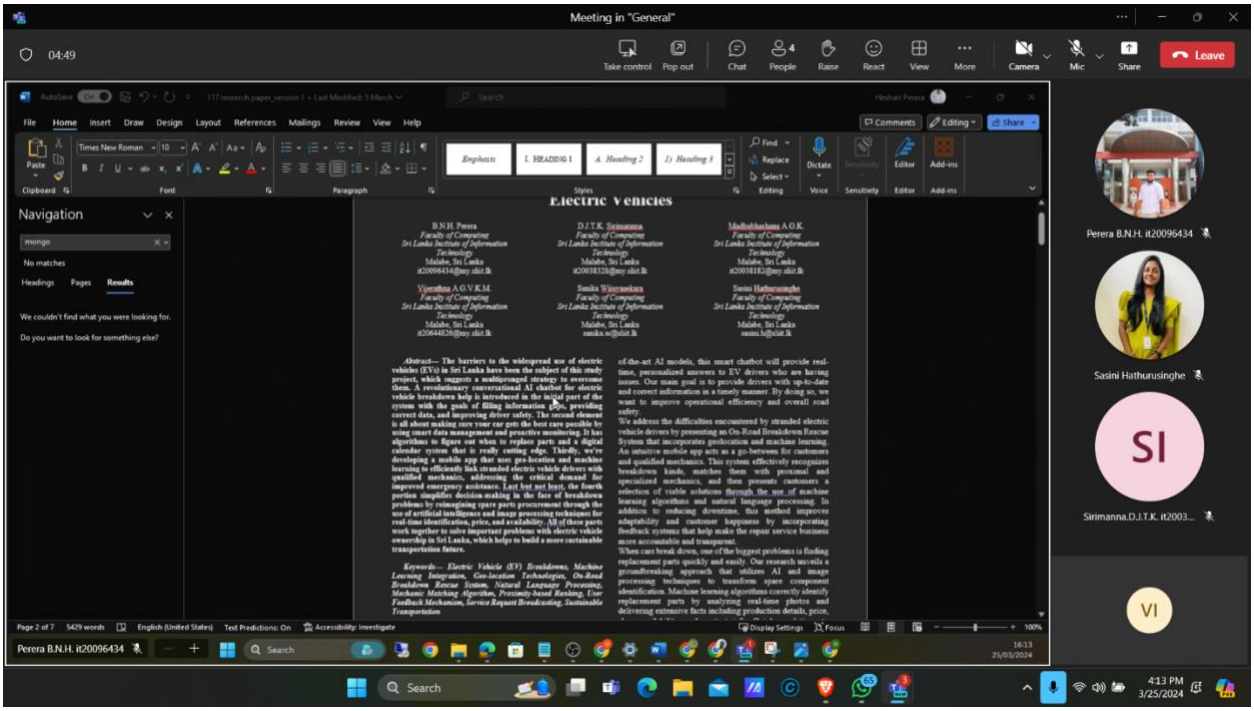
	precision	recall	f1-score	support
Electrical and Software Issues	0.61	0.92	0.73	25
Infrastructure and Operational Issues	0.67	0.44	0.53	9
Mechanical Issues	0.94	0.64	0.76	25
Safety and Hardware Issues	1.00	0.67	0.80	6
accuracy			0.72	65
macro avg	0.80	0.67	0.71	65
weighted avg	0.78	0.72	0.72	65

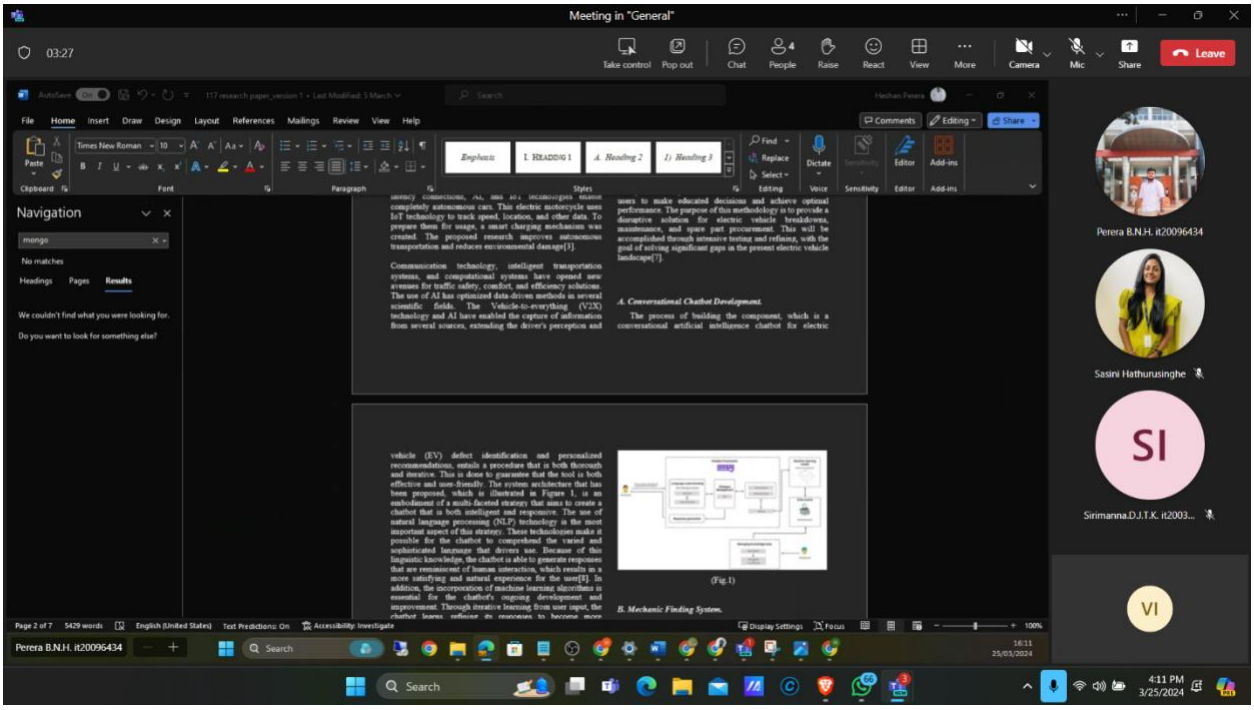
5.4 Model Accuracy

```
[18]
from sklearn.metrics import accuracy_score

model.eval()
predictions, true_labels = [], []
for batch in loader:
    batch = {k: v.to(device) for k, v in batch.items()}
    with torch.no_grad():
        outputs = model(**batch)

    logits = outputs.logits
    predictions.extend(torch.argmax(logits, dim=-1).tolist())
    true_labels.extend(batch['labels'].tolist())

print("Accuracy:", accuracy_score(true_labels, predictions))
```

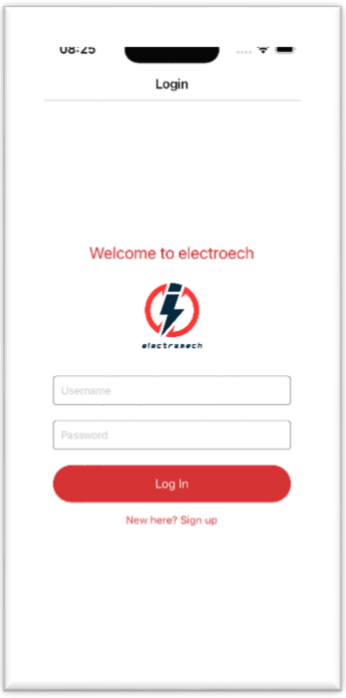
```
Accuracy: 0.8307692307692308
```

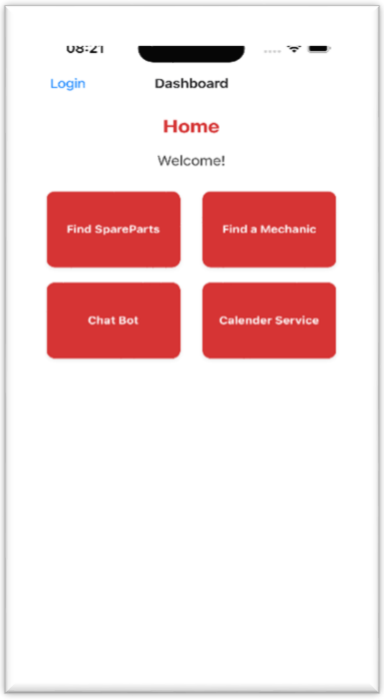
6. Research Paper Works

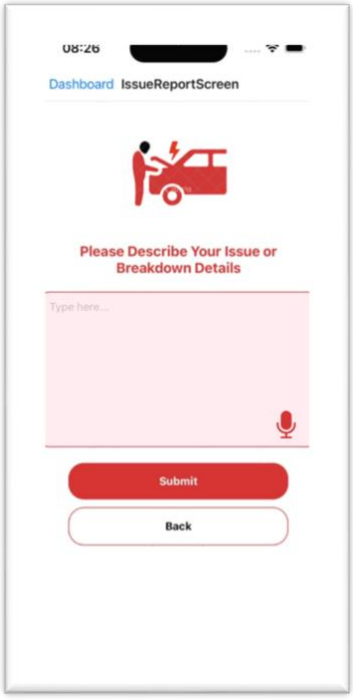


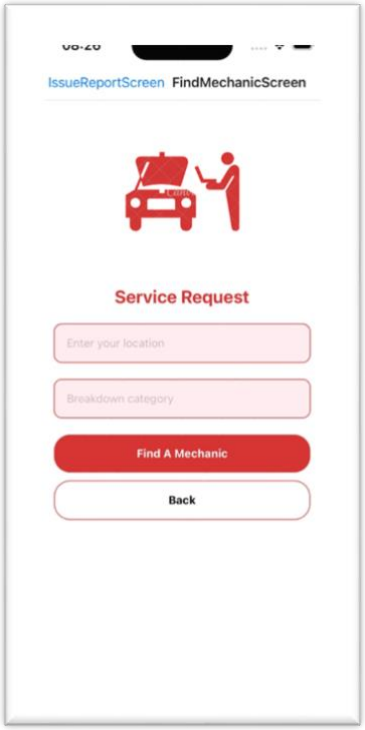


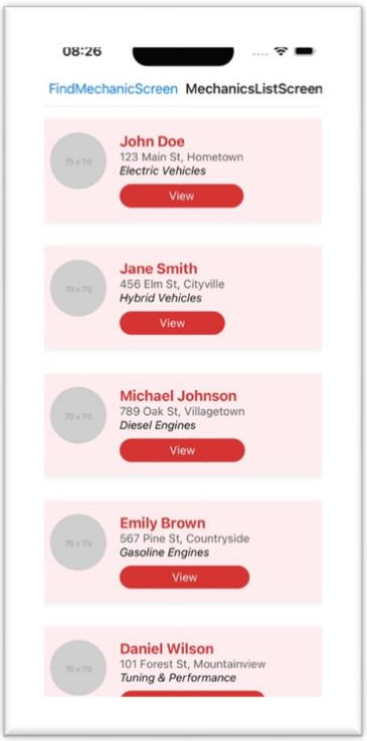
7. Mobile Application





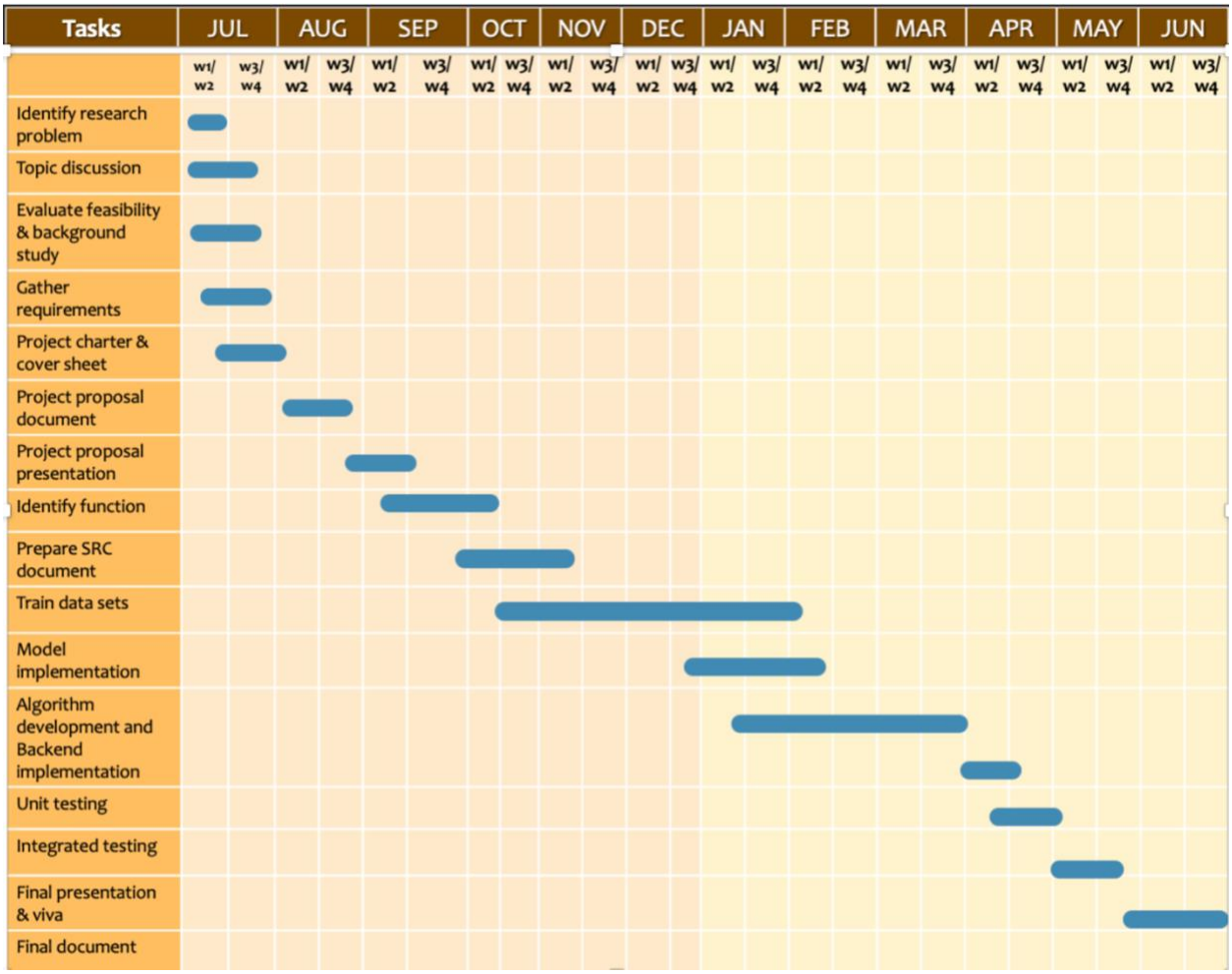
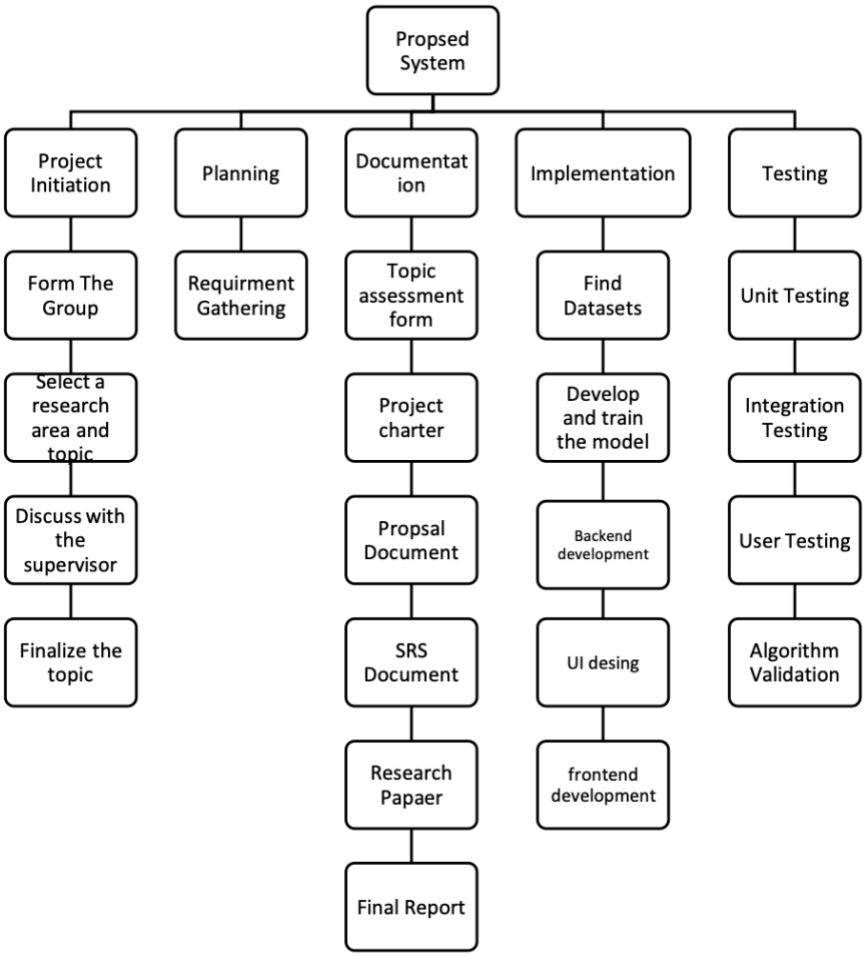






8. App Logo

9. Gannt Chart



10. Work Breakdown Chart