



AI-Powered Solutions for Breakdown Challenges with Electric Vehicles

EV SPARE PARTS SHOP FINDING SERVICE

Project Id: 2023-24-117

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BSc (Hons) in Information Technology Specializing in Information
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1. Group Gatherings

1.1 Meetings with Supervisor

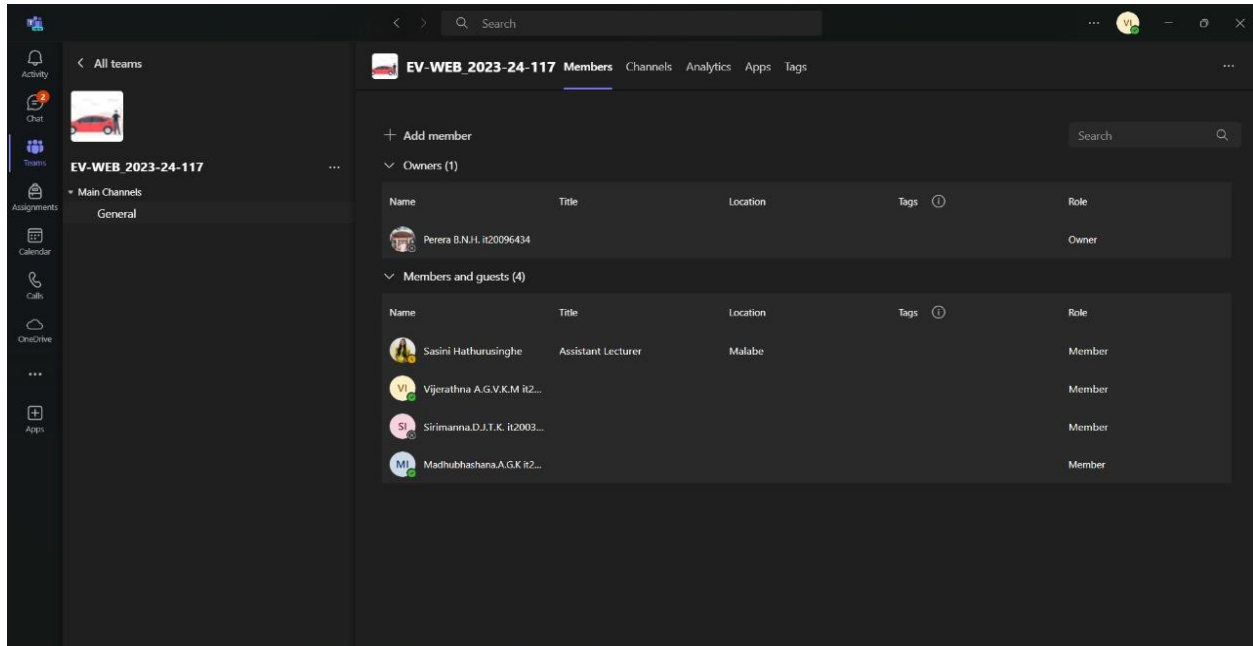


1.2 Group Members

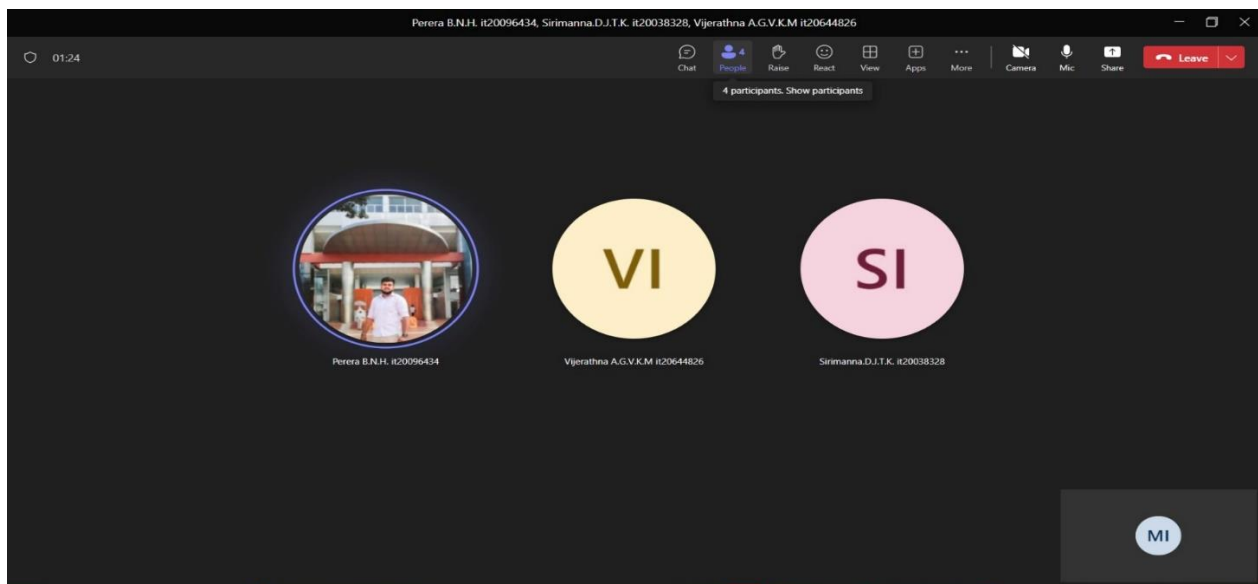


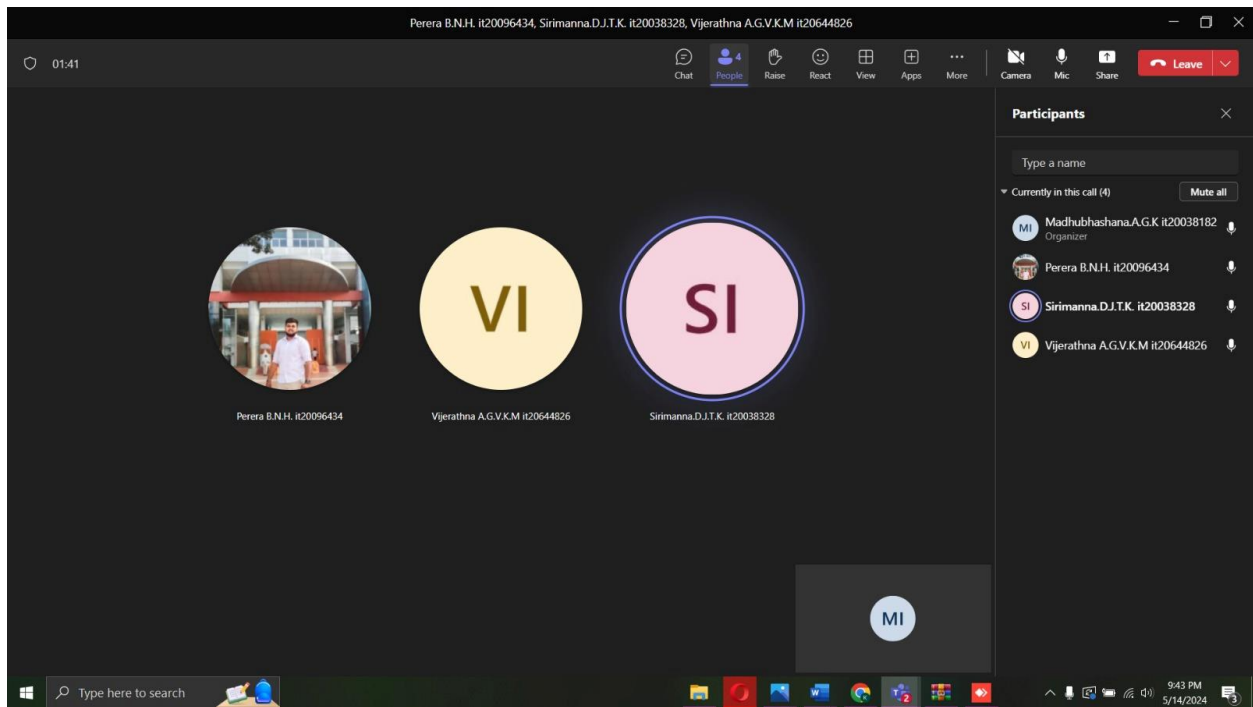
2. MS Teams Details

2.1 Team and Team Members

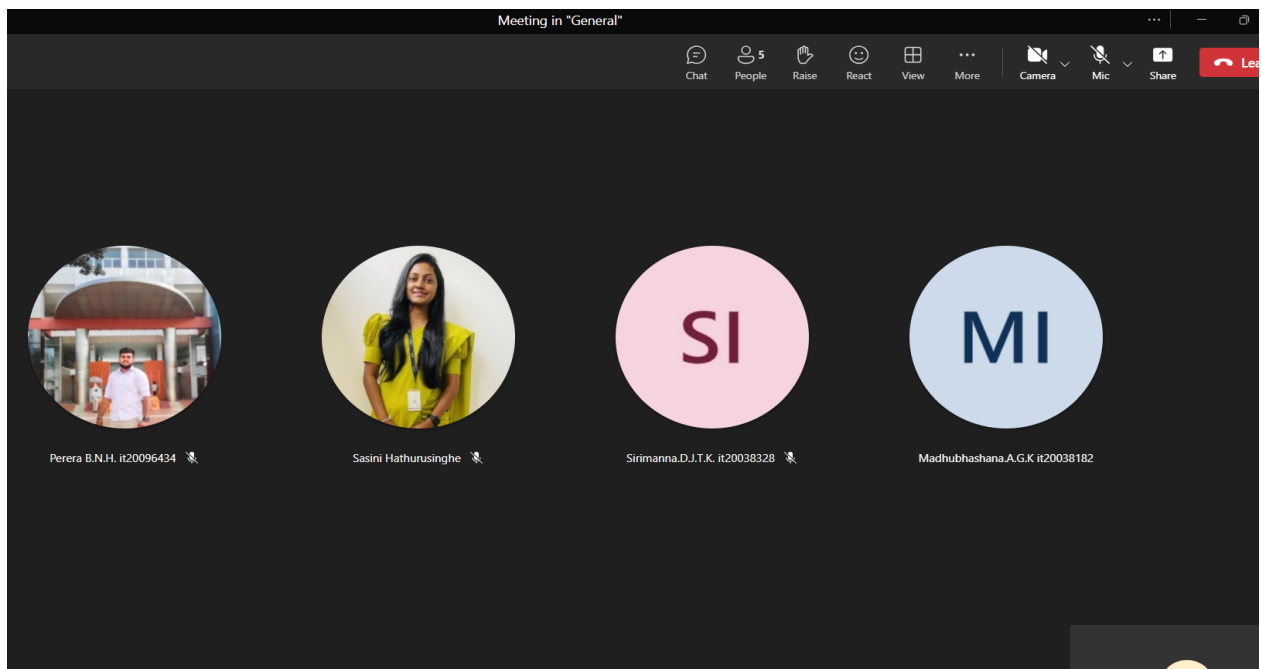


2.2 Teams Calls with Research Team



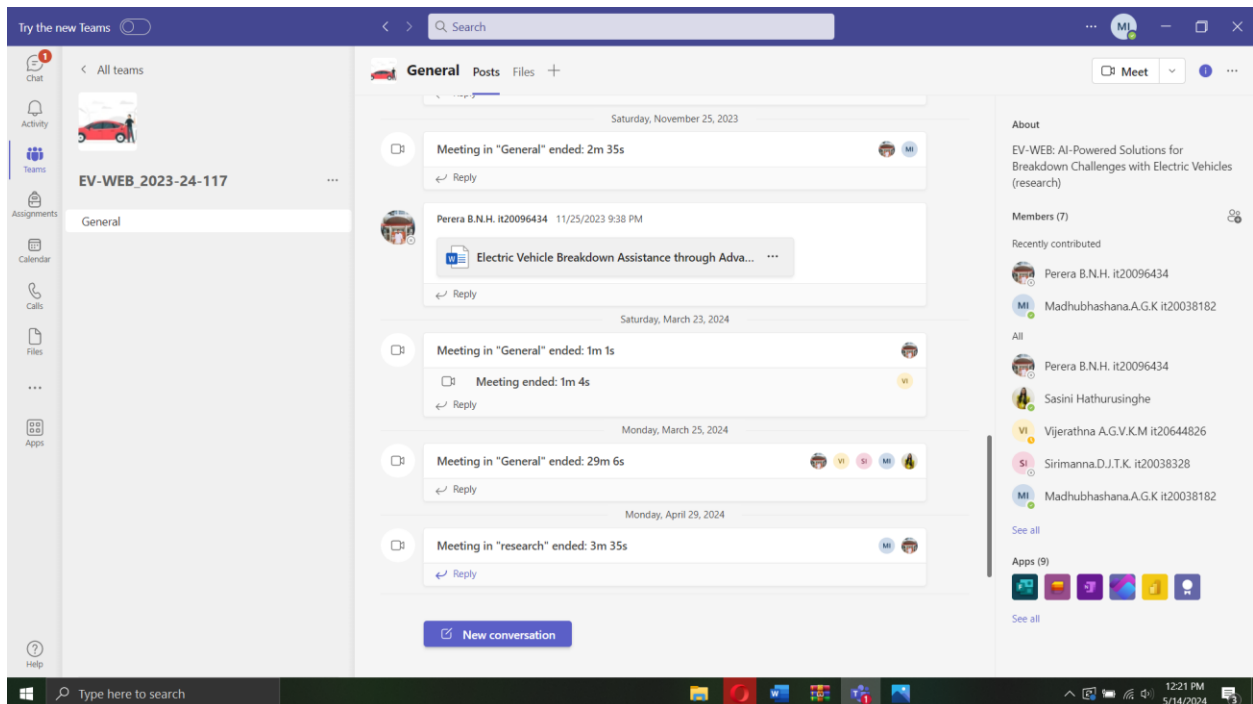


2.3 Teams calls with co supervisor



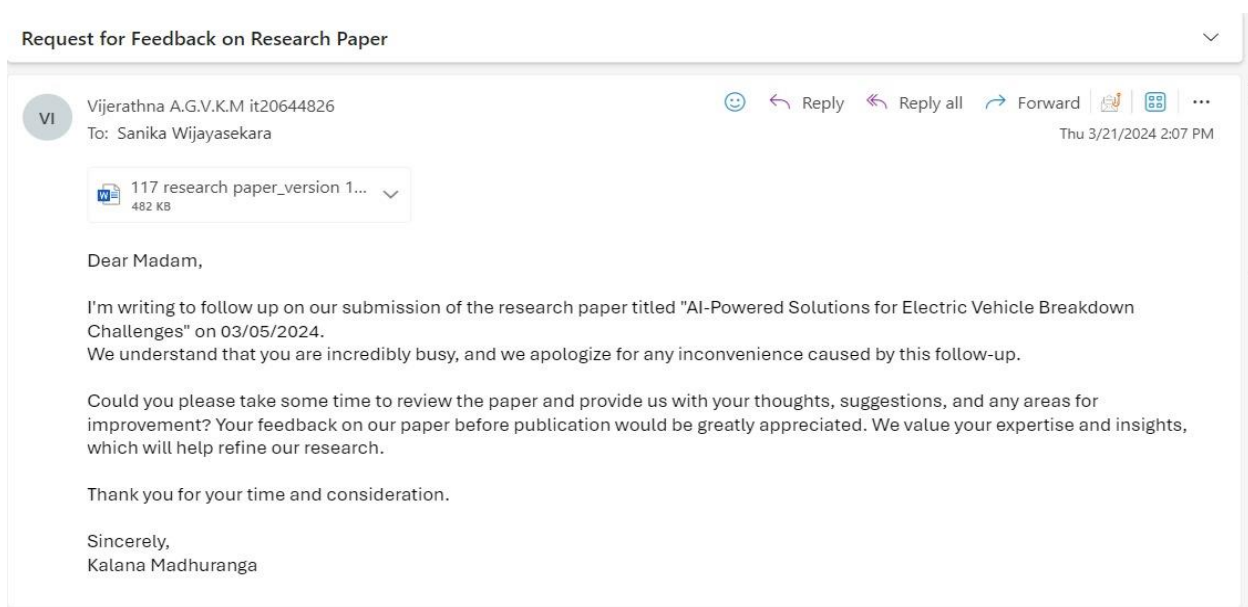


2.5 Teams Group Chat



3. Emails on Outlook

3.1 Outlook Mails with Supervisor





Sanika Wijayasekara

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Thank You,

Sanika K. Wijayasekara (PhD)

Assistant Professor

Department of Computer System Engineering

Faculty of Computing

SLIIT, Malabe Campus, Sri Lanka.

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...

Request for Feedback on Research Paper

VI

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Dear Madam,

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Kalana Madhuranga

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Sanika K. Wijayasekara (PhD)

Assistant Professor

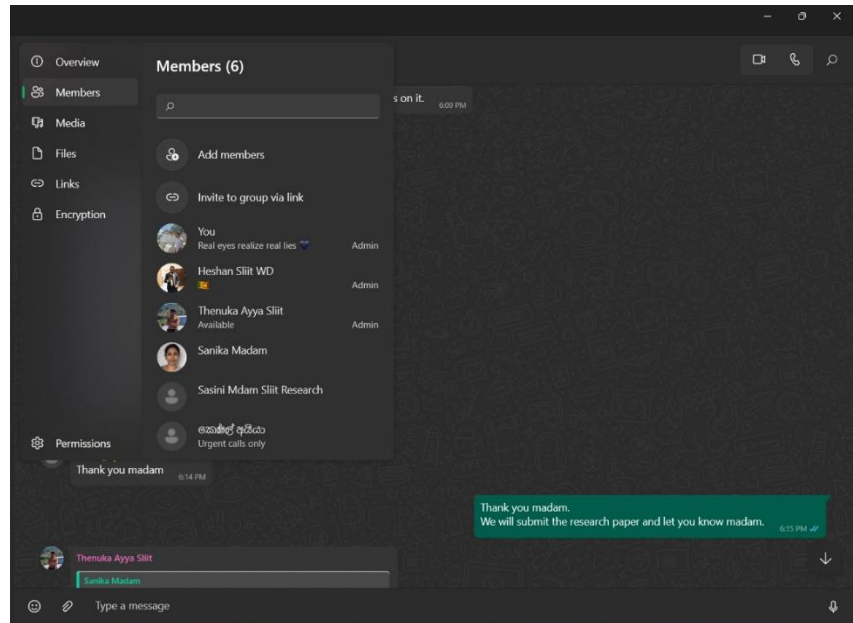
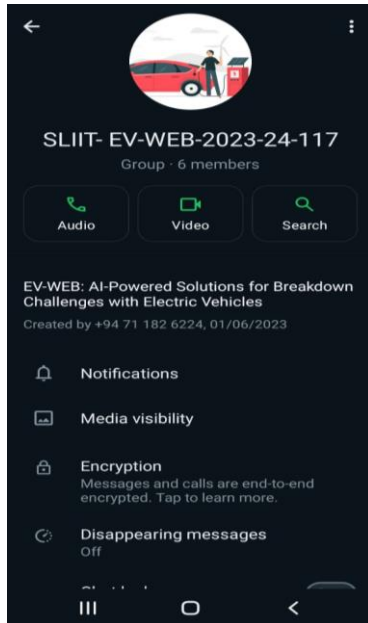
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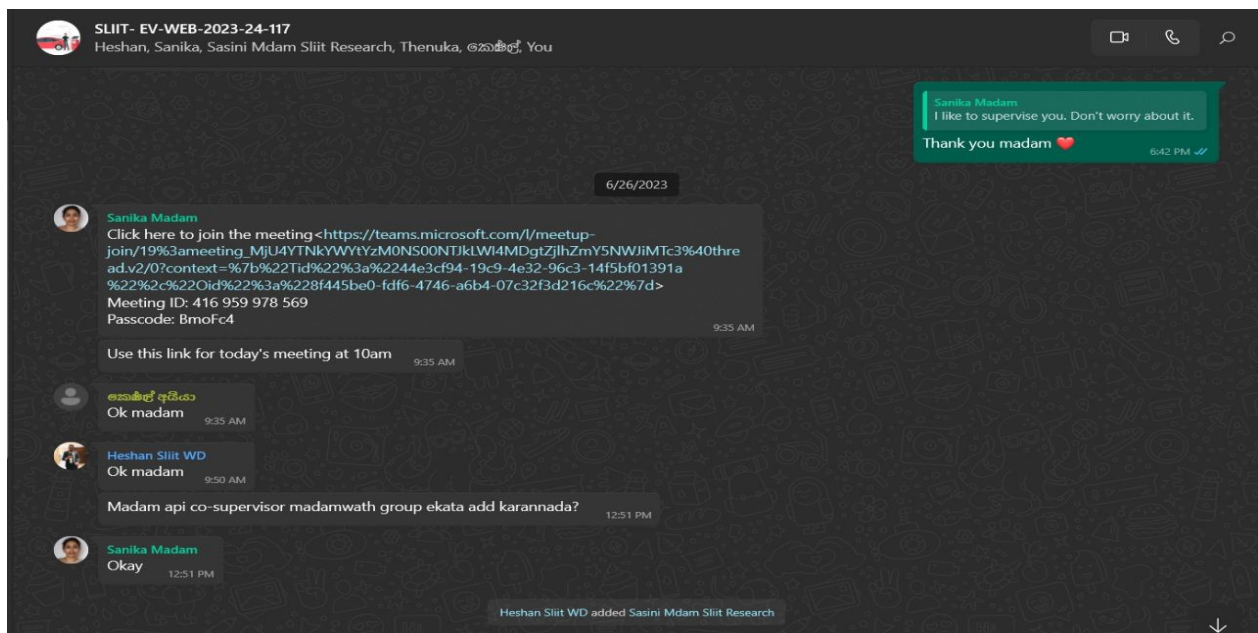
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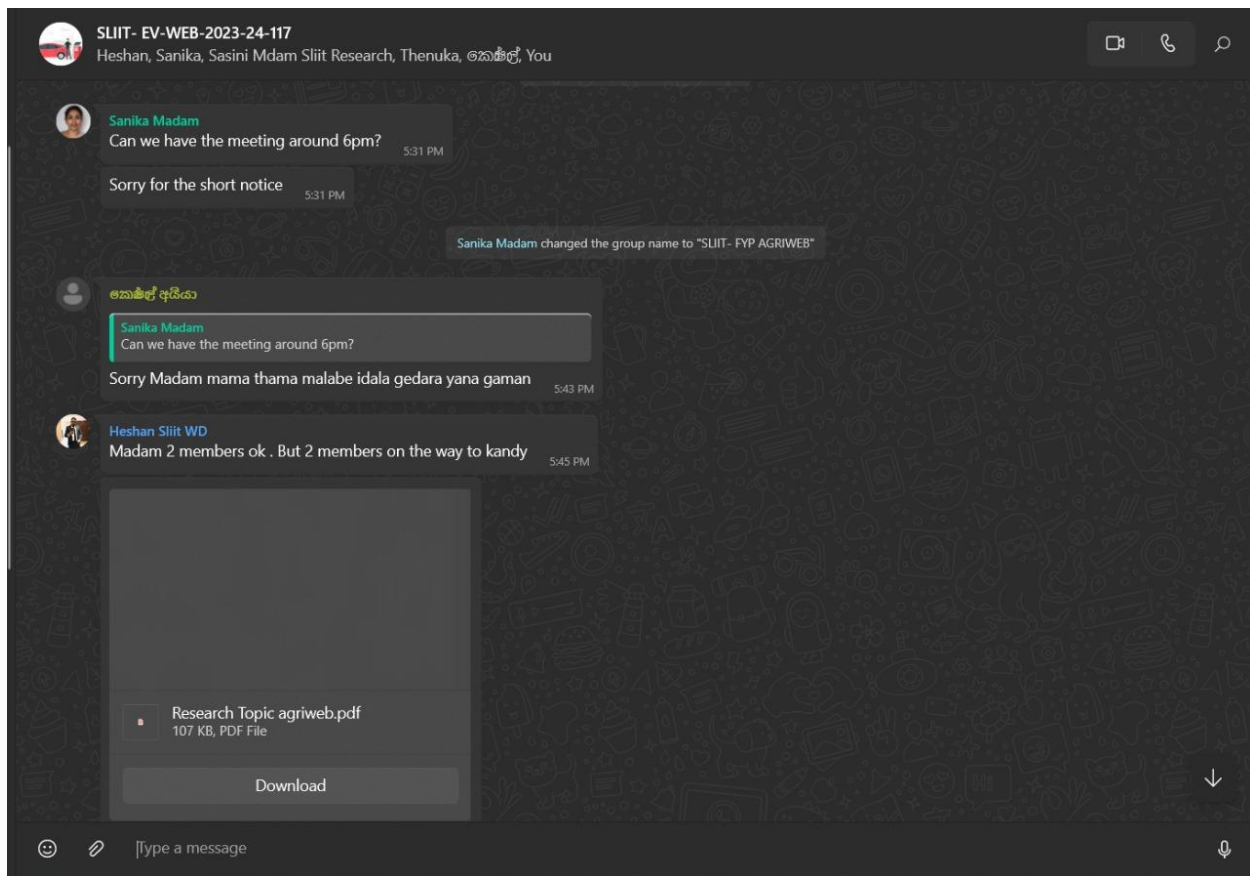
4. Maintain the WhatsApp Group

4.1 WhatsApp Group Details



4.2 WhatsApp Group Chats



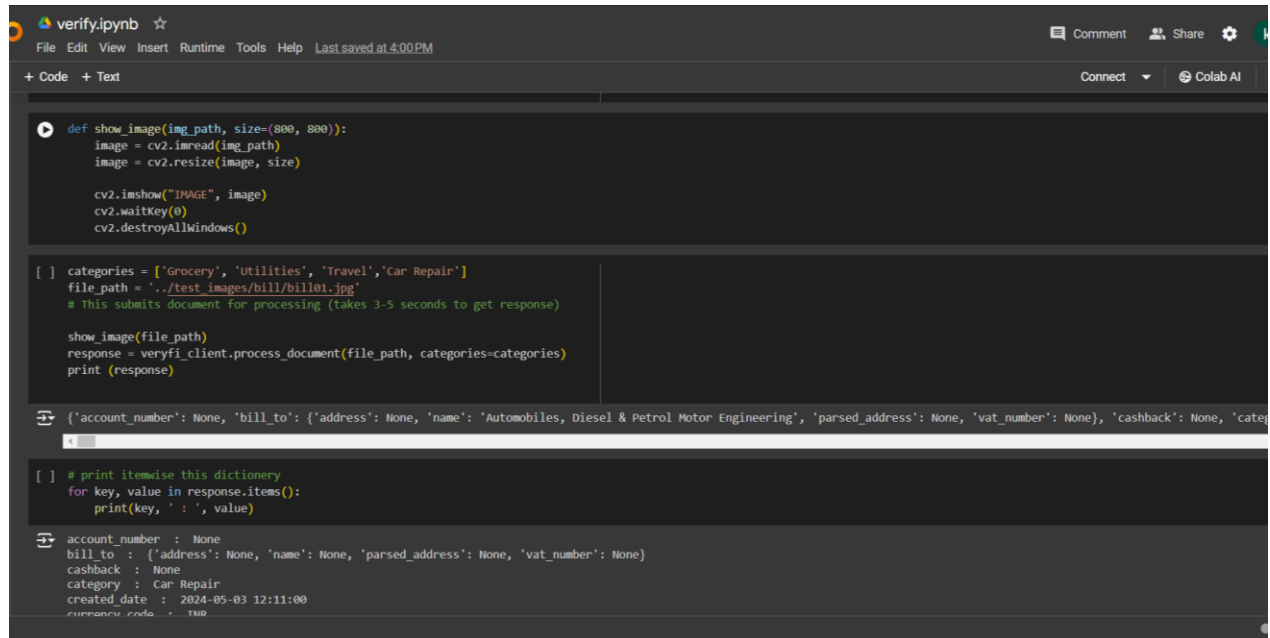


5. Models

5.1 Dataset

Power steel internal	30	275042	Electric Sc new	Central Hig Mountain R	69 months
Driveshaft internal	233	103328	NEV new	Central Hig Road Cons	88 months
HVAC control internal	47	169789	Electric Bic new	Dry Zone Road Haza	47 months
Rack and pinion internal	123	339084	Electric Sc new	Intermedia Rural Road	56 months
Suspension internal	16	77564	EV used	Central Hig Urban Roa	41402 km
12V Battery internal	176	27943	Electric Bic new	Intermedia Traffic Cor	72 months
Wheel speed internal	192	28442	NEV new	Intermedia Coastal Ro	36562 km
Wheel speed internal	77	349987	HEV new	Lowland C Urban Roa	40155 km
Interior light internal	30	111999	PHEV new	Central Hig Rural Road	39136 km
Rearview mirror internal	233	105602	FCEV new	Central Hig Rural Road	40217 km
Wheel speed internal	234	30462	EV new	Lowland C Road Cons	37534 km
Speakers internal	62	337593	HEV new	Dry Zone Traffic Cor	39151 km
Rearview Camera internal	7	255383	FCEV used	Central Hig Rural Road	40342 km
Power steering internal	228	258359	BEV used	Lowland C Rural Road	67 months
Key Fob external	240	169355	NEV new	Intermedia Highways &	40622 km

5.2 OCR Model



The screenshot shows a Jupyter Notebook interface with the title 'verify.ipynb'. The code is written in Python and includes a function to display an image, a list of categories, and a call to a document processing API. The output shows a dictionary with various fields, including 'category' which is 'Car Repair'.

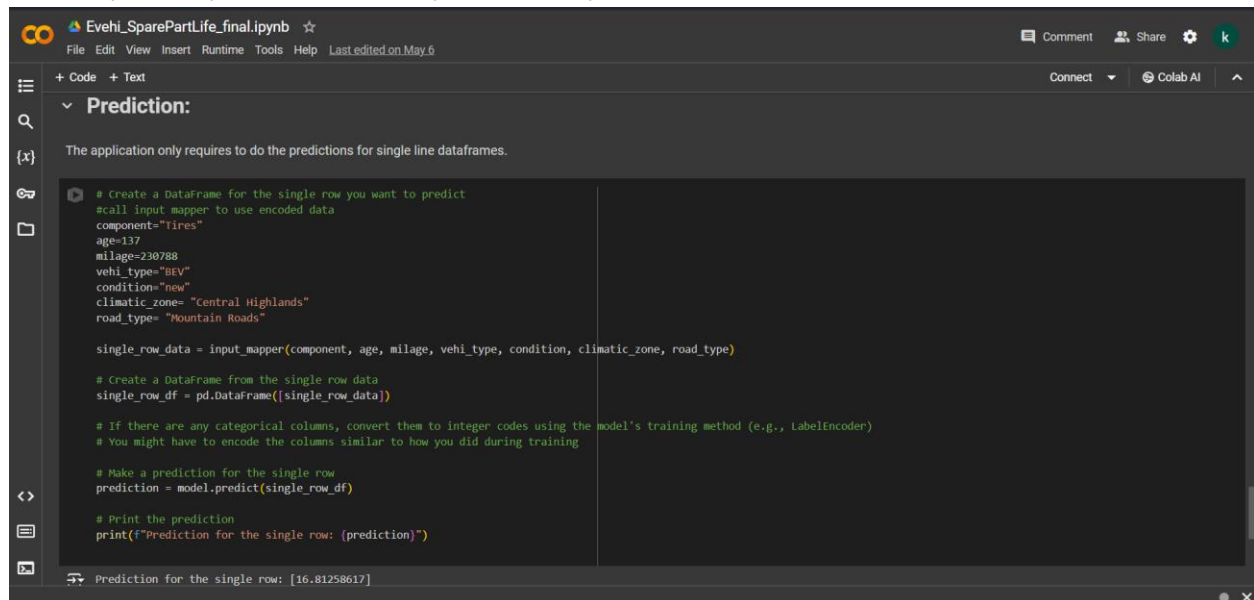
```
def show_image(img_path, size=(800, 800)):
    image = cv2.imread(img_path)
    image = cv2.resize(image, size)

    cv2.imshow("IMAGE", image)
    cv2.waitKey(0)
    cv2.destroyAllWindows()

categories = ['Grocery', 'Utilities', 'Travel', 'Car Repair']
file_path = '../test_images/bill/bill01.jpg'
# This submits document for processing (takes 3-5 seconds to get response)
show_image(file_path)
response = verify_client.process_document(file_path, categories=categories)
print(response)

{'account_number': None, 'bill_to': {'address': None, 'name': 'Automobiles, Diesel & Petrol Motor Engineering', 'parsed_address': None, 'vat_number': None}, 'cashback': None, 'category': 'Car Repair', 'created_date': '2024-05-03 12:11:00', 'currency_code': 'TND'}
```

5.3 Spare parts life expectancy Prediction



The screenshot shows a Jupyter Notebook interface with the title 'Evehi_SparePartLife_final.ipynb'. The code is written in Python and includes a function to create a DataFrame from input data, convert categorical columns to integer codes, and make a prediction using a model. The output shows the prediction for a single row: [16.81258617].

```
# Create a DataFrame for the single row you want to predict
# call input mapper to use encoded data
component="fires"
age=137
milage=230788
vehi_type="BEV"
condition="new"
climatic_zone= "Central Highlands"
road_type= "Mountain Roads"

single_row_data = input_mapper(component, age, milage, vehi_type, condition, climatic_zone, road_type)

# Create a DataFrame from the single row data
single_row_df = pd.DataFrame([single_row_data])

# If there are any categorical columns, convert them to integer codes using the model's training method (e.g., LabelEncoder)
# You might have to encode the columns similar to how you did during training

# Make a prediction for the single row
prediction = model.predict(single_row_df)

# Print the prediction
print(f"Prediction for the single row: {prediction}")

Prediction for the single row: [16.81258617]
```

6. Research Paper Works

Meeting in "General"

04:49

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Abstract—The barriers to the widespread use of electric vehicles (EVs) in Sri Lanka have been the subject of this study project, which suggests a multi-pronged strategy to overcome them. A revolutionary conventional AI chatbot for electric vehicle breakdown help is introduced in the initial part of the system with the goal of filling information gaps, providing correct data, and improving driver safety. The second element is all about making sure your car gets the best care possible by using smart data management and proactive monitoring. It has algorithms to figure out when to replace parts and a digital calendar system that is really cutting edge. Thirdly, we're developing a mobile app that uses geo-location and machine learning to efficiently track electric vehicle drivers with qualified mechanics, addressing the critical demand for improved emergency assistance. Last but not least, the fourth prong simplifies decision-making in the face of breakdown problems by reimagining spare parts procurement through the use of artificial intelligence and image processing techniques for real-time identification, price, and availability. All of these parts work together to solve important problems with electric vehicle ownership in Sri Lanka, which helps to build a more sustainable transportation future.

Keywords—Electric Vehicle (EV) Breakdowns, Machine Learning, Integration, Geolocation, Technologies, On-Road Breakdown Rescue System, Natural Language Processing, Machine Matching, Algorithms, Personality-based Ranking, User Feedback Mechanism, Service Request Broadcasting, Sustainable Transportation

Page 2 of 7 5429 words English (United States) Text Predictions: On Accessibility: Investigate

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16:13 25/03/2024

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agency connections, AI, and IoT technologies assist completely autonomous cars. This electric motorcycle uses IoT technology to track speed, location, and other data. To prepare them for stage, a smart charging mechanism was created. The proposed research improves autonomous transportation and reduces environmental damage[1].

Communication technology, intelligent transportation systems, and computational systems have opened new avenues for traffic safety, comfort, and efficiency solutions. The use of AI has optimized data-driven methods in several scientific fields. The "Vehicle-to-everything" (V2X) technology and AI have enabled the capture of information from several sources, extending the driver's perception and

users to make educated decisions and achieve optimal performance. The purpose of this methodology is to provide a disruptive solution for electric vehicle breakdowns, maintenance, and spare part procurement. This will be accomplished through intensive testing and refining, with the goal of solving significant gaps in the present electric vehicle landscape[7].

A. Generalized Chatbot Development

The process of building the component, which is a conversational artificial intelligence chatbot for electric

vehicle (EV) defect identification and personalized recommendations, entails a procedure that is both thorough and iterative. This is done to guarantee that the tool is both effective and user-friendly. The system architecture that has been proposed, which is illustrated in Figure 1, is an embodiment of a multi-focused strategy that aims to create a chatbot that is both intelligent and responsive. The use of natural language processing (NLP) technology is the most important aspect of this strategy. These technologies make it possible for the chatbot to comprehend the "rained and sophisticated language that drivers use. Because of this linguistic knowledge, the chatbot is able to generate responses that are reminiscent of human interaction, which results in a more satisfying and natural experience for the user[5]. In addition, the incorporation of machine learning algorithms is essential for the chatbot's ongoing development and improvement. Through iterative learning from user input, the chatbot learns, refines its responses to become more

(Fig.1)

B. Mechanic-Finding System

Page 2 of 7 5429 words English (United States) Text Predictions: On Accessibility: Investigate

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16:11 25/03/2024

7. Mobile Application

08:25

Login

Welcome to electroech



Username

Password

Log In

New here? Sign up

01:06

Login Dashboard

Home

Welcome!

Find Spare Parts Find a Mechanic

Chat Bot Calendar Service

Scan Bill

00:57

Dashboard RegisterVehicleScreen

Register Vehicle

Vehicle Model

Vehicle No

Vehicle Owner

Gender:
Male (Selected)
Female

Nature of Driver:
Beginner (Selected)
Medium
Expert

Nature of Road:
Highway (Selected)
Urban
Rural

Register

08:33



electramech

00:58

RegisterVehicleScreen UploadMileageScr...

Upload Vehicle Mileage

Enter mileage in KM KM

Submit

Skip

00:58

UploadMileageScreen MonitoringCalenda...

< March 2023 >

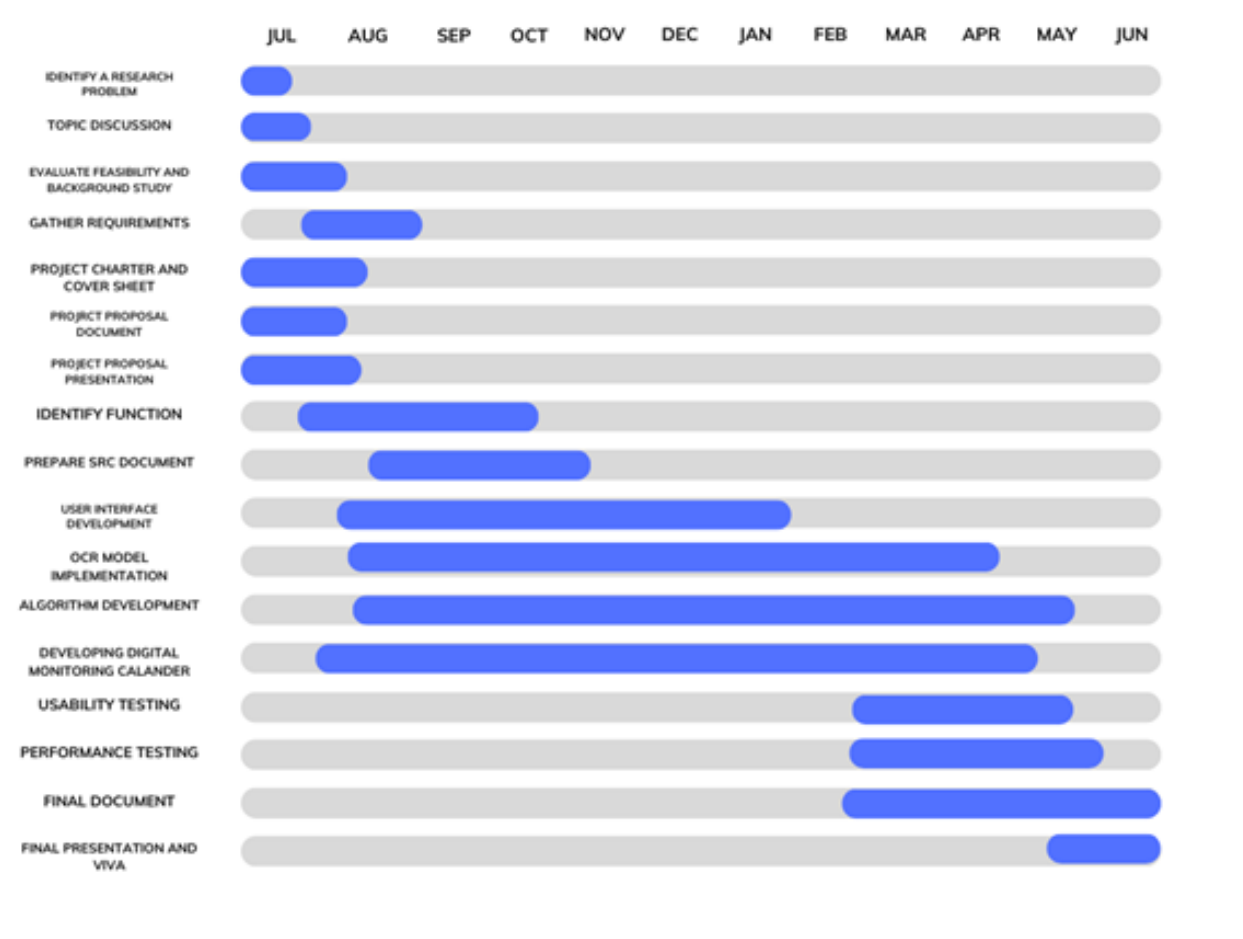
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20	21	22	23	24	25	26
27	28	29	30	31		

otifications:
ou should replace the motor before 6th March.

8. App Logo



9. Gantt Chart



10. Work Breakdown Chart

