

Train Detection & Alert System

Status Document – 02



B.Sc. (Hons) Degree in Information Technology

Specialized Data Science

Department of Information Technology

Group: 23-302

Jayanga B.M.C – IT20188672

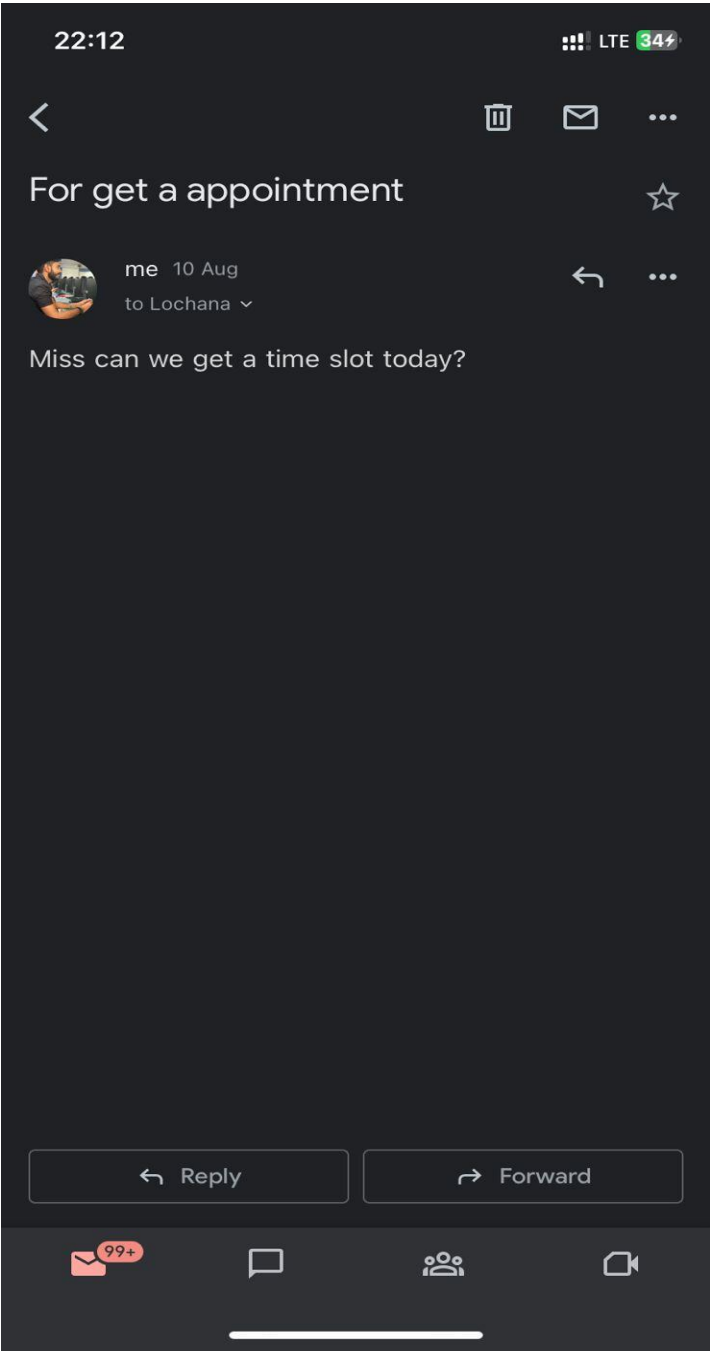
Submission Date: 07/09/2023

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1. Communication with Supervisors

1.1. Visiting the Supervisor and the co-supervisor regularly.



16:51

LTE 72



Re: For Research Progress Meeting

Inbox



Lochana Rajamanthri 24 May

to me ▾



Dear Vihan,

Come and meet me at 9.30 am.

Best Regards,
Lochana Rajamanthri

Lecturer| SLIIT Business School | SLIIT |
www.sliit.lk/business<<http://www.sliit.lk/business>>

Phone: +94(0)11 754 4801 - Ext 4614 | Email:
lochana.r@sliit.lk

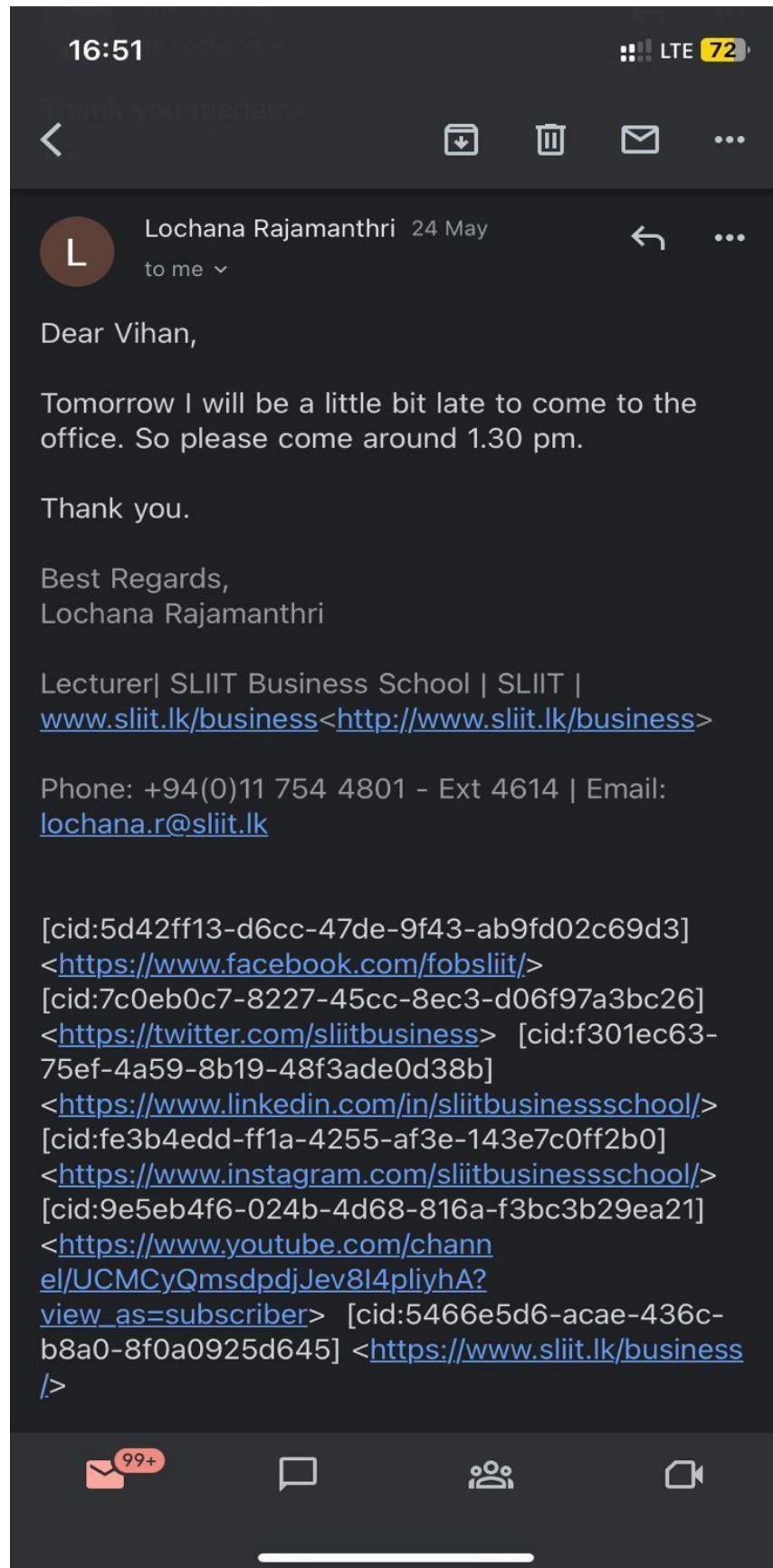
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<<https://www.linkedin.com/in/sliitbusinessschool/>>

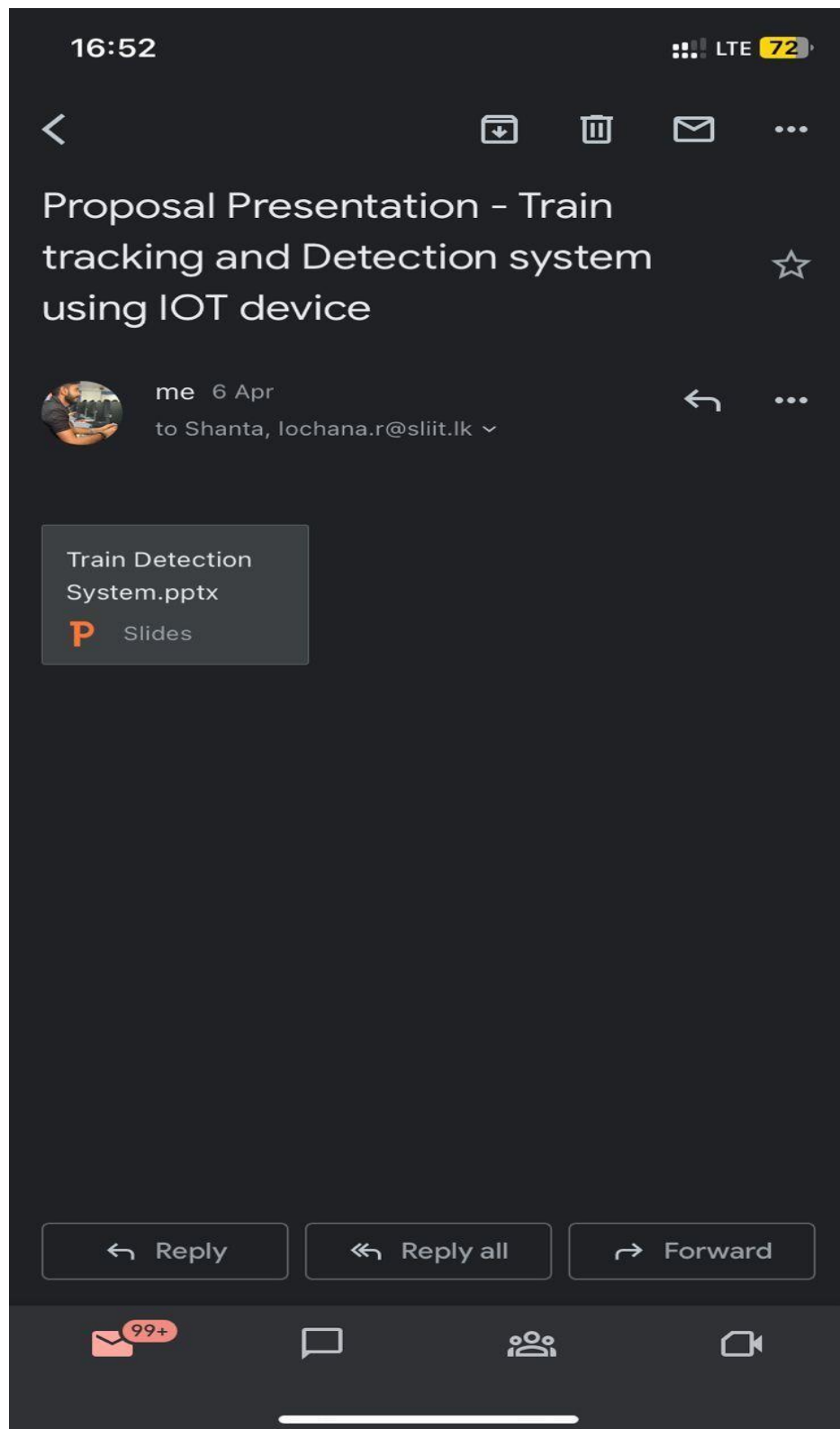
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1.1. Sending research project-related files to the Supervisor and Co-supervisor



16:52

LTE 72



Train Tracking and Detection System for Citizens



me 14 Mar

to Shanta, lochana.r@sliit.lk



Train Tracking and Detection S...



zip

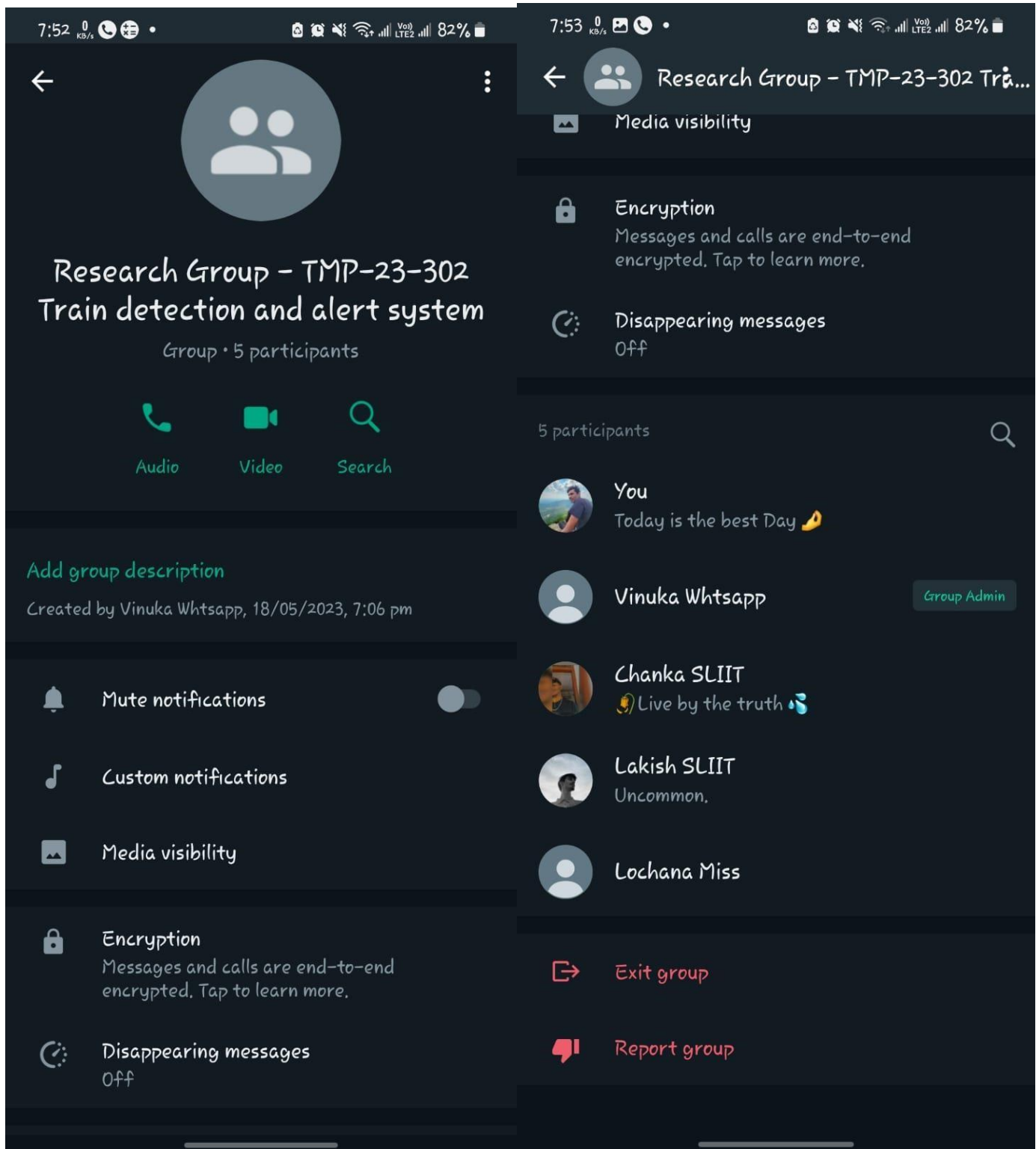
Reply

Reply all

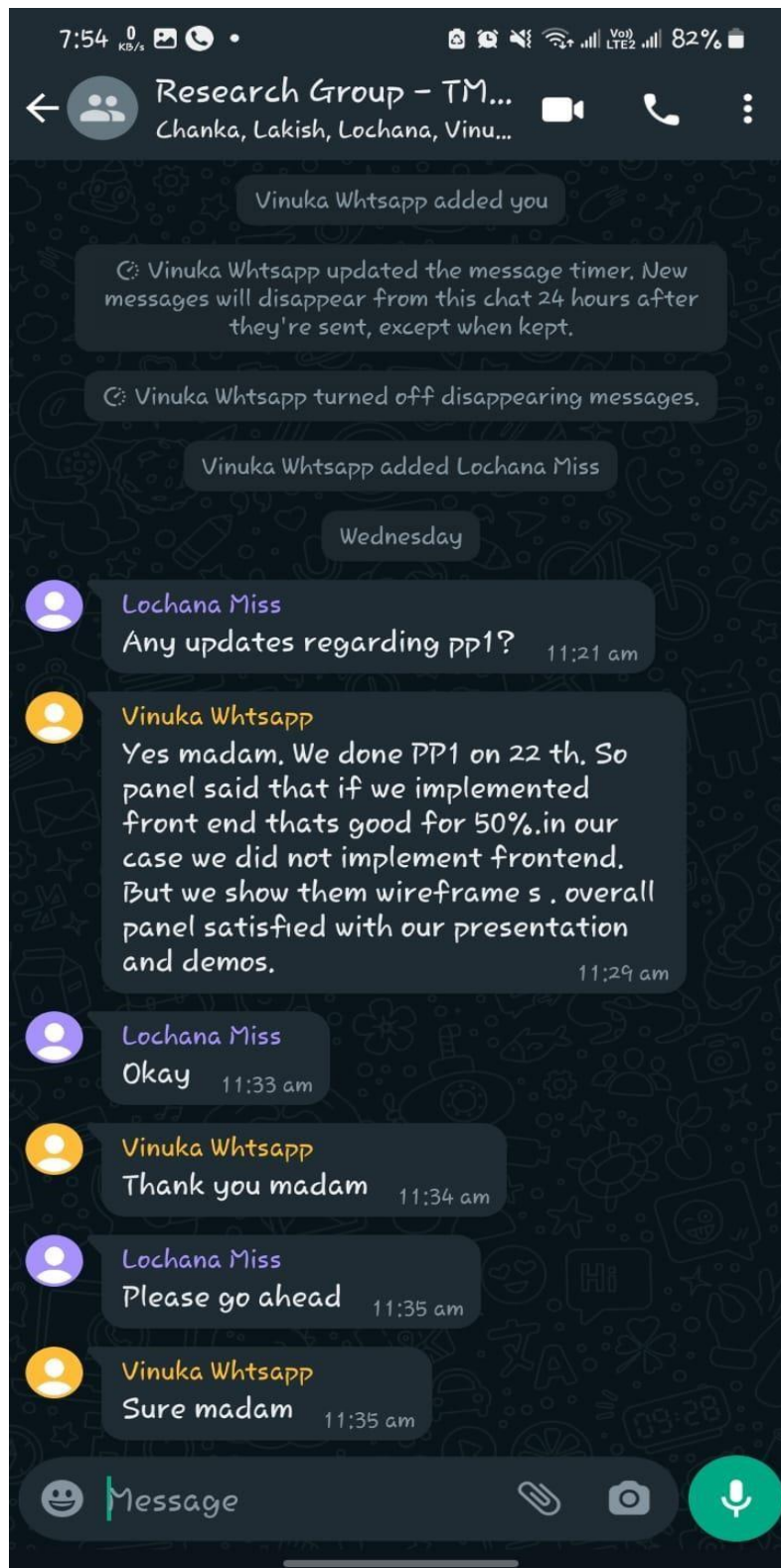
Forward



1.2. Create a WhatsApp Group with supervisor and co-supervisor

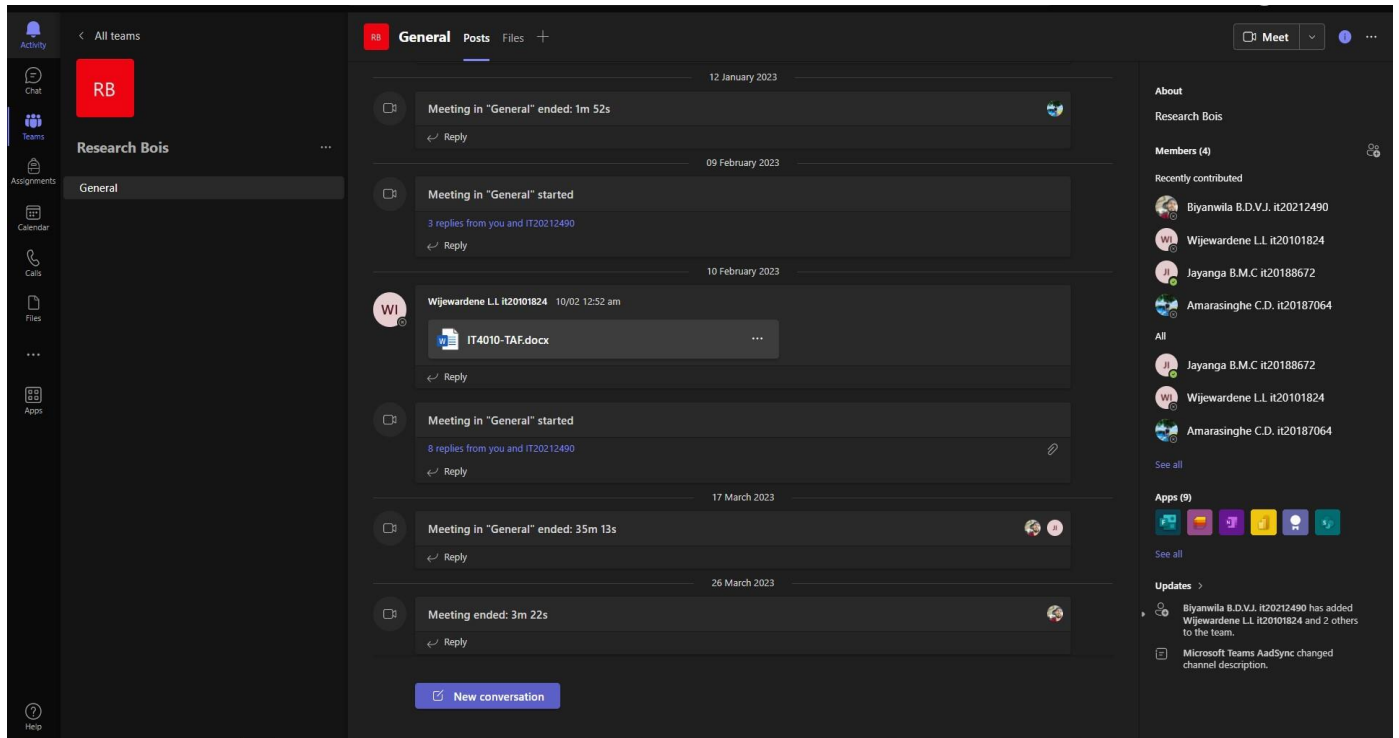


1.3. Share ideas with supervisor through WhatsApp chats.

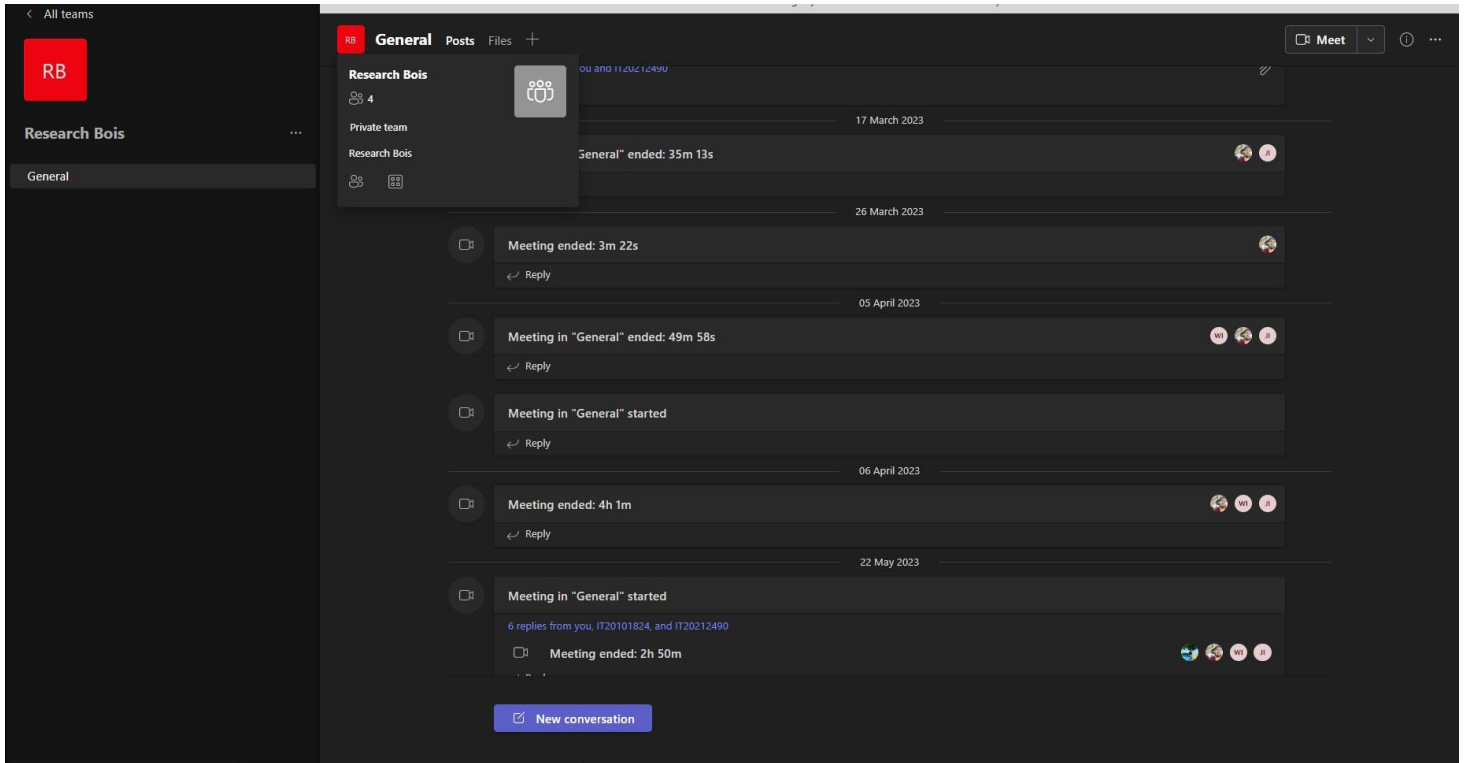


2. Research Group

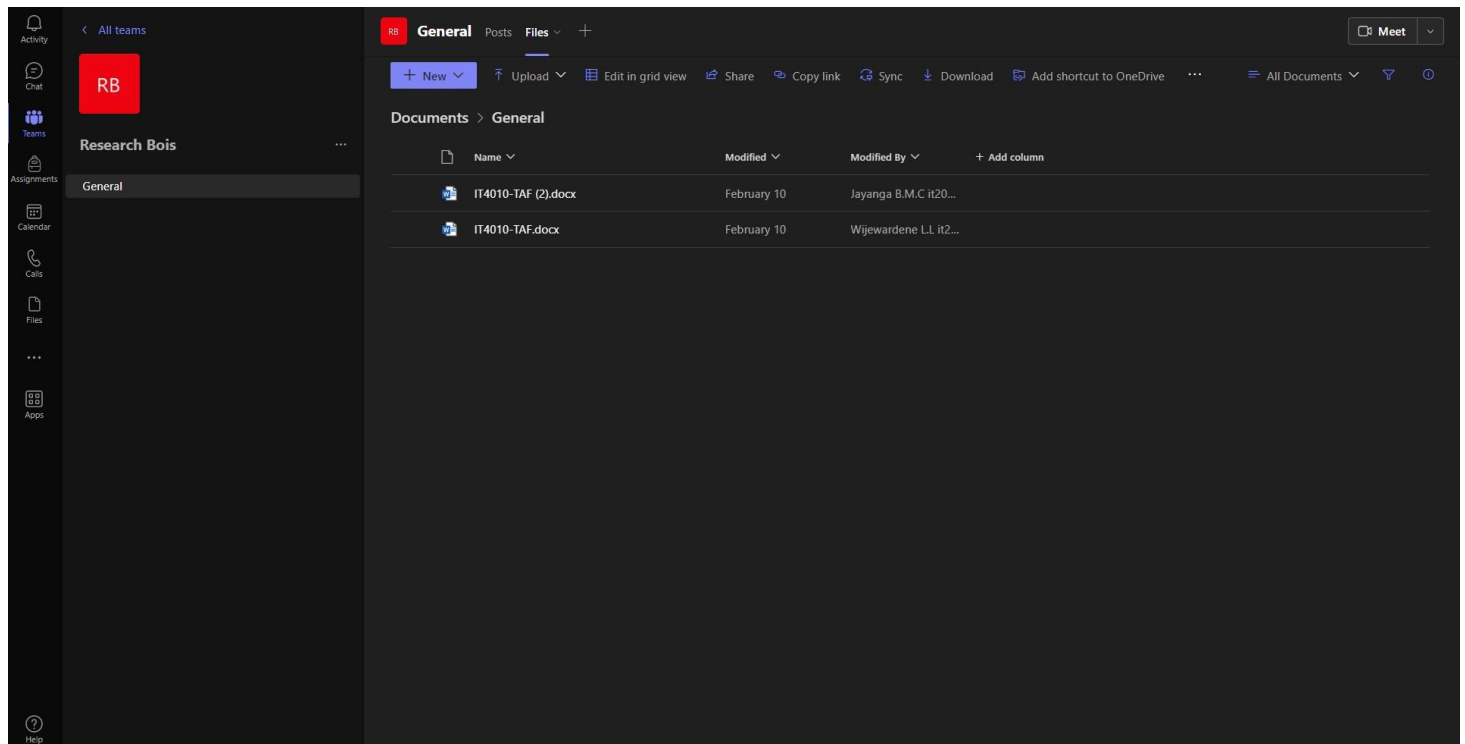
2.1. Create a MS team group with team members.



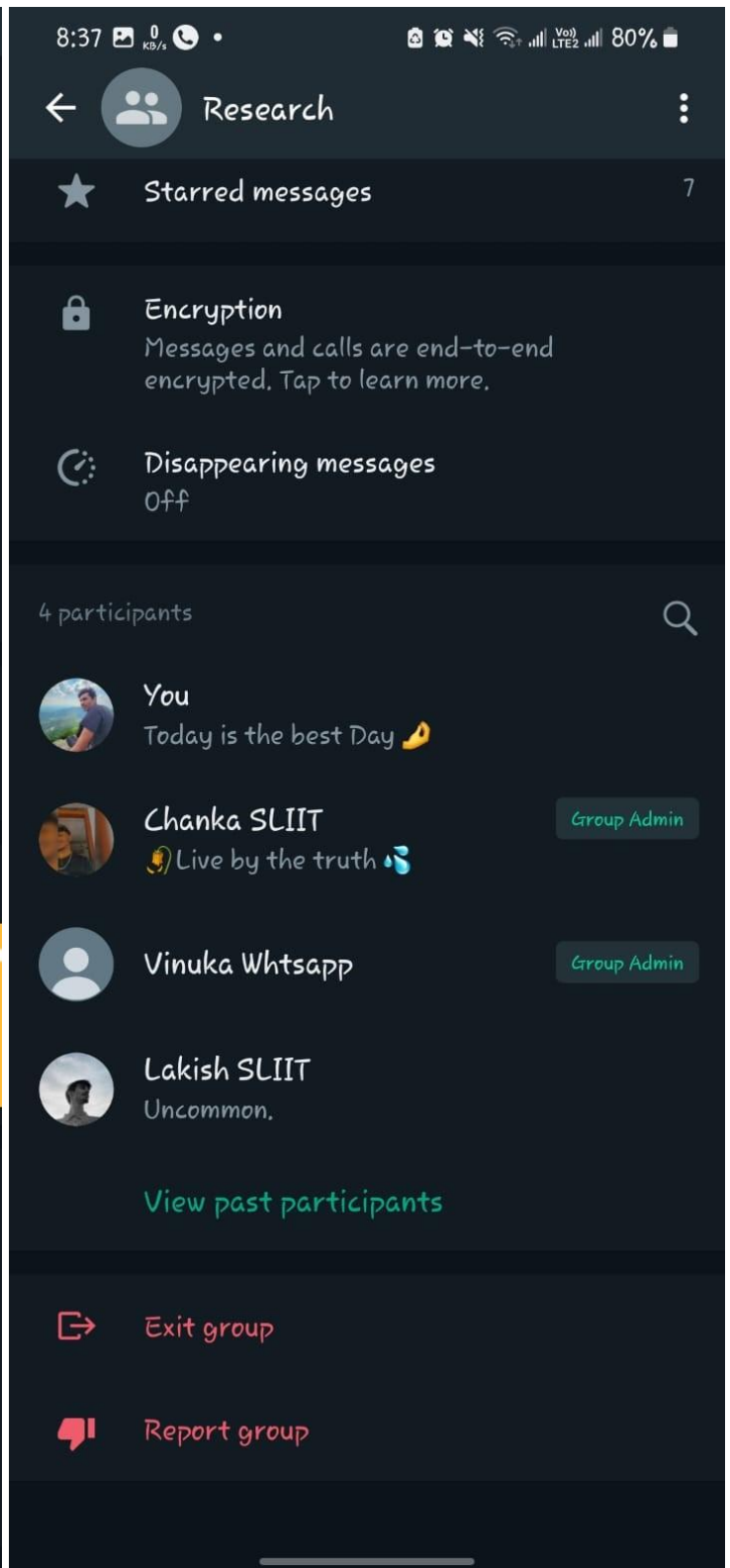
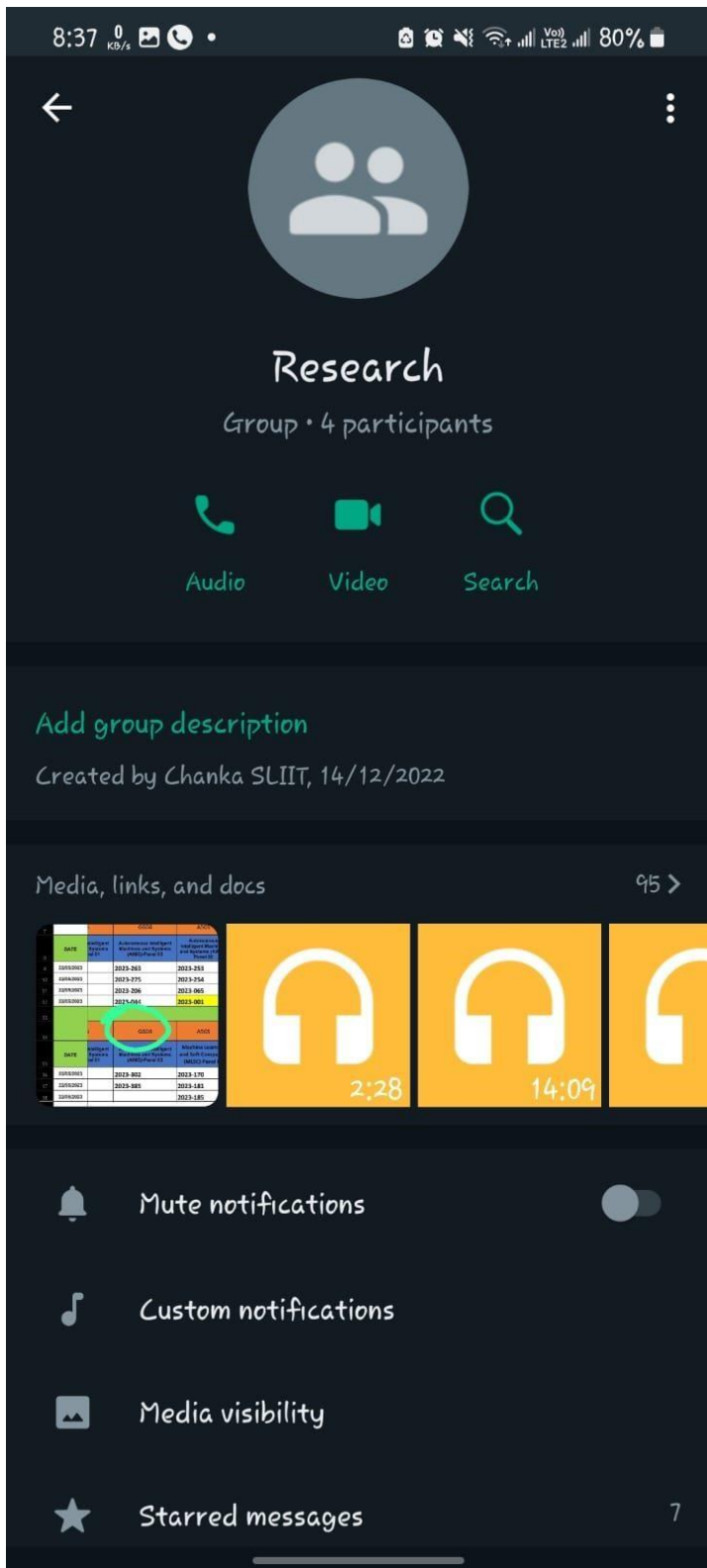
2.2. MS teams meetings with members.



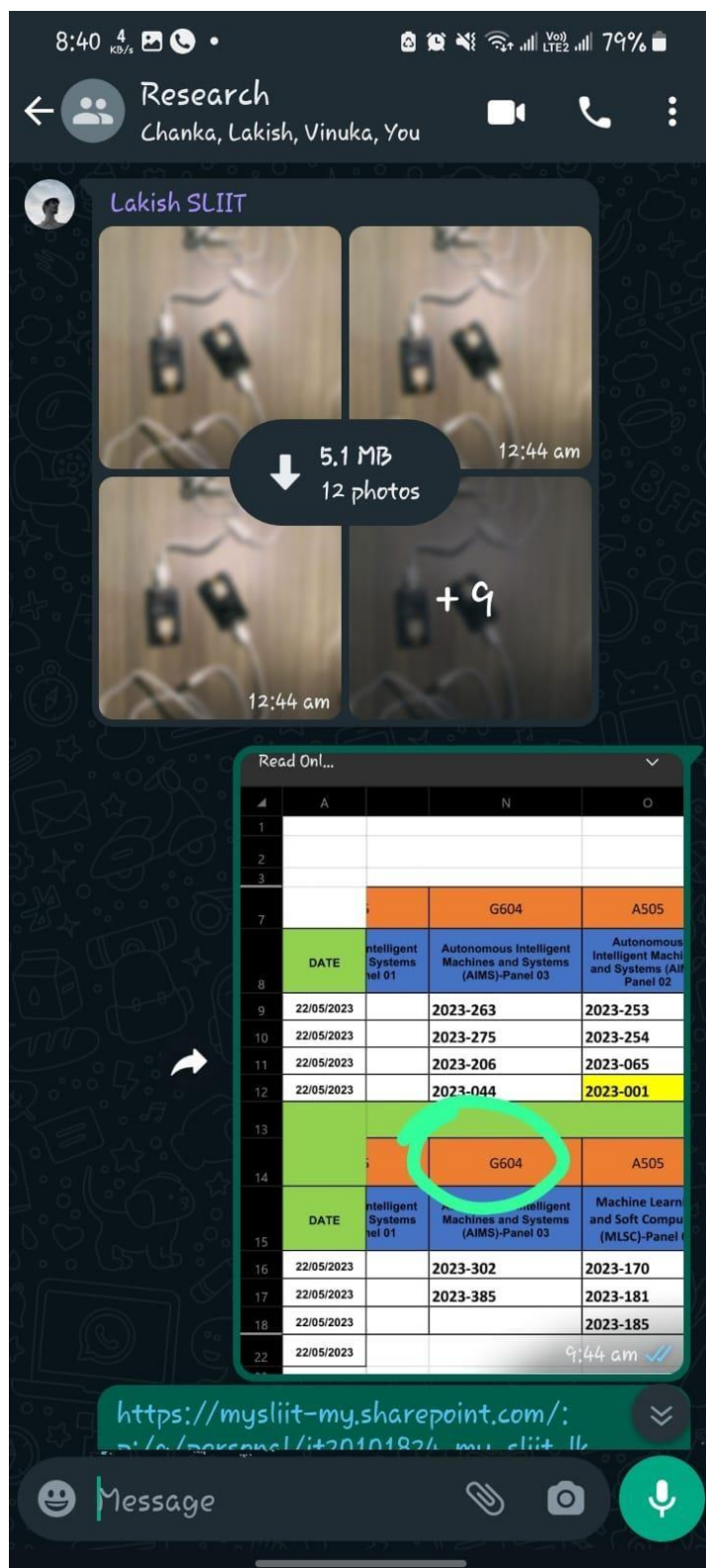
2.3. MS teams files



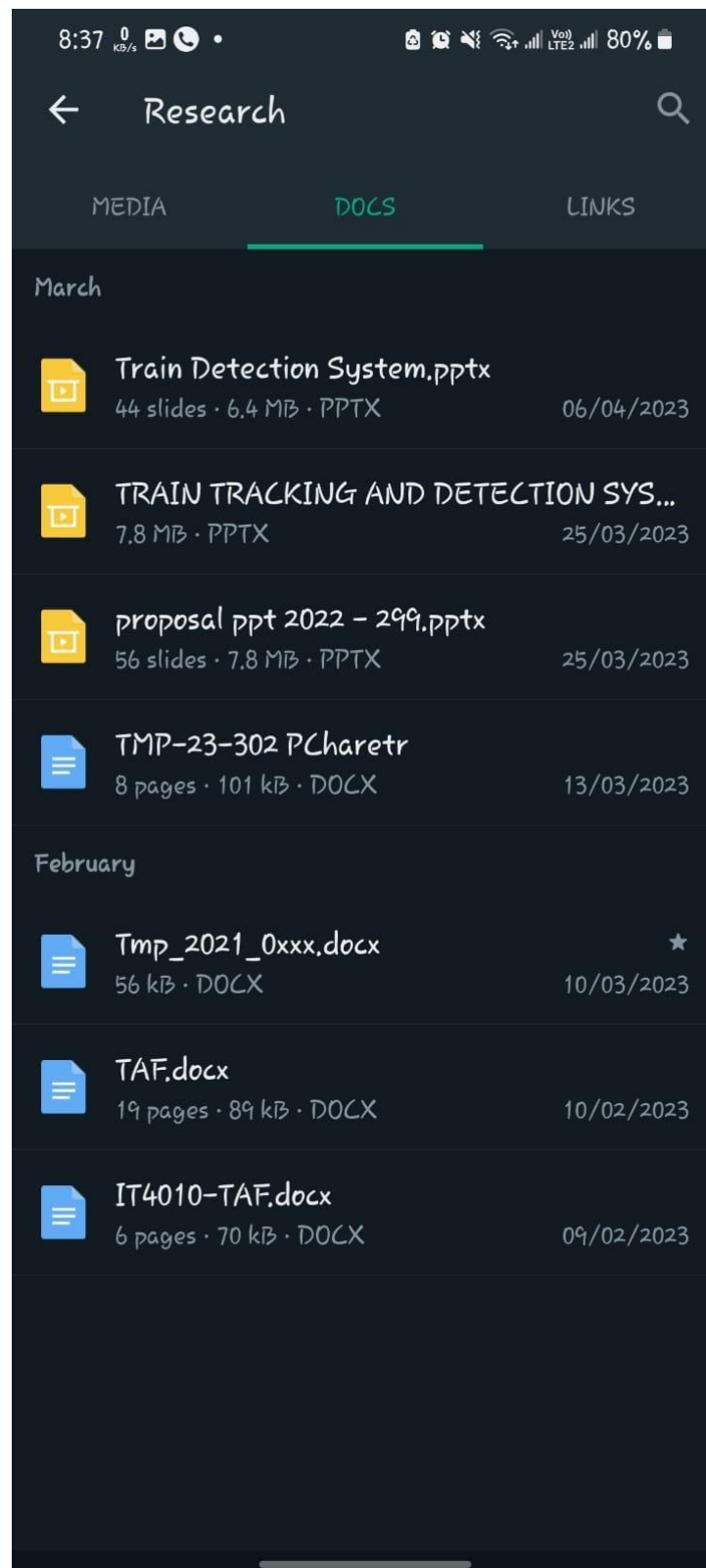
2.4. Create a WhatsApp group with team members.



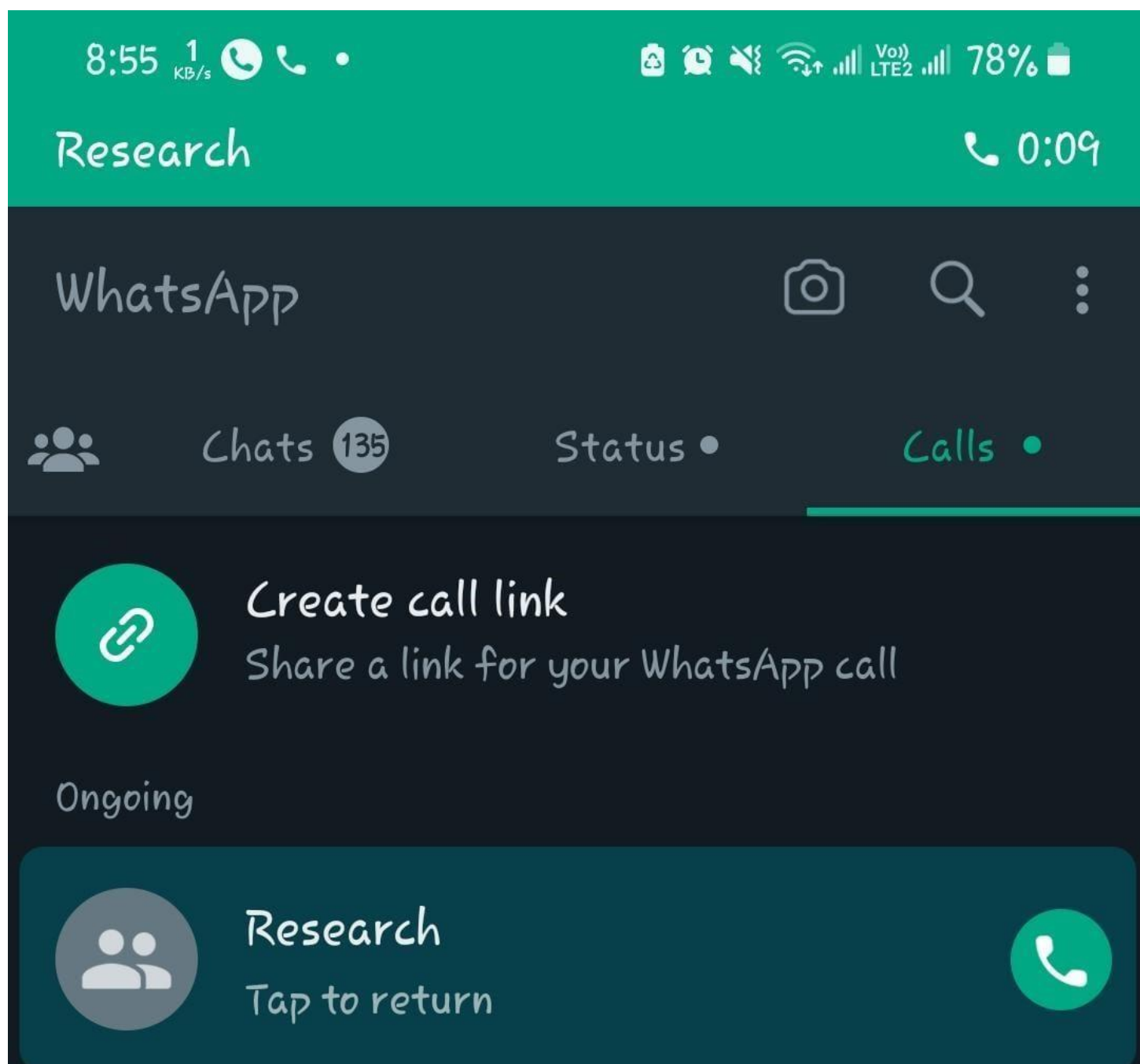
2.5. Chat in WhatsApp group with group members



2.6. Files shared in WhatsApp group with group members



2.7. WhatsApp group calls.



3. Update CDAP Cloud Submissions

SharePoint

Search this library

CDAPSubmissionCloud

Private group

Not following

2 members

New

Upload

Share

Copy link

Sync

Add shortcut to OneDrive

Download

Export to Excel

Automate

Integrate

...

All Documents

2023RegCloud > 23-302-Students

Name	Modified	Modified By	File Size
1. Project Proposal	April 20	CDAP SLUIT	2 items
2. Status Document 1	April 20	CDAP SLUIT	5 items
3. Progress Presentation - 1	April 20	CDAP SLUIT	2 items
4. Research Paper	April 20	CDAP SLUIT	5 items
5. Progress Presentation - 2	April 20	CDAP SLUIT	3 items
6. Final Report & Presentation	April 20	CDAP SLUIT	2 items
7. Status Document 2	April 20	CDAP SLUIT	2 items
8. Website	April 20	CDAP SLUIT	1 item
9. Log Book	April 20	CDAP SLUIT	3 items
Marking Schemes	April 20	CDAP SLUIT	1 item
Project Registration Documents	April 20	CDAP SLUIT	5 items
Panel Comments for the Students.xlsm	July 2	CDAP SLUIT	47.8 KB

Count

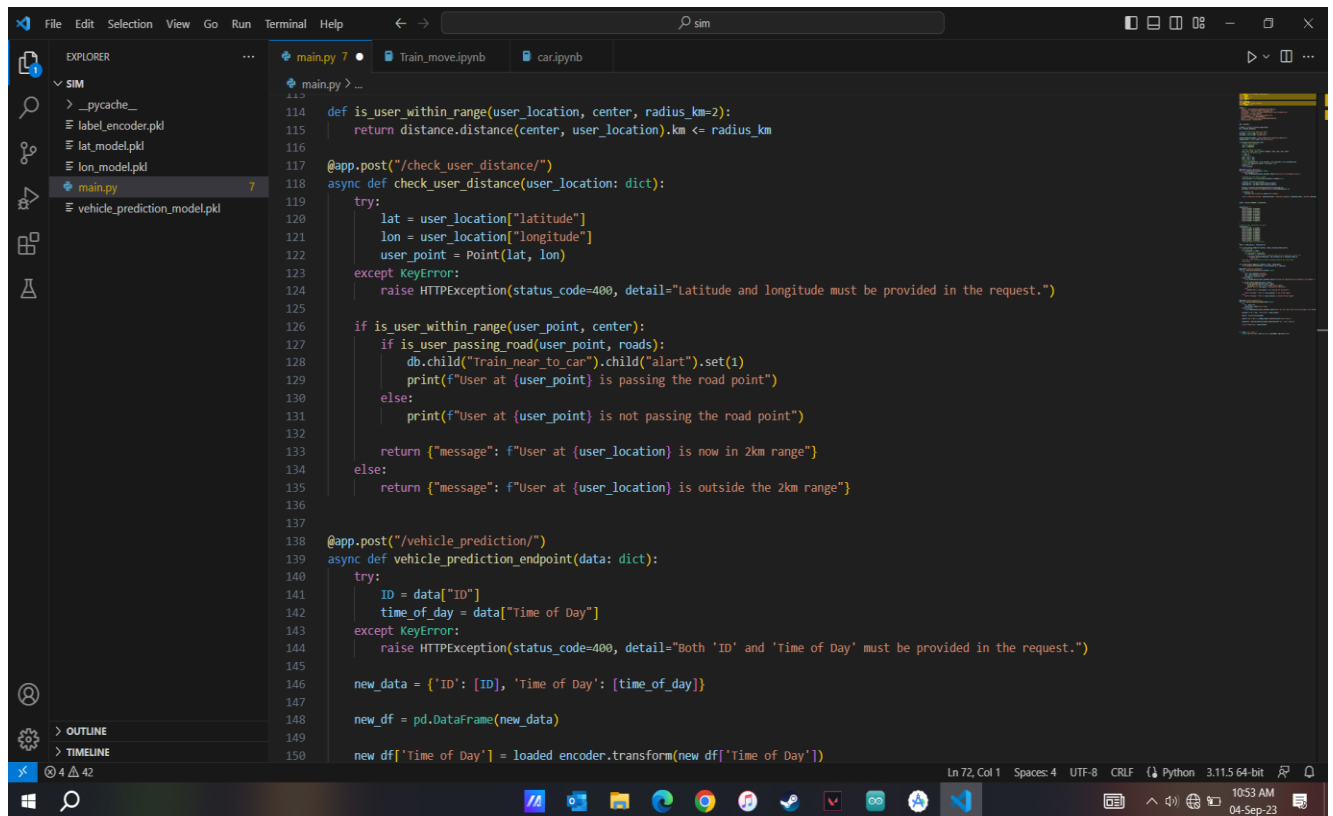
13

Count

2

4. Completed 90% of the Research Project

4.1 Main Back-end code



```
114 def is_user_within_range(user_location, center, radius_km=2):
115     return distance.distance(center, user_location).km <= radius_km
116
117 @app.post("/check_user_distance/")
118 async def check_user_distance(user_location: dict):
119     try:
120         lat = user_location["latitude"]
121         lon = user_location["longitude"]
122         user_point = Point(lat, lon)
123     except KeyError:
124         raise HTTPException(status_code=400, detail="Latitude and longitude must be provided in the request.")
125
126     if is_user_within_range(user_point, center):
127         if is_user_passing_road(user_point, roads):
128             db.child("Train_near_to_car").child("alarm").set(1)
129             print(f"User at {user_point} is passing the road point")
130         else:
131             print(f"User at {user_point} is not passing the road point")
132
133     return {"message": f"User at {user_location} is now in 2km range"}
134 else:
135     return {"message": f"User at {user_location} is outside the 2km range"}
136
137
138 @app.post("/vehicle_prediction/")
139 async def vehicle_prediction_endpoint(data: dict):
140     try:
141         ID = data["ID"]
142         time_of_day = data["Time of Day"]
143     except KeyError:
144         raise HTTPException(status_code=400, detail="Both 'ID' and 'Time of Day' must be provided in the request.")
145
146     new_data = {'ID': [ID], 'Time of Day': [time_of_day]}
147
148     new_df = pd.DataFrame(new_data)
149
150     new_df['Time of Day'] = loaded_encoder.transform(new_df['Time of Day'])
```

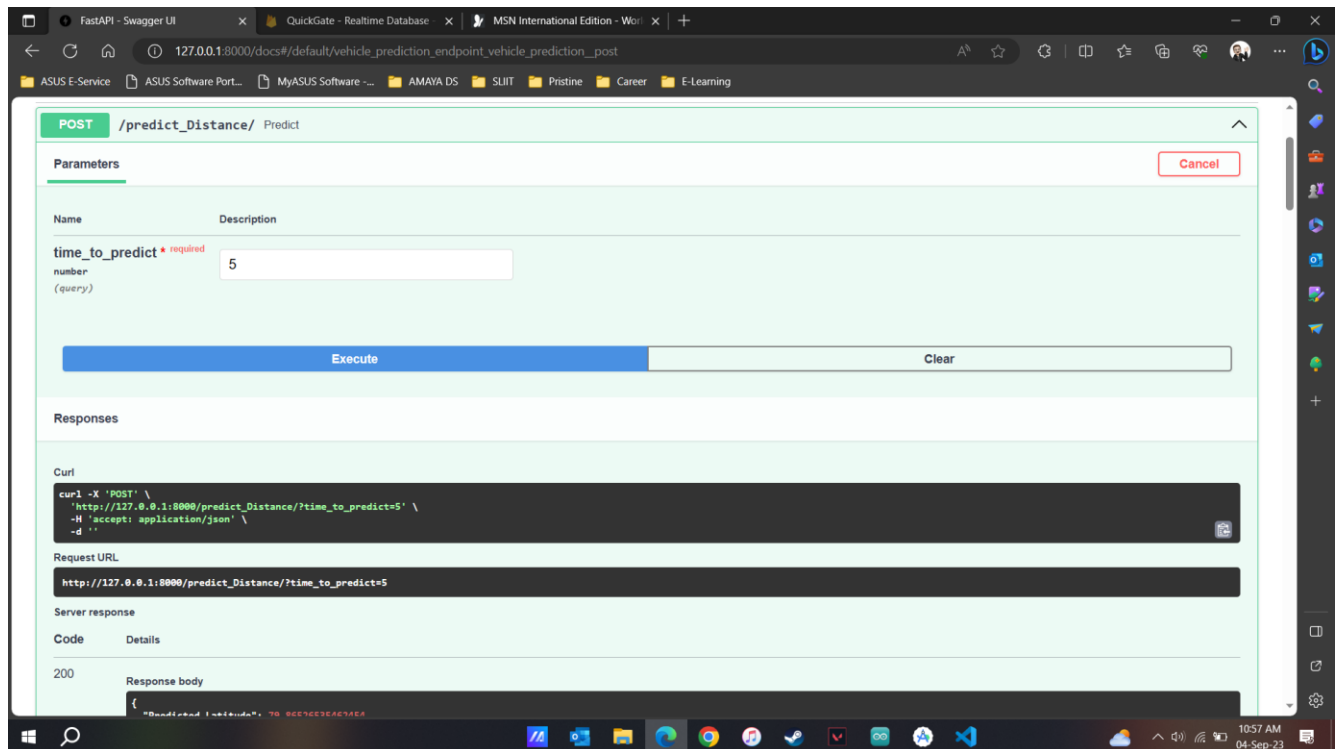
4.2 Defining the roads near the railway crossing

```
73 center = Point(6.92995042, 79.86713778)
74
75
76 road_points_1 = [
77     Point(6.917045, 79.875338),
78     Point(6.917856, 79.874471),
79     Point(6.918869, 79.873501),
80     Point(6.919629, 79.872761),
81     Point(6.920490, 79.871894),
82     Point(6.921732, 79.870771),
83     Point(6.922466, 79.870005),
84     Point(6.923302, 79.869189),
85     Point(6.924087, 79.868372),
86 ]
87
88 # These are your road points for road 2
89 road_points_2 = [
90     Point(6.912799, 79.864805),
91     Point(6.913660, 79.864754),
92     Point(6.914572, 79.864830),
93     Point(6.915256, 79.864881),
94     Point(6.915901, 79.864820),
95     Point(6.917119, 79.864892),
96     Point(6.918015, 79.864820),
97     Point(6.918787, 79.864795),
98     Point(6.920113, 79.864552),
99     # Add the points for road 2 here
100 ]
101 roads = [road_points_1, road_points_2]
102
103 def is_user_passing_road(user_location, roads, proximity_radius_m=0.2):
104     # For each road
105     for road_points in roads:
106         # For each point in the road
107         for road_point in road_points:
108             # If user location is within proximity_radius_m km of road point, return True
109             if distance.distance(road_point, user_location).km <= proximity_radius_m:
```

4.3. IoT devices used for the system



4.4. Distance Prediction display using API



4.5. Data retrieving to the Firebase Database

