

REAL-TIME CARBON NEUTRALITY MANAGEMENT AND OPTIMIZATION USING NATURAL LANGUAGE PROCESSING

Project ID: 2022-175

Status Document 2

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1. GANTT CHART COMPARISON

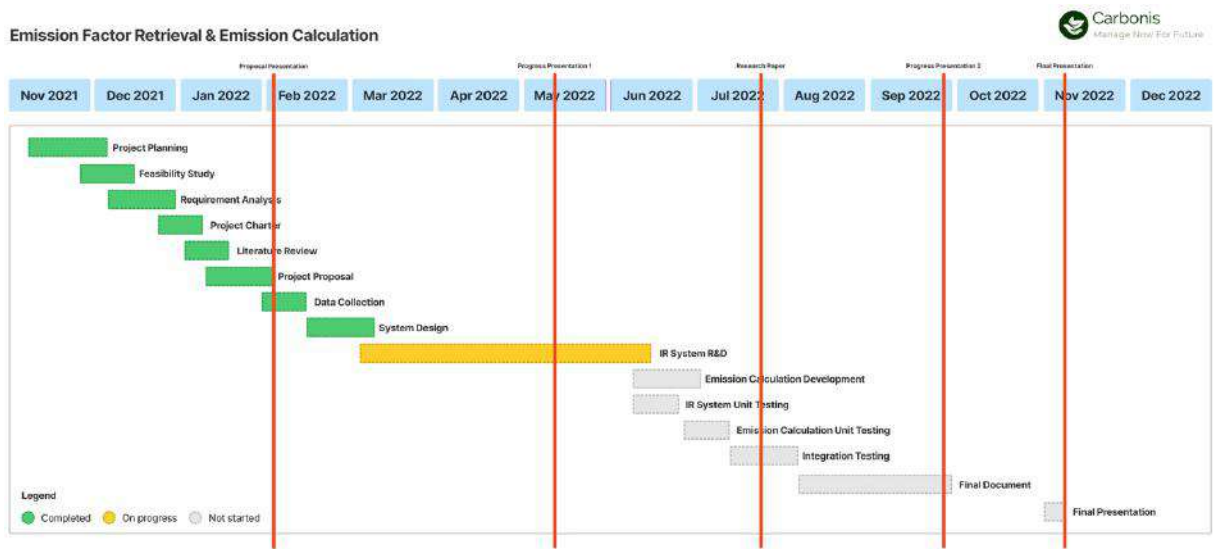


Figure 1.1: Gantt chart submitted with proposal report

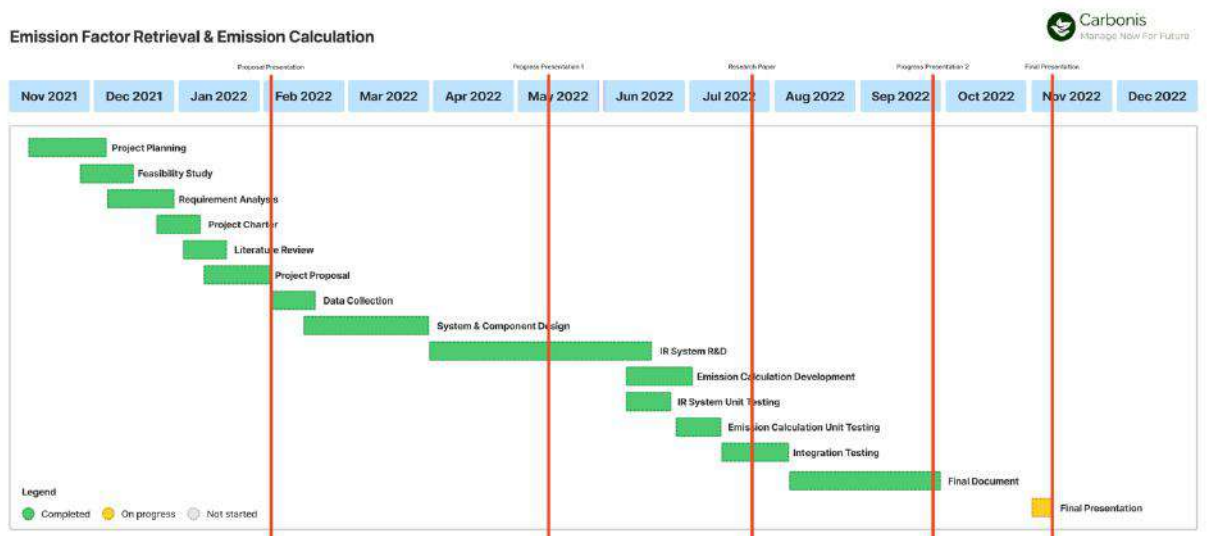


Figure 1.2: Updated Gantt chart

2. TIMELINE COMPARISON AND WORK ALLOCATION

When compared with the Gantt chart submitted with the proposal report (shown in Figure 1.1) to the current Gantt chart (shown in Figure 1.2), the following changes occurred,

1. Delay in the starting of the data collection phase
Reasons: Due to the time taken to study the emission factor standard and find resource persons, the beginning of this phase has been delayed.
2. Extension of the system design phase
Reasons: Due to the addition of component design (component architecture and component use case diagram) and unanticipated designs for system design (database physical diagram, API design, and cloud design) design phase got extended.
3. Additional application development workload
Reasons: Due to the deadline limitation and the unforeseeable delay from the other members' components, most of the development workload has been allocated to me. This included the backend and frontend mobile application development.

However, there were no observable changes made after the 50% progress completion. Following risk mitigation changes have been carried out to achieve the deadlines despite delays,

1. Increased the speed of the IR system research and development phase and reduced the time allocated for this phase. Worked more time daily to achieve the same deadline.
2. Contributed to the additional application development workload in parallel with pre-existing component workload to achieve milestone deadlines.
3. Started testing as soon as the developments were completed. This has dispersed the testing phase and avoided allocating the whole time for the testing alone.
4. Started studying necessary technologies beforehand to reduce the development time e.g., React Native and Django Rest Framework for the application development.

3. FINALIZED WORK ALLOCATION

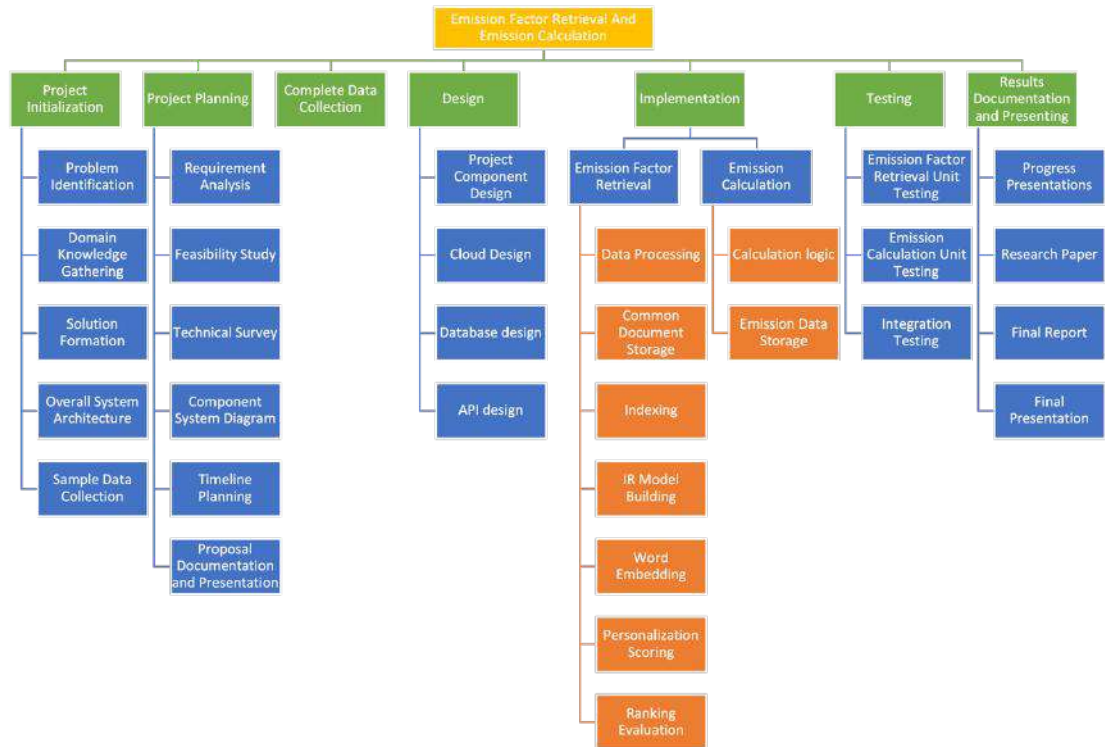


Figure 3.1: Updated work breakdown structure

As shown in Figure 1.2 updated Gantt chart and explained in chapter 2, the risk mitigation for occurring delays only applied to the reduction of days allocated for IR system research and development by increasing daily work hours. Additionally, the work breakdown structure also includes the word embedding scoring and ranking evaluation to find the best emission factor ranking parameters. Finalized work allocation remains similar to the proposal for other parts as shown in Figure 1.2 and Figure 3.1.

4.1. Planner Reports

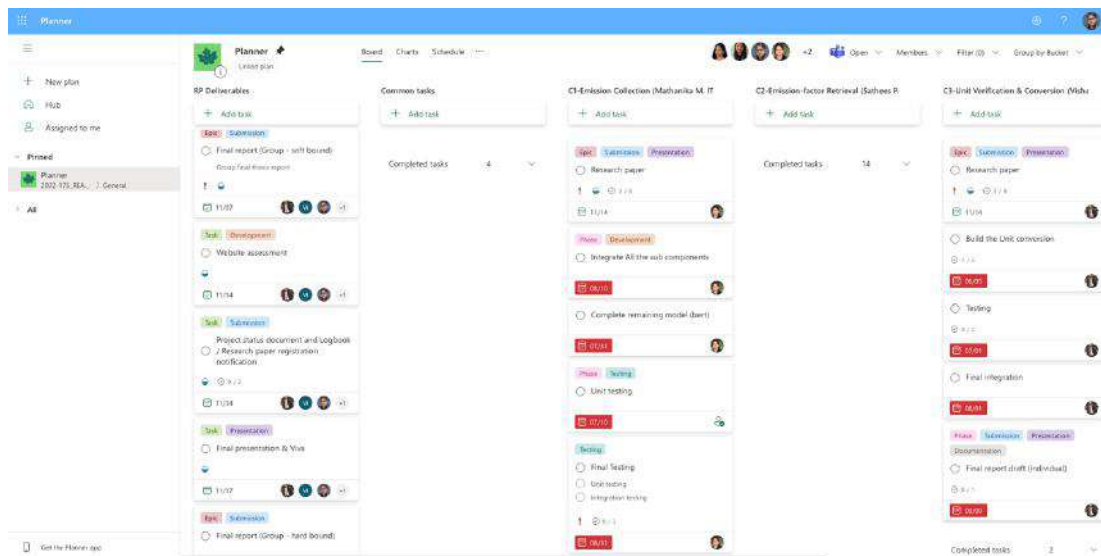


Figure 4.1: Full view of the project management tool (Planner)

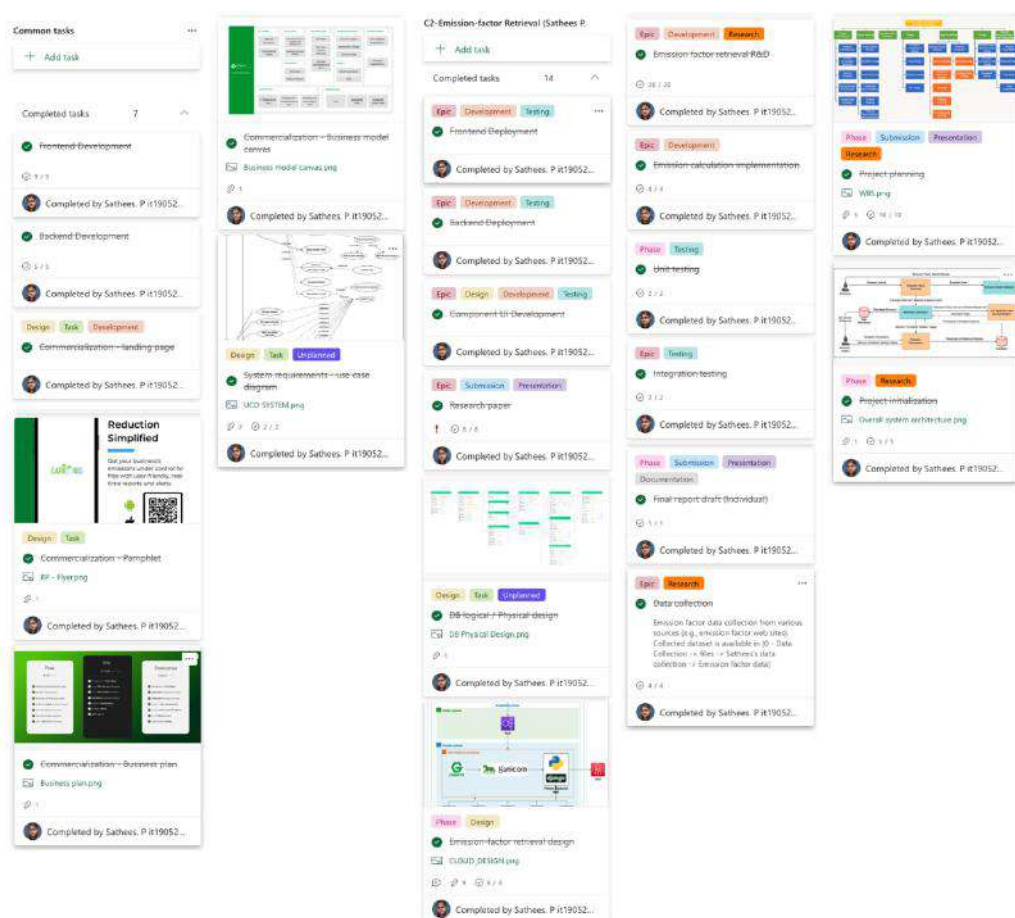


Figure 4.2: Tasks completed by me until now

Microsoft Planner was used to managing project tasks and work allocations (shown in Figure 4.1). Figure 4.2 shows the phases and tasks completed by me until now. As individual progress is completed to a hundred percent there are no remaining tasks that are solely assigned to me currently. However, there are documentation works that I have been contributing under the group tasks.

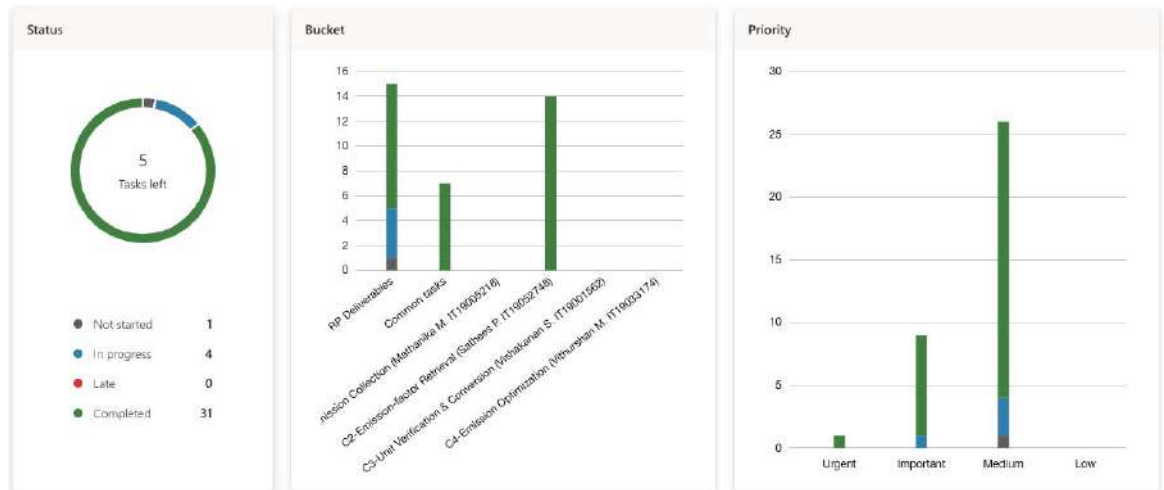


Figure 4.3: Planner report generated for my component, common tasks, and project deliverables part

Figure 4.3 and Figure 4.4 show the reports generated by the planner for my contribution and progress status at the current moment.

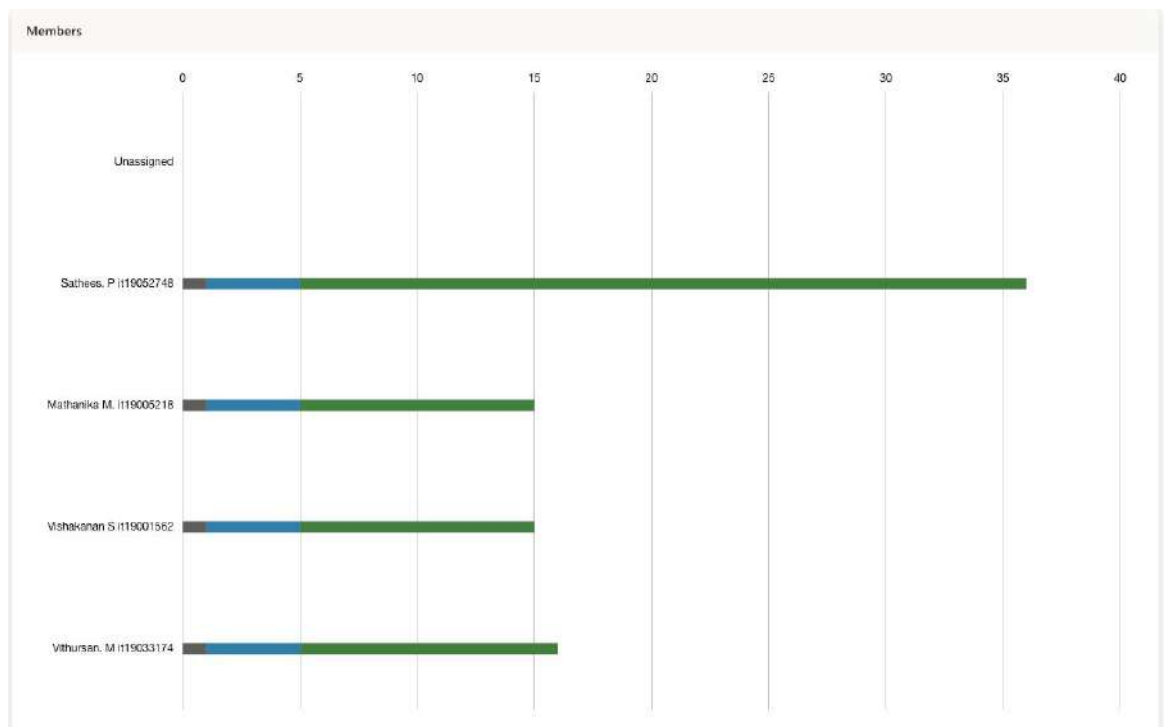


Figure 4.4: Planner overall contribution report generated

4.2. Milestones Completion

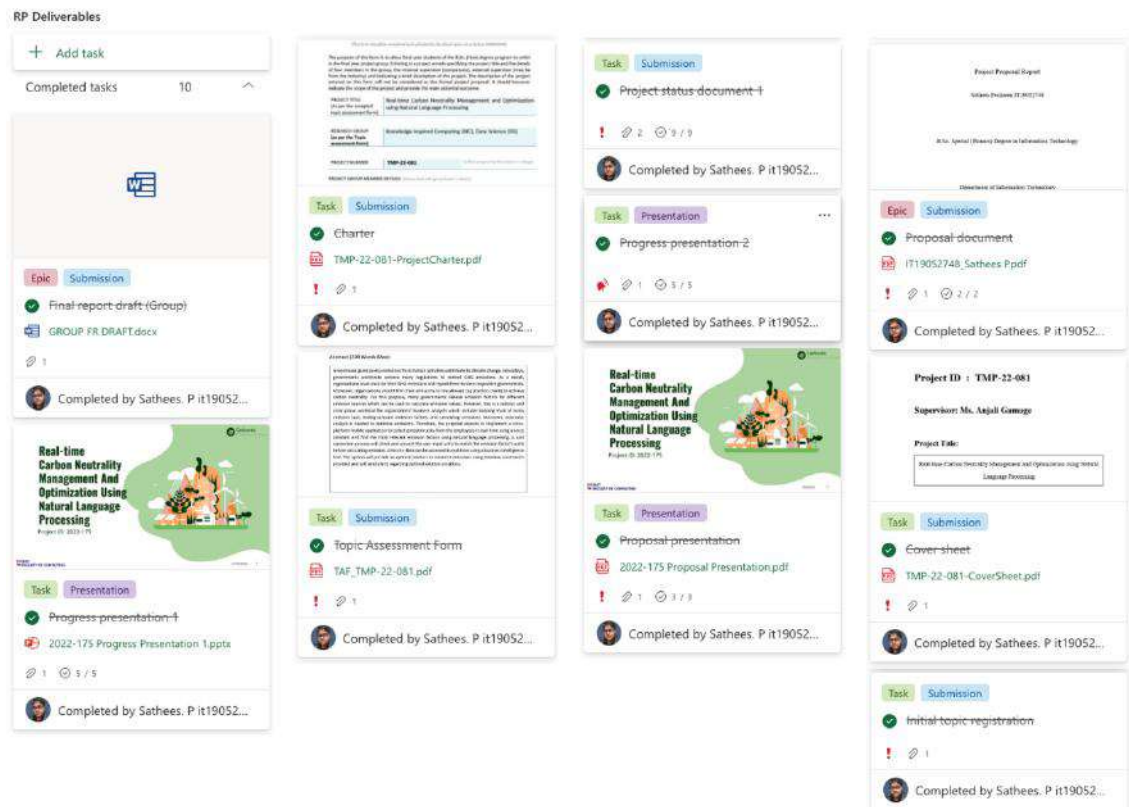


Figure 4.5: Milestones completed or contributed

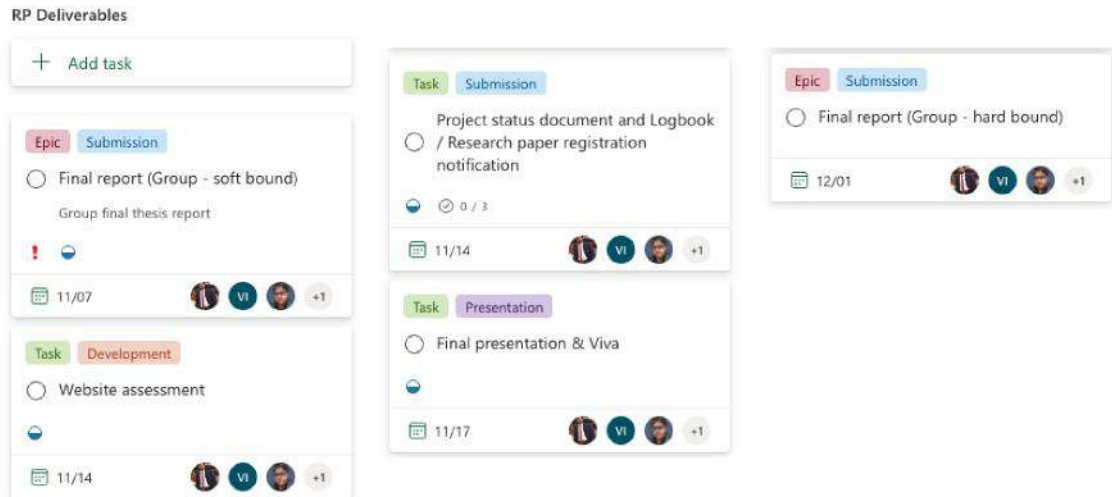


Figure 4.6: Ongoing and remaining milestones

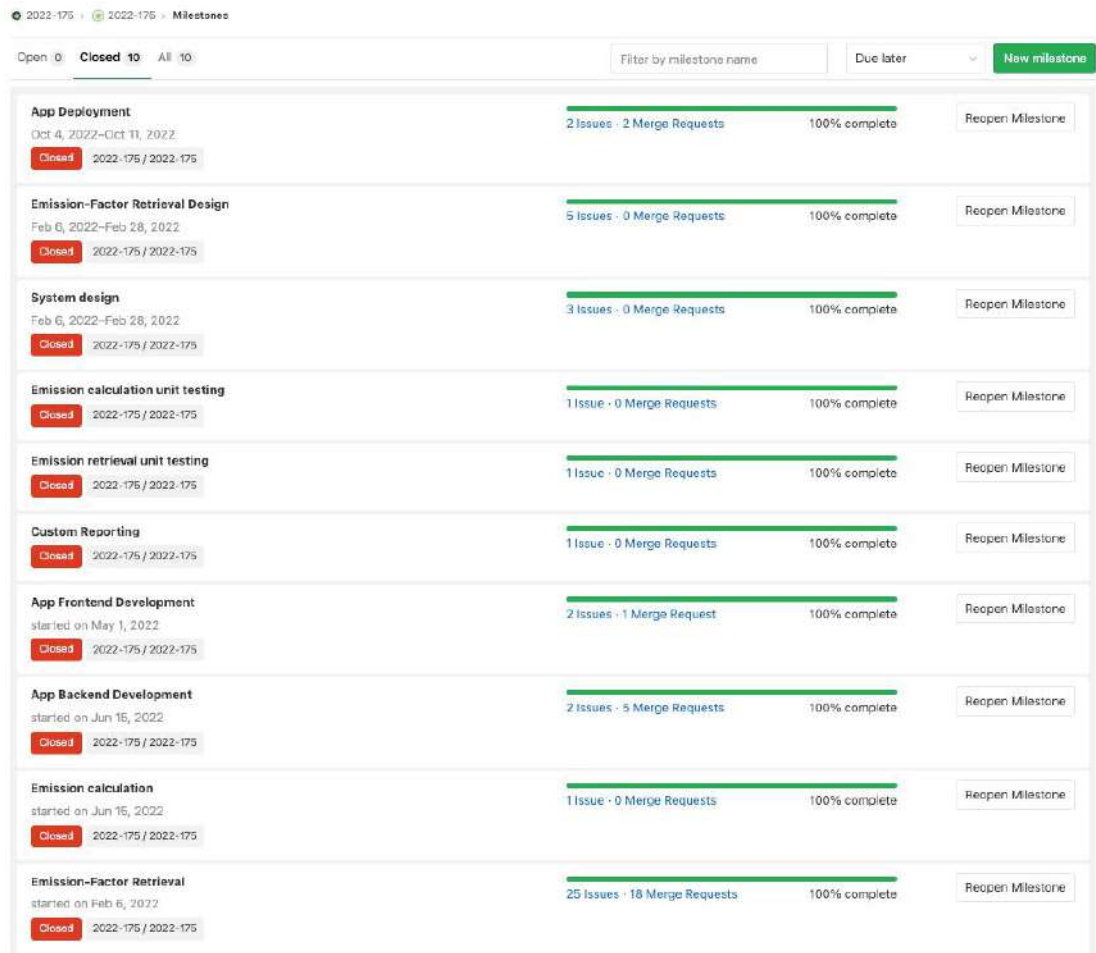


Figure 4.7: GitLab milestone completion

4.3. GitLab Contributions

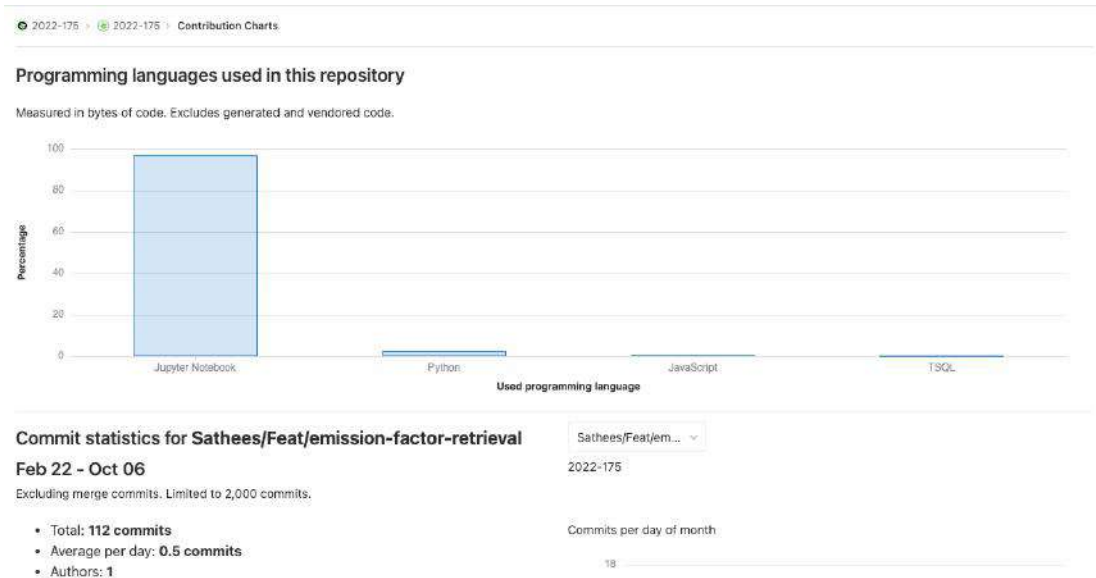


Figure 4.8: Commit contribution for emission factor retrieval

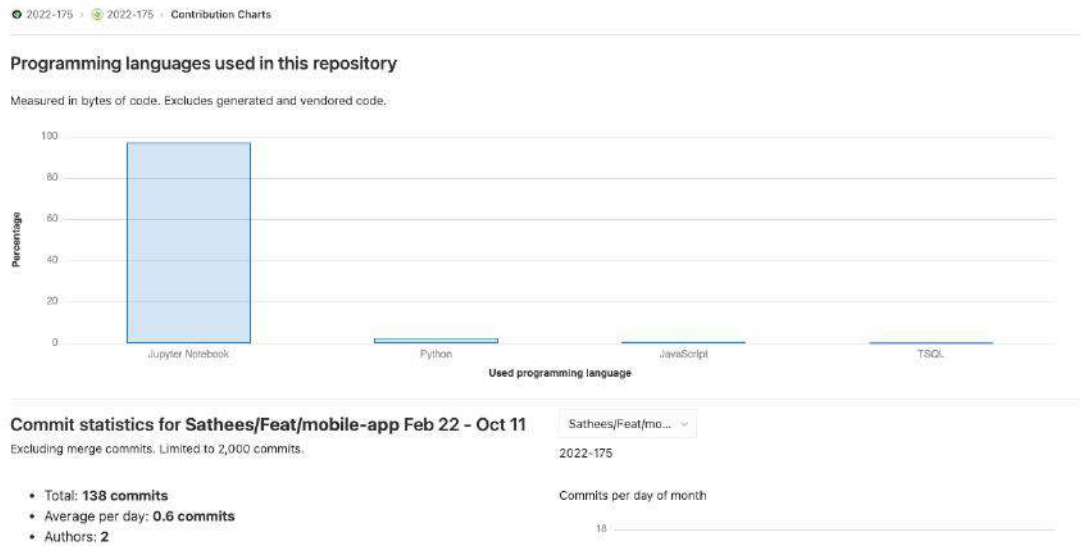


Figure 4.9: Commit contribution to mobile application development

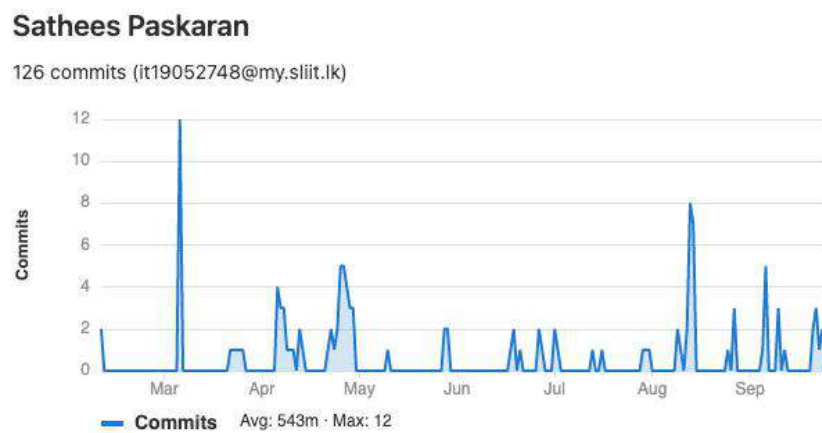


Figure 4.10: Overall committed contribution to the master branch

4.4. Sample Outputs

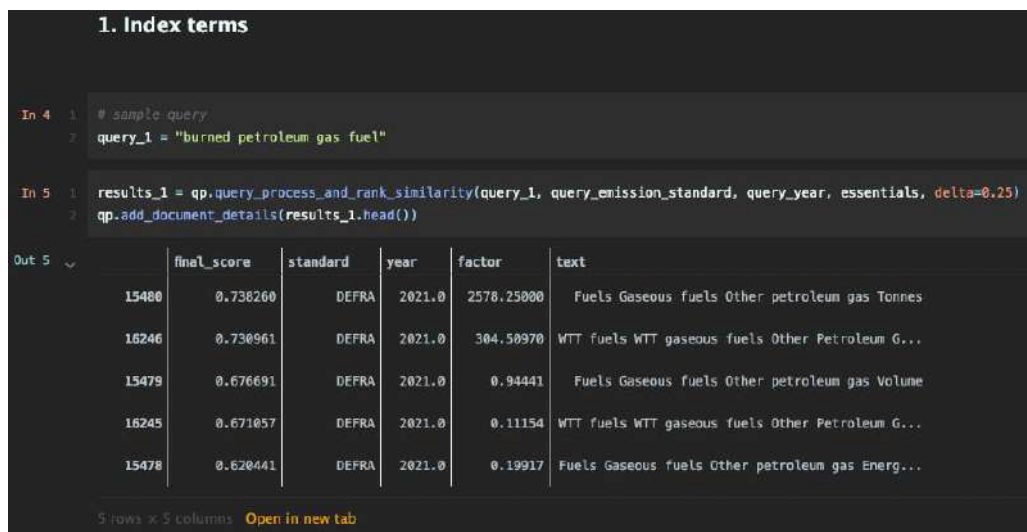


Figure 4.11: Sample output 1

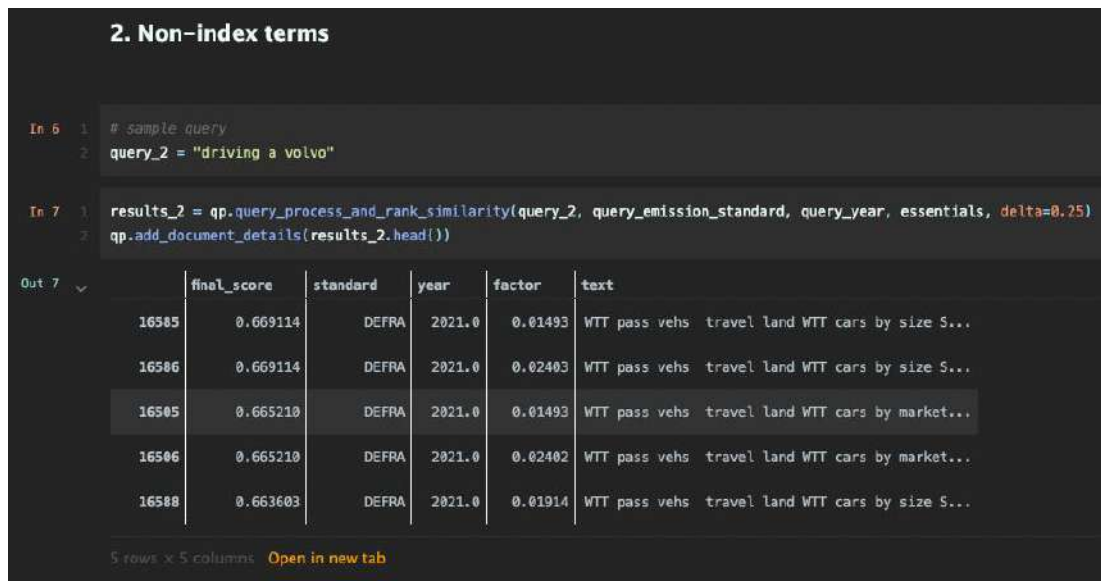


Figure 4.12: Sample output 2

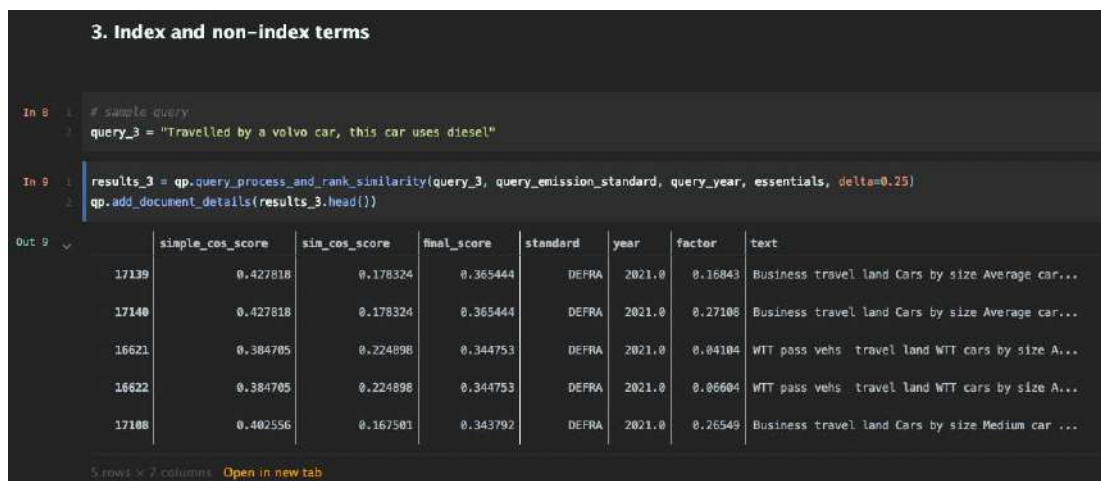


Figure 4.13: Sample output 3

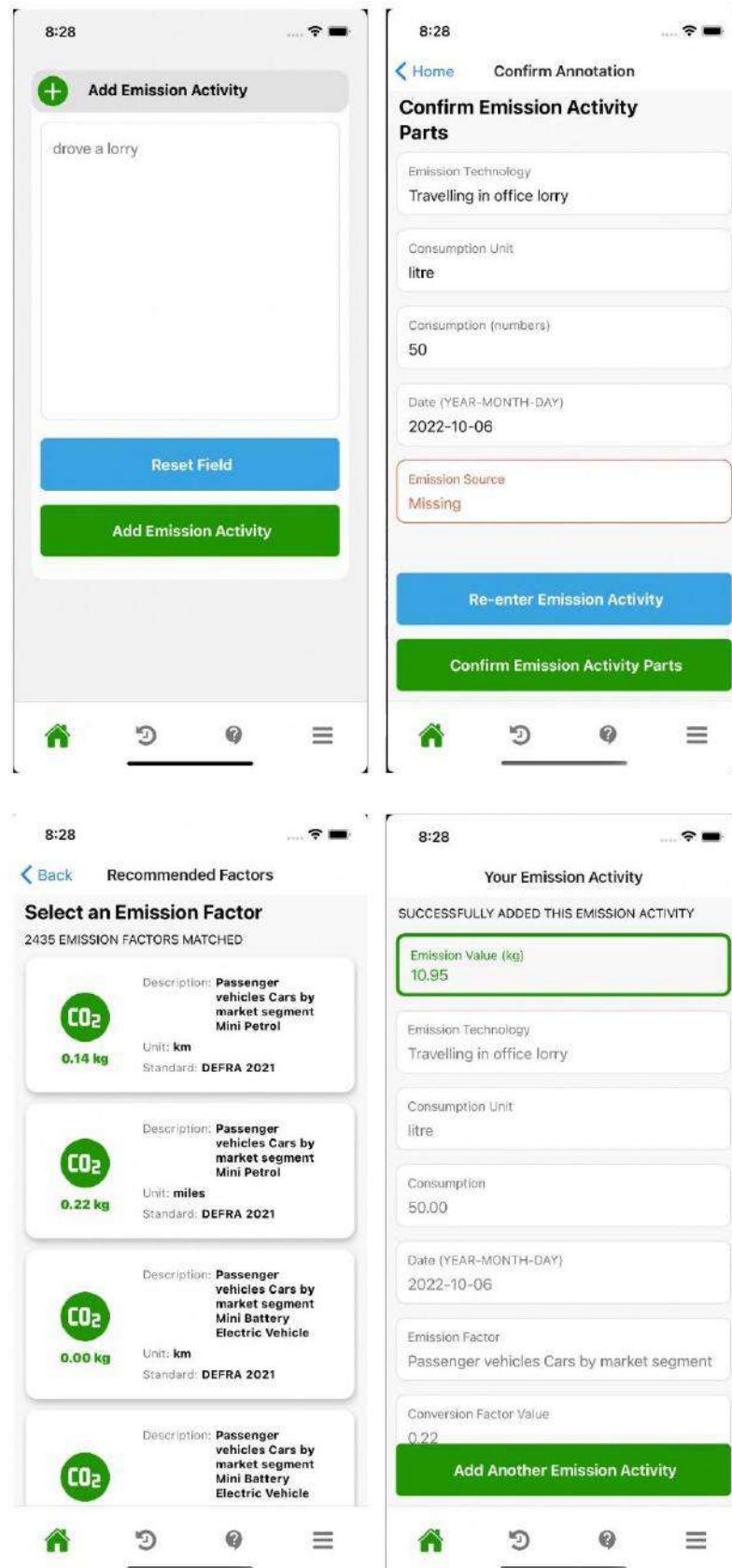


Figure 4.14: Mobile Sample Output

4.5. Task Allocation

Since all allocated tasks for this component were completed within the provided deadlines, there was no need to reallocate tasks to other members currently. However, project wise app development was assigned and completed due to the delay from other components,

1. Backend API development and deployment: **Sathees P. (IT19052748)**
2. Frontend mobile app development parts (Emission Flow, Authentication, Authorization, Navigation, Emission factor retrieval) and deployment: **Sathees P. (IT19052748)**
3. Emission flow testing: **Sathees P. (IT19052748)**

4.6. Documentation Works

Until now I have contributed to the following documentation works,

1. Initial topic registration
2. Topic assessment form
3. Charter
4. Project proposal (individual)
5. Proposal presentation
 - a. Introduction
 - b. My component
 - c. Commercialization
 - d. Wrap-up
6. Meeting logbooks
7. Progress presentation 1
 - a. Introduction
 - b. My component
 - c. Commercialization – Business model canvas
 - d. Wrap-up
8. Status document 1 (individual)
9. Research Paper (individual) – A novel ranked emission-factor retrieval for emission calculation.

10. NBQSA presentation
11. Progress presentation 2
 - a. Introduction (Slides)
 - b. My component
 - c. Commercialization – Pamphlet and landing website
12. Final Report (Group Thesis)
 - a. Introduction
 - b. Research problem
 - c. Objectives
 - d. Methodology
 - i. Preliminaries: emission calculation, vector space model, and word embedding
 - ii. System architecture
 - iii. Technologies and Implementation: Emission factor retrieval implementation, Application backend implementation, Application frontend implementation
 - iv. Experimentations: Experimentation methodology, Emission factor retrieval evaluation
 - v. Commercialization
 - e. Results and discussion
 - i. Results: Emission factor retrieval results
 - ii. Research findings: Emission factor retrieval findings
 - f. Discussion: Emission factor retrieval
 - g. Summary of each student contribution
 - h. Conclusions: Emission factor retrieval
 - i. References
 - j. Appendices
 - k. Overall formatting
13. Final Report (Individual Thesis)
14. Website assessment
15. Project status document 2 (Individual)
16. Logbook (Individual)

17. Final presentation

- a. Introduction (Slides)
- b. My component
- c. Commercialization

4.7. Meeting Logs and Proofs

Table 4.1: Group meeting logs

Date	Time	Platform	Sathees	Discussions	Conclusions
2021-11-20	8:00 PM	Zoom	Present	Component separation, supervisor selection	Chosen topic 1 as the priority idea Started working on component separation
2021-11-21	1:00 PM	Zoom	Present		
2021-11-22	1:00 PM	Zoom	Present	Finalize supervisor document Send mail to the supervisor Responsive and informing prior Journal task allocation Slack usage	
2021-11-23	8:00 AM	Zoom	Present	Informing prior about attendance Meeting time (in the morning) Slack usage	
2021-11-24	8:00 AM	Zoom	Present		
2021-11-29	10:00 AM	Zoom	Present	Identify unique research components Allocate sections	Decided to research each section
2021-12-01	8:00 AM	Zoom	Present	Research component search progress Supervisor issue	Decided to mail the supervisor for a meeting this Friday
2021-12-02	8:00 AM	Zoom	Present	New component separation Component allocation Courses System diagram Allocation of the time title submission form	Decided to send a mail to the supervisor requesting a meeting
2021-12-03	5:00 PM	Zoom	Present	Mail sent Tasks identified	
2021-12-05	8:00 AM	Zoom	Present	Tasks identified Supervisor status Form submissions	Decided to send a reminder mail to the supervisor for topic selection, supervision, and co-supervisor. Decided to conduct meetings every day from now.

2021-12-06	8:00 AM	Zoom	Present	Supervisor issue Dataset issue Sending a third mail	Decided to ask for a supervisor
2021-12-06	9:00 PM	Zoom	Present	Data and Topic issue	Sent emails to supervisors
2021-12-07	8:00 AM	Zoom	Present	Updates on mails Data science technologies	
2021-12-07	9:00 PM	Zoom	Present	Topic selection Co-supervisor selection Components Communications with supervisor (e.g. teams) External supervisor	Identify more relevant components for this bee idea Find a more novel idea
2021-12-08	8:00 AM	Zoom	Present	New idea formation Co-supervisor More resources for 1st idea	Decided to send documents of a new idea to the supervisor Asked for a co-supervisor
2021-12-09	8:00 AM	Zoom	Present	New components to the new idea	
2021-12-09	8:00 PM	Zoom	Present	Arranging a new meeting with the supervisor Concept of bee idea	Wait for the co-supervisor meeting
2021-12-10	8:00 PM	Zoom	Present	New ideas Feasibility of the ideas What to ask with co-supervisor	Decided to ask for a schedule with co-supervisor
2021-12-11	8:00 AM	Zoom	Present	What to discuss with co-supervisor Any new ideas	Go with the second idea
2021-12-11	8:00 PM	Zoom	Present	Identify topics Product name	
2021-12-12	8:00 AM	Zoom	Present	Forming topic Submitting the topic	
2021-12-12	8:00 PM	Zoom	Present	Literature review Technical side	No meeting on Monday morning
2021-12-19	8:00 PM	Zoom	Present	Task allocation New idea finding	
2021-12-20	8:00 PM	Zoom	Present	New ideas TAF rewrite Supervisor contact	Find a relevant component for Vithursan
2021-12-21	8:00 PM	Zoom	Present		
2021-12-22	8:00 PM	Zoom	Present		
2021-12-23	8:00 PM	Zoom	Present		
2021-12-24	8:00 PM	Zoom	Present		

2021-12-27	8:00 PM	Zoom	Present		
2022-03-10	19:00	MS Teams	Present	Progress status	
2022-03-12	19:00	MS Teams	Present	Progress status	
2022-03-15	19:00	MS Teams	Present	Progress status	
2022-03-16	19:00	MS Teams	Present	Progress status	
2022-03-17	19:00	MS Teams	Absent	Progress status	
2022-03-19	19:00	MS Teams	Present	Progress status	
2022-03-21	19:00	MS Teams	Present	Progress status	
2022-03-22	19:00	MS Teams	Present	Progress status	
2022-03-23	19:00	MS Teams	Present	Progress status	
2022-03-24	19:00	MS Teams	Present	Progress status	
2022-03-26	19:00	MS Teams	Present	Progress status	
2022-03-29	19:00	MS Teams	Present	Progress status	
2022-03-30	19:00	MS Teams	Present	Progress status	
2022-03-31	19:00	MS Teams	Present	Canceled due to connection issue	
2022-04-02	19:00	MS Teams	Absent	Canceled due to connection issue	
2022-04-05	19:00	MS Teams	Present	Progress status	
2022-04-06	19:00	MS Teams	Present	Progress status	
2022-04-07	19:00	MS Teams	Present	Progress status	
2022-04-09	19:00	MS Teams	Absent	Progress status	
2022-04-12	19:00	MS Teams	Present	Progress status	
2022-04-13	19:00	MS Teams	Present	Progress status	
2022-04-14	19:00	MS Teams	Absent	Canceled due to New year	
2022-04-16	19:00	MS Teams	Present	Progress status	
2022-04-19	19:00	MS Teams	Present	Progress status	
2022-04-20	19:00	MS Teams	Present	Progress status	

2022-04-21	19:00	MS Teams	Present	Progress status	
2022-04-23	19:00	MS Teams	Present	Progress status	
2022-04-26	19:00	MS Teams	Present	Progress status	
2022-04-27	7:00 PM	MS Teams	Present	Progress status, meeting journal	
2022-04-28	7:00 PM	MS Teams	Present	Progress status	
2022-05-03	7:00 PM	MS Teams	Present	Progress status, PP1 Marking Rubric discussion	
2022-05-04	7:00 PM	MS Teams	Present	50% Progress status for PP1, PP1 Marking Rubric discussion, PP1 Slides Preparation	
2022-05-05	7:00 PM	MS Teams	Present	50% Progress status for PP1, PP1 Marking Rubric discussion, PP1 Slides Preparation	
2022-05-07	7:00 PM	MS Teams	Present	50% Progress status for PP1, PP1 Marking Rubric discussion, PP1 Slides Preparation	
2022-05-10	7:00 PM	MS Teams	Present	50% Progress status for PP1, PP1 Marking Rubric discussion, PP1 Slides Preparation	
2022-05-11	7:00 PM	MS Teams	Present	50% Progress status for PP1, PP1 Marking Rubric discussion, PP1 Slides Preparation	
2022-05-12	7:00 PM	MS Teams	Present	50% Progress status for PP1, PP1 Marking Rubric discussion, PP1 Slides Preparation, discussion with the supervisor about the slides and demo for PP1	
2022-05-14	7:00 PM	MS Teams	Present	Progress status	
2022-05-17	7:00 PM	MS Teams	Present	Progress status	
2022-05-18	7:00 PM	MS Teams	Absent	Progress status	
2022-05-19	7:00 PM	MS Teams	Present	Progress status	

2022-05-21	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-05-24	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences started Research paper works	
2022-05-25	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-05-26	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-05-28	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-05-31	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences, Created branches for the backend and frontend in Git Lab	
2022-06-08	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-06-11	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-06-23	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-06-25	7:00 PM	MS Teams	Present	Progress status, Discussion about research paper and conferences, Discussion with the supervisor about the conferences and research paper	
2022-06-29	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-07-02	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-07-05	7:00 PM	MS Teams	Present	Progress status, Discussion about research paper and conferences, Discussion with co-supervisor	

				about the conferences and research paper	
2022-07-09	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-07-13	7:00 PM	MS Teams	Present	Progress status, Discussion about research paper and conferences got feedback about the research paper from Co-Supervisor	
2022-07-16	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-07-21	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-07-23	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-07-30	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences	
2022-08-04	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences, discussion about the Backend and Frontend development	
2022-08-06	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences, discussion about the Backend and Frontend development	
2022-08-10	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences, discussion about the Backend and Frontend development	
2022-08-13	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences, discussion about the Backend and Frontend development	
2022-08-17	7:00 PM	MS Teams	Present	Progress status, Discussion about research papers and conferences, discussion about the Backend and Frontend development	

2022-08-20	7:00 PM	MS Teams	Present	Progress status	
2022-08-27	7:00 PM	MS Teams	Present	Progress status	
2022-09-01	7:00 PM	MS Teams	Present	Progress status, Progress Discussion with Supervisor	
2022-09-03	7:30 PM	MS Teams	Present	Progress status, Progress Discussion with Co-Supervisor	
2022-09-14	7:30 PM	MS Teams	Present	Progress status	
2022-09-17	7:30 PM	MS Teams	Absent	Progress status	
2022-09-24	7:30 PM	MS Teams	Present	Progress status	
2022-09-27	7:30 PM	MS Teams	Present	Progress status	
2022-09-28	7:30 PM	MS Teams	Present	Progress status	
2022-10-12	7:30 PM	MS Teams	Present	Progress status, Discussion with the Supervisor about PP2 presentation slides and demo	
2022-10-18	7:30 PM	MS Teams	Present	Progress status	
2022-10-19	7:30 PM	MS Teams	Present	Progress status	
2022-11-02	7:30 PM	MS Teams	Present	Progress status, Discussion with Co-Supervisor about Research paper acceptance	
2022-11-03	7:30 PM	MS Teams	Present	Progress status, Discussion with Co-Supervisor about Research paper acceptance	
2022-11-04	7:30 PM	MS Teams	Present	Discussion about Final Presentation slides and marking rubric, Discussion about the progress	
2022-11-08	7:30 PM	MS Teams	Present	Progress status, Discussion about Final Presentation slides, and marking rubric	
2022-11-10	7:30 PM	MS Teams	Present	Progress status, Discussion about Final Presentation slides, and marking rubric	

Table 4.2: Supervisors' meeting logs

Date	Time	Platform	With Whom	Discussions	Conclusions
2021-12-06	8:00 PM	MS Teams	Supervisor	Topic selection Co-supervisor selection Components Communications with supervisor (e.g. teams) External supervisor	Identify more relevant components for the idea Find a more novel idea
2021-12-10	8:00 PM	MS Teams	Co-supervisor	Group intro Research area/technologies Reason for delay Idea 2 - domain, problem, implementation Idea 2 - possible implementation Dataset collection Form submission extension Communication - 077-6918328	Decided to go with KIC and data science Arrange a meeting with the supervisor Might have a large scope Formulate a topic
2021-12-28	4:00 PM	Zoom	External supervisor	Domain area, Problems, Idea	Decided to be our external supervisor
2022-03-28	2:00 PM	MS Teams	Co-supervisor	Progress	progress comments
2022-03-08	12:40	Whatsapp	Co-supervisor	Meeting arrangement	Meeting time
2022-03-29	2:00 PM	MS Teams	Co-supervisor	Progress, PP1 demo with Jupyter notebooks, Weekly meetings	Decided to demo PP1 within jupyter notebooks
2022-04-05	2:00 PM	MS Teams	Co-supervisor	Progress discussion	progress comments

2022-04-21	9:00 PM	MS Teams	Supervisor	Progress discussion	progress comments
2022-04-26	3:30 PM	MS Teams	Supervisor	Individual progress, Demo instructions, Presentation draft discussions, Next meeting	Decided to meet after 5th May to see the trial PP! presentation and demo.
2022-04-29	2:00 PM	MS Teams	Co- supervisor	Individual progress, Reviewing PP1 slides, Changes to the system architecture diagram, Next meeting for demo	Decided to add detailed parts for Components 1 and 4, Decided to have a demo presentation after 5th May
2022-05-24	7:00 PM	Whatsapp	Supervisor	Progress meeting time	Time: 26th May
2022-05-25	1:00 PM	Whatsapp	Co- supervisor	Meeting arrangement	Meeting time
2022-05-26	8:00 PM	MS Teams	Supervisor	Reviewing the PP1 Presentation and demo, Corrections to PP1 Slides	Decided to update slides for the corrections proposed by the supervisor
2022-06-07	10:00 AM	MS Teams	Co- supervisor	Conference guides, research approach, NBQSA competition guides.	Decided to write individual papers. Decided to publish in 20 - 30 h index conferences.
2022-06-16	9:00 PM	MS Teams	Supervisor	Progress discussion, NBQSA preparation	Comments on progress, NBQSA demo
2022-07-06	9:00 PM	MS Teams	Supervisor	NBQSA preparation, Presentation demo	Slides improvements & corrections, Sample questions.
2022-07-14	8:20 PM	Whatsapp	Supervisor	NBQSA issues	Gone with a simpler approach
2022-07-29	10:00 AM	Whatsapp	Supervisor	Discussed possible conferences	Agreed with 2 conferences

2022-08-12	9:30 PM	MS Teams	Supervisor	NBQSA Competition final demo	Agreed on the presentation slides
2022-08-15	5:00 PM	Whatsapp	Supervisor	CENIM Conference	Agreed to submit
2022-08-25	6:20 PM	Whatsapp	Supervisor	IoTAIS Conference	Agreed to submit
2022-09-05	6:20 PM	Whatsapp	Supervisor	Thesis discussion	Draft submission
2022-09-10	1:00 PM	Whatsapp	Supervisor	Thesis issue	The timeline issue happened by mistake
2022-09-22	11:00 PM	Whatsapp	Supervisor	Discussed possible conferences	New conference
2022-10-09	9:30 AM	Whatsapp	Supervisor	Paper issues & Registration	Solved issues and paper status
2022-10-18	2:00 PM	MS Teams	Co-supervisor	Paper comments & review	Review changes given

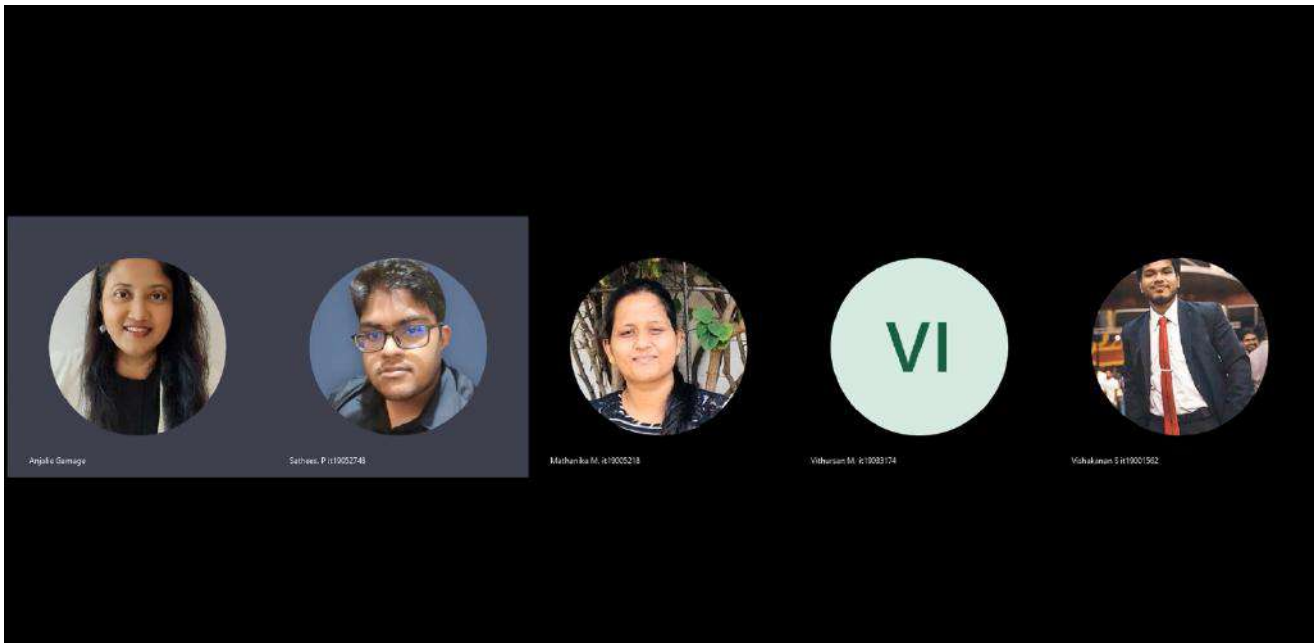


Figure 4.15: Supervisor meeting proof

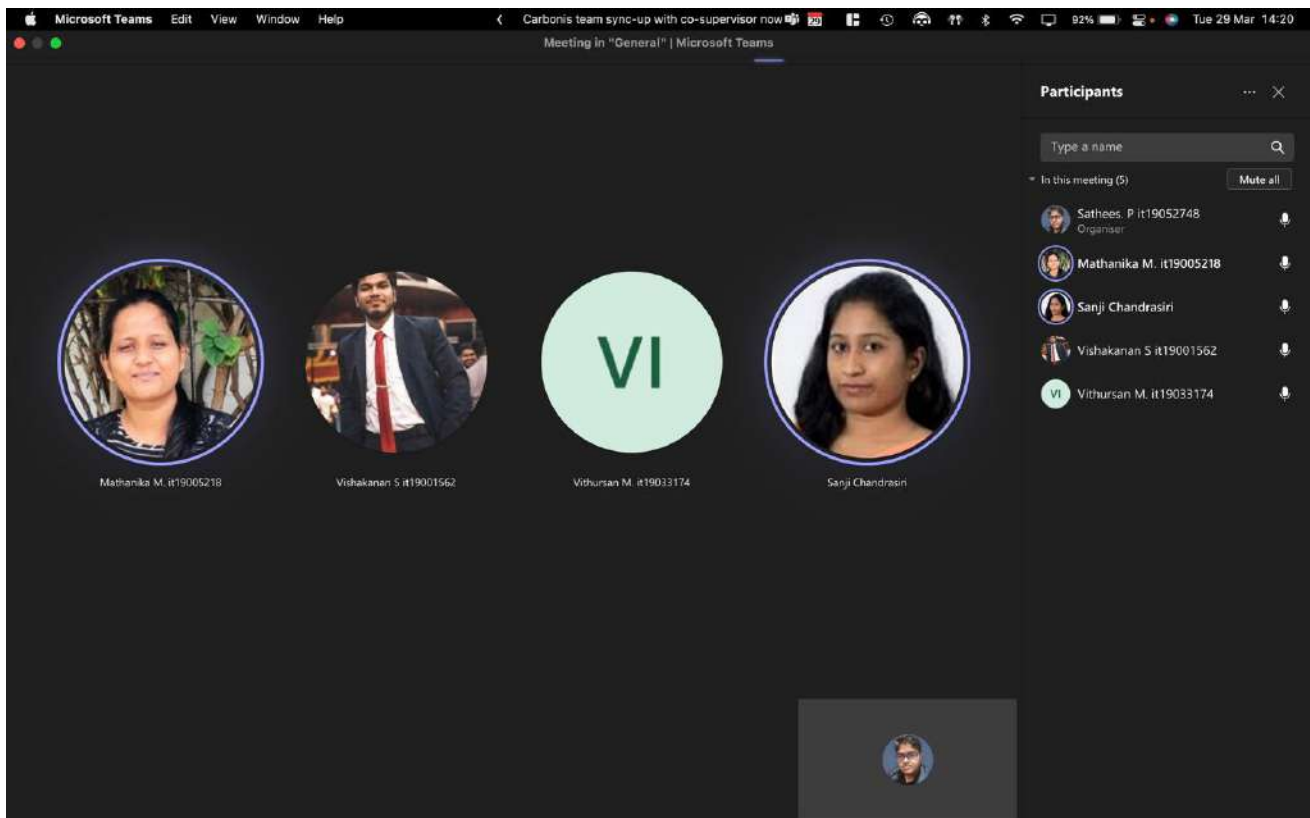


Figure 4.16: Co-supervisor meeting proof

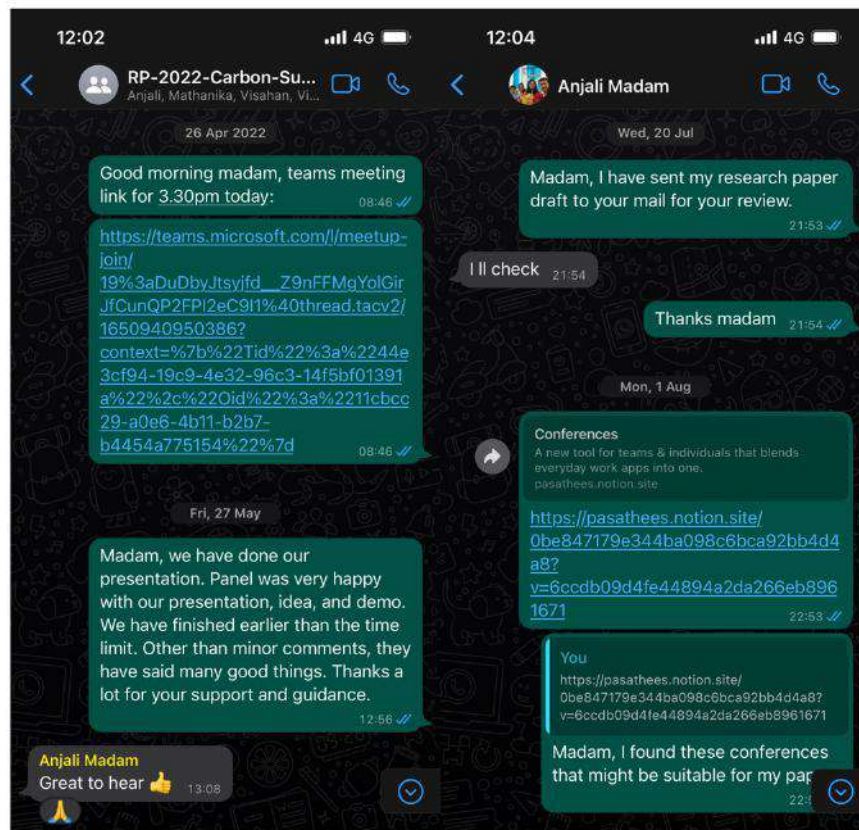


Figure 4.17: Sample WhatsApp chats with the supervisor

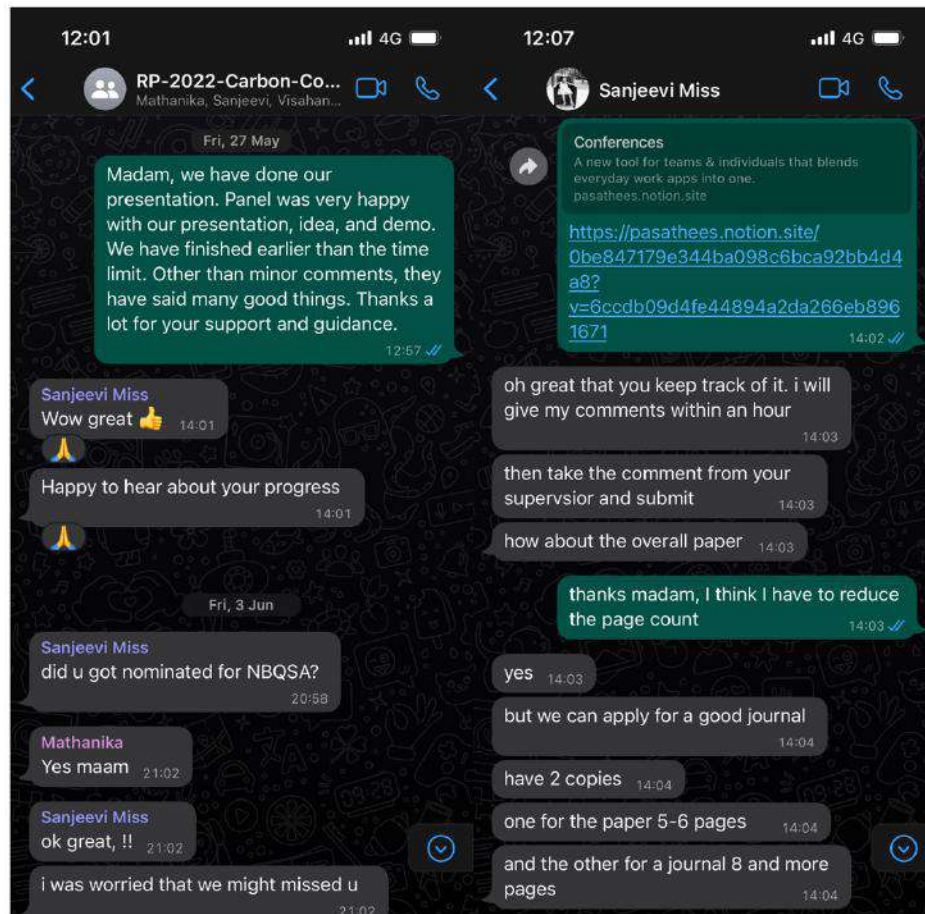


Figure 4.18: Sample WhatsApp chats with co-supervisor