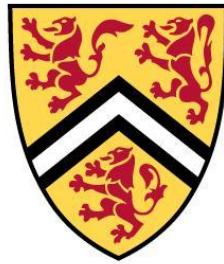


UNIVERSITY OF  
**WATERLOO**



**Faculty of Engineering  
Department of Electrical and Computer  
Engineering**

**NeAR Me  
Progress Report  
2023.12**

Alice Ye, 20700916  
Michael Sawyer, 20765348  
Shizhen Li, 20785413  
Aidan Foster, 20721410

Pouya Mehrannia

July 26, 2022

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# 1. Overview of Project

## 1.1 Revised Project Abstract

Google data from 2019-2021 shows that searches for "open now near me" have grown 400% year-over-year. More and more, people are using digital maps not only for navigation, but also to explore and learn about their surroundings. However, with existing map and navigation mobile applications, exploring and learning about the surroundings is far from a smooth experience while on the move. Try searching, swiping, spreading, pinching, pressing, tapping, reading and reorienting while negotiating busy streets and uneven terrain! NeAR Me is a mobile application that uses augmented reality (AR) to enrich people's travelling experience by rendering information about their surroundings in real-time, right in front of their cameras. Users can post AR content to topics at their locations for other users to see, and subscribe to topics of interest (e.g., restaurants, concerts, must-visit places, anything) to have AR content from those topics rendered around them. NeAR Me provides users with a highly visual experience, allowing them to place their content in the world and explore it with ease!

## 1.2 Original Project Timeline

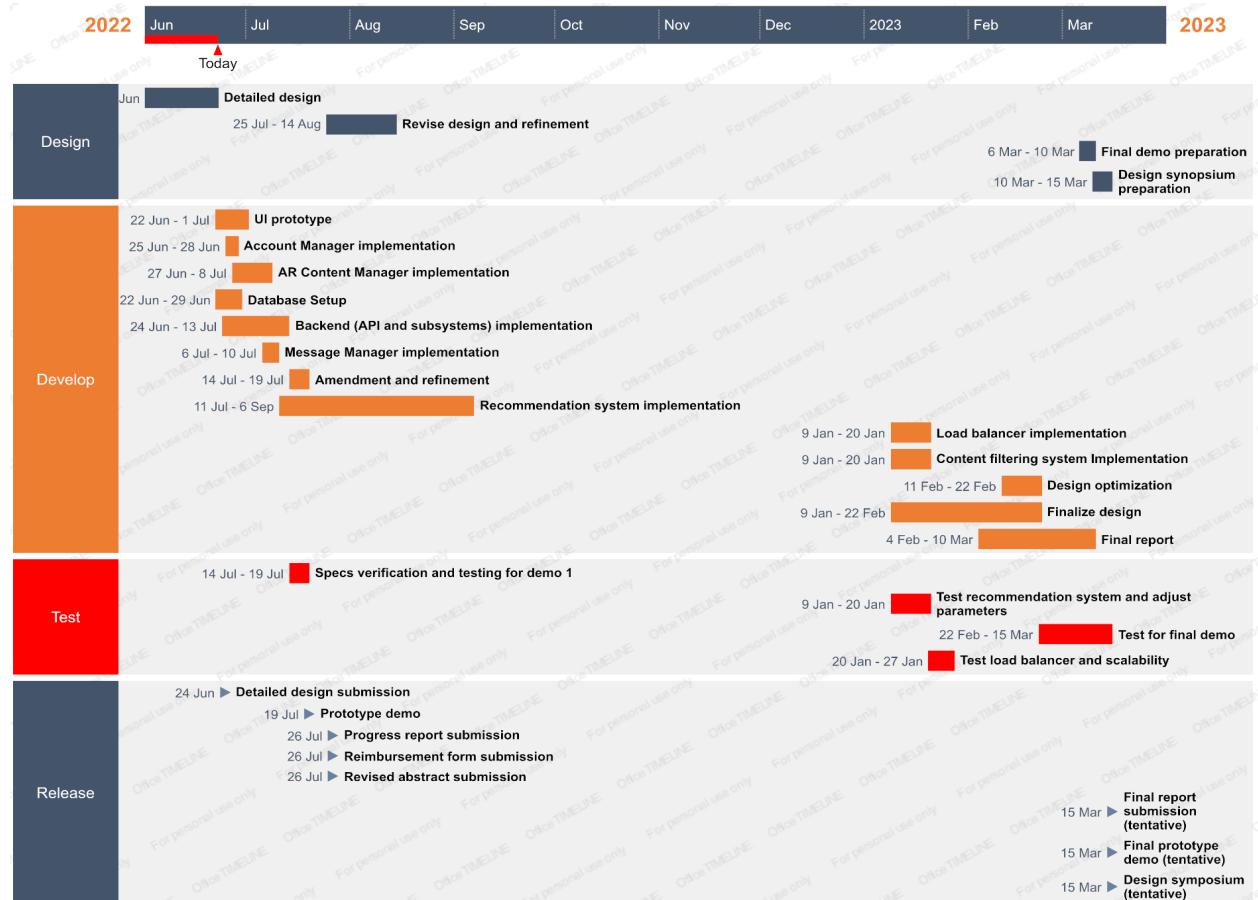


Figure 1: Original project timeline.

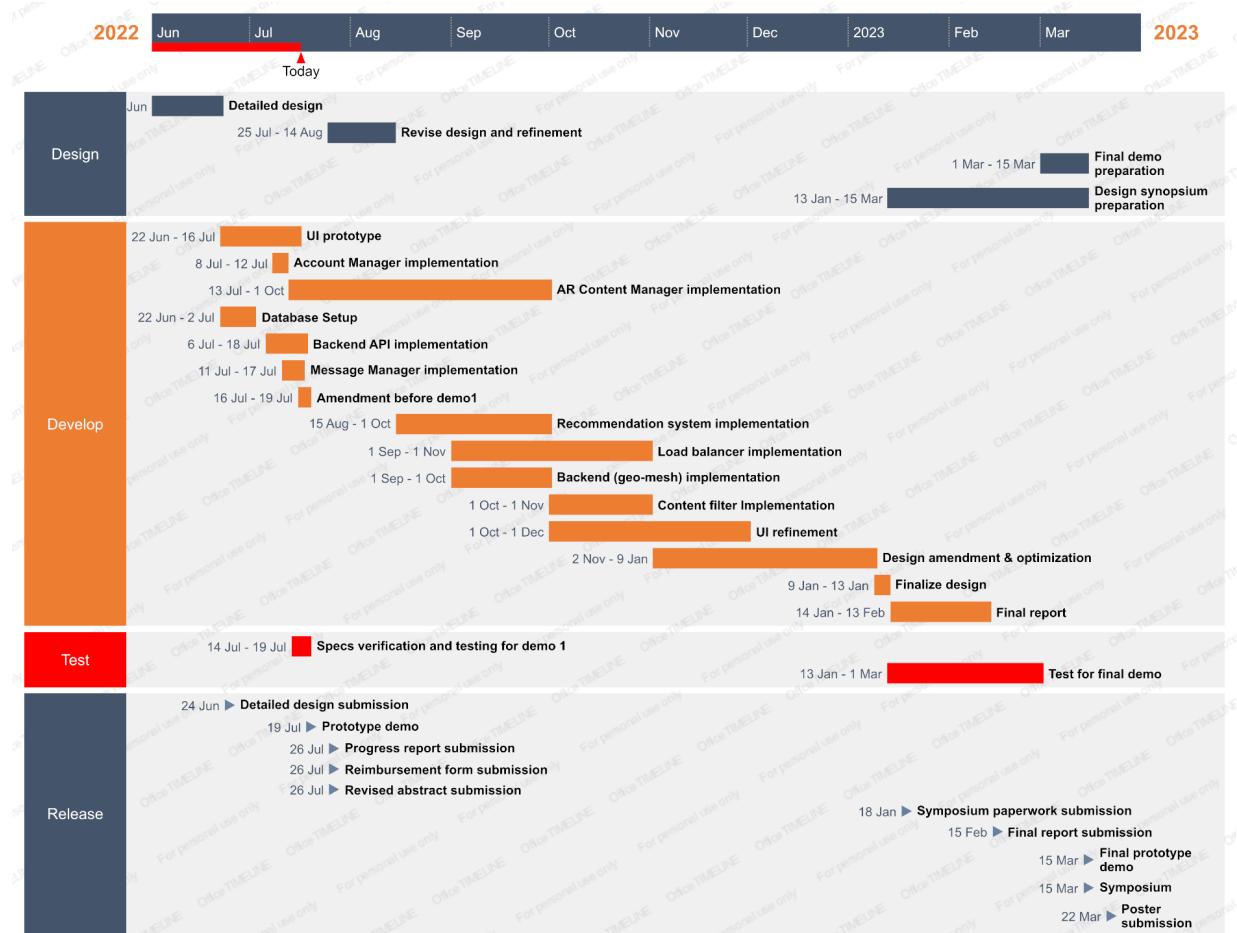


Figure 2: Revised project timeline.

## 2. Current Status of Project

### 2.1 Prototype Completion

The current prototype completion status is about 50%, estimated based on the completion status of the submodules.

Table 1: Submodule completion status.

Submodule	Progress	Weight	Description
User interface	70%	20%	Main UI flow (visual, navigation, interaction) ready. Layout/rendering refinement and feature updates required on some UI with regards to consultant advice.

AccountManager (Frontend)	100%	2.5%	Authentication service ready. User data management ready.
MessageManager (Frontend)	80%	2.5%	Main infrastructure and code templates ready. Refinement required on topic search.
ARContentManager (Frontend)	40%	20%	Device positioning service (ARCore Geospatial) ready. Content requests and instantiation ready. Content cache management not ready. Content interaction and occlusion not ready.
Frontend API	90%	5%	Code ready; waiting to integrate with the backend server.
Backend API	85%	5%	API request-response interface is completed and tested. Backend connection to authorization service and database is completed. Permanent server address and frontend access is pending.
Geo-mesh algorithm (Backend)	0%	5%	
Content filter (Backend)	0%	10%	
Recommendation system (Backend)	10%	10%	Design ready.
Server and load balancer setup	0%	5%	
Database	95%	15%	Database configured and accessible. Data structures ready. Adjustment and refinement needed depending on feature changes.
<b>Total</b>	50.5%	100%	-

\*\* Weights are assigned based on the workload and importance of each submodule.

## 2.2 Student Hours

**Table 2:** Total student hours.

Alice	Aidan	Michael	Sean (Shizhen)	Total
195	110.25	156	122	583.25

### 3. Discussion

We are very confident that we will meet all the essential specifications and 80% confident that we will complete all the desired (including non-essential) features by March 2023.

Up until now, we have roughly 300 hours in total on the project implementation, including ramp-up time for the tools we use. Considering the project completion status, we will likely need to allocate another 300 hours in the Fall term (Sep. 2022 to Dec. 2022) as a group to complete the project, and if we divide the tasks amongst the team members, this comes down to approximately 20 hours per month per person, which is a feasible workload for us even during co-op.

Nonetheless, there are few factors that could impact our schedule, mainly:

1. **Feature changes:** During the implementation stage, we have made several design changes with regards to the display and features, which requires some redesigning in our UI and backend algorithm. For example, we have decided to change the condition for creating an AR post from ‘user is the owner of the current location’ to ‘the current location is public, or is private but owner allows AR posting’.
2. **Custom AR creation and rendering:** There are a lot of uncertainties in the implementation of the AR Content Manager (i.e., AR object handling) because this submodule relies heavily on third-party resources for AR rendering (Unity AR engine) and device positioning (ARCore Geospatial). Trial and error is required for the implementation, and design adjustments need to be made on the go to deliver a smooth interactive AR experience.
3. **Backend optimization:** In our design specs, we have listed that users are expected to receive new data within one second. However, with our backend design, a list of modules need to be passed through sequentially: 1) Request preprocessing; 2) Query to database; 3) Filter through content filter system and recommendation system; 4) Data regrouping and response. We would need to optimize both the submodule design and the communication between modules to guarantee a timely response. This part is subject to unpredictable difficulties.
4. **Content filtering:** The content filtering system is necessary because returning all content to a user would potentially clutter their screen and use a lot of mobile data. The content filtering system cannot filter random content because users may not receive content they would have been interested in. For this reason, we opted to give users the choice for how they want their content filtered (e.g., most popular, newest, etc.). The problem is that the current publish-subscribe system design assumes content is randomly filtered; almost any other type of filtering will not work correctly with this design. This means we must spend time redesigning the publish-subscribe system and the content filtering system so that they both work correctly.

## Appendix A: Student Logs

ECE498A: Student Log					
Name:	Alice Ye	Group:	2023.12	Signature:	
By signing above, I am stating that this is an accurate account of the tasks, dates, and times that I worked on my capstone design project.					
Task	Date	Start time	Finish time	Hours	Running total of hours
Project discussion	May 11	15:00	17:00	2	2
Project discussion	May 12	17:30	20:00	2.5	4.5
Finding consultant(s)	May 15	17:00	18:00	1	5.5
Abstract writing	May 16	21:00	22:00	1	6.5
Project coordination	May 17	13:30	15:00	1.5	8
Project Implementation discussion	May 18	15:00	17:00	2	10
Research on recommendation system and authentication tools; Block diagram layout	May 21	8:00	11:00	3	13
Research result discussion	May 22	13:00	15:00	2	15
Specs and block diagram discussion	May 25	15:00	19:00	4	20
Finalize specs and risks	May 28	13:00	16:00	3	23
Start detailed design	June 1	15:00	17:30	2.5	25.5
UI view and flow design	June 8	10:00	13:00	3	28.5
Detailed design discussion	June 8	15:00	17:30	2.5	31
Initial design for recommendation system and consulting	June 9	9:00	12:00	2	33
Research on AI algorithms for recommendation system design	June 12	10:00	16:00	6	39
Detailed design discussion	June 15	15:00	18:00	3	42
Research on framework; frontend submodule design and report writing	June 18	15:00	20:00	5	47
Detailed design discussion	June 19	13:00	16:00	3	50
Timeline planning	June 19	20:00	21:00	1	51

Research and report write up for backend framework and load balancing	June 20	10:00	16:00	6	57
Quantitative analysis for recommendation system algorithms	June 21	20:00	24:00	4	61
Detailed design discussion	June 22	15:00	18:00	3	64
Detailed design report updates	June 23	12:00	14:00	1	65
Recommendation system research and reporting	June 24	7:00	12:00	5	70
Finalize detailed design submission	June 26	8:00	9:00	1	71
UI implementation	June 29	9:00	17:00	8	79
UI implementation	June 30	15:00	22:00	7	86
UI implementation	July 1	11:00	23:00	12	98
UI implementation	July 2	11:00	18:00	7	105
UI implementation	July 3	9:00	21:00	12	117
UI implementation	July 4	7:00	15:00	8	125
UI implementation	July 5	7:00	10:00	3	128
Progress discussion	July 6	15:00	16:00	1	129
UI implementation	July 6	19:00	20:00	1	130
UI implementation	July 7	8:00	12:00	4	134
UI implementation	July 8	8:00	13:00	5	139
UI implementation	July 9	9:00	14:00	5	144
UI implementation	July 10	14:00	22:00	8	152
UI & Frontend API implementation	July 11	8:00	13:00	5	157
Frontend API implementation	July 12	10:00	19:00	9	166
Progress discussion	July 13	15:00	16:30	1.5	167.5
Frontend implementation	July 14	13:00	17:00	4	171.5
Progress discussion	July 17	14:00	17:30	3.5	175

UI implementation & demo planning	July 18	9:00	21:00	12	187
Demo preparation (PPT and speech)	July 19	6:00	11:00	5	192
Initial prototype demo	July 19	11:00	12:00	1	193
Progress report and timeline discussion	July 20	15:30	16:00	0.5	193.5
Revise abstract and estimate progress	July 22	9:00	10:00	1	194.5
Progress report & revise abstract	July 24	13:00	13:30	0.5	195

**ECE498A: Student Log**

Name: Shizhen Li Group: 2023.12 Signature: Shizhen Li

By signing above, I am stating that this is an accurate account of the tasks, dates, and times that I worked on my capstone design project.

Task	Date	Start time	Finish time	Hours	Running total of hours
Brainstorm and verify project ideas	May 8, 2022	6:00pm	8:30pm	2.5	2.5
Team meeting – discuss and analyze ideas	May 11, 2022	3:00pm	5:30pm	2.5	5
Team meeting – project topic choice update after talking with professors	May 13, 2022	5:30pm	8:30pm	3	8
Team meeting – project high level design and feasibility	May 18, 2022	3:00pm	6:00pm	3	11
Adding entries to specifications and risk assessment section	May 21, 2022	10:00pm	11:00pm	1	12
Team meeting – project specification and risk assessment	May 25, 2022	3:00pm	6:00pm	3	15
Team meeting – detailed design, more specific separation of functionality blocks	June 1, 2022	3:00pm	6:00pm	3	18
Search and read documentations of suggested external modules	June 5, 2022	7:00pm	9:00pm	2	20
Team meeting – shrink down design choices and separate main module and tasks	June 8, 2022	3:00pm	4:30pm	1.5	21.5
Design pub-sub subsystem of the project	June 13, 2022	10:00pm	12:00am	2	23.5
Team meeting – update on progress, proposing updated designs, started discussion on API	June 15, 2022	3:00pm	7:00pm	4	27.5
Finalizing design on pub-sub subsystem, draft its section in detailed design document (3.2.3)	June 17, 2022	10:00pm	12:00am	2	29.5
Team meeting – discussing interactions between subsystems and confirming final design choice for each subsystem	June 19, 2022	1:00pm	4:00pm	3	32.5
Final draft of section 3.2.3 for pub-sub design document	June 21, 2022	9:00pm	12:00am	3	35.5
Team meeting – update on progress, explain final design and additional requirements on other components, finalize API design, discussed timeline	June 22, 2022	3:00pm	7:00pm	4	39.5

Proofread detailed design and timeline document	June 24, 2022	7:00pm	7:30pm	0.5	40
Team meeting – discuss, prepare, and test project skeleton code and discuss timeline feasibility	June 29, 2022	3:00pm	5:00pm	2	42
Following guides to install unit for frontend development, build frontend app skeleton	July 1, 2022	1:00pm	5:00pm	4	46
Local project setup and learning Spring Framework	July 1, 2022	8:00pm	12:00am	4	50
Trial development on two API specification, build and debug	July 5, 2022	7:00pm	11:00pm	4	54
Team meeting – demo on frontend UI, clarifying some design details with teammates	July 6, 2022	3:00pm	5:00pm	2	56
Rebuild frontend, try running simulator and on phone	July 8, 2022	5:00pm	9:00pm	4	60
Develop backend interface with API portion	July 11, 2022	4:00pm	11:00pm	7	67
Confirm with database designer about accessing method and data structure naming conventions	July 12, 2022	3:00pm	7:00pm	4	71
Team meeting – update on progress; change on API definitions with mainly moving param locations in the RPCs.	July 13, 2022	3:00pm	6:00pm	3	74
Creating test case and pass condition for backend API	July 14, 2022	5:00pm	11:00pm	6	80
Implement backend services to match updated API, further separate logic layers in backend Spring framework to single out connections with other subsystems	July 15	2:00pm	10:00pm	8	88
Team meeting – showcase of frontend AR rendering result, formalize parameter names in API, confirm database accessing method, show specific example of API workflow in backend	July 16	2:00pm	6:00pm	4	92
Review and merge with database accessor from database development branch	July 16	8:00pm	11:00pm	3	95
Update API test collection with new modifications	July 17	8:00am	11:00am	3	98
Apply changes to match with updated API, connect with database, and completed simple service logic APIs	July 17	2:00pm	6:00pm	4	102
Complete backend API services, test backend code for demo, prepare related slide for demo	July 18	7:00pm	12:00am	5	107

Final preparations for demo and attend demo	July 19	8:00am	12:00pm	4	111
Post demo – optimization on backend API handling	July 19	16:00pm	20:00pm	4	115
Post demo – rebuilding and running frontend locally	July 20	9:00am	12:00pm	3	118
Revise student log, edit progress report **	July 24	6:00pm	9:00pm	3	121
Review progress report and sign document **	July 25	6:00pm	7:00pm	1	122

**\*\* The task is planned (not yet started) at the time of completing this student log**

ECE498A: Student Log						
Name:	Michael Sawyer	Group:	2023.12	Signature:		
By signing above, I am stating that this is an accurate account of the tasks, dates, and times that I worked on my capstone design project.						
Task	Date	Start time	Finish time	Hours	Running total of hours	
Met with group, brainstormed, and came up with 5 different topics.	05/11/22	15:00	17:00	2	2	
Met with group, determined feasibility, rated topics, and narrowed down topic list to 2.	05/12/22	17:30	20:00	2.5	4.5	
Met with potential consultant to discuss potential topic.	05/13/22	13:00	13:15	0.25	4.75	
Worked on initial draft of abstract.	05/16/22	18:00	19:00	1	5.75	
Met with consultant and decided on topic.	05/17/22	13:30	13:45	0.25	6	
Worked on final draft of abstract.	05/17/22	14:50	15:50	1	7	
Worked on project specification with group.	05/18/22	15:00	17:00	2	9	
Researched potential framework for augmented reality (AR) component.	05/18/22	19:00	20:00	1	10	
Looked into Google ARCore as potential framework for AR component.	05/19/22	8:45	9:15	0.5	10.5	
Tested Unity AR Foundation and Google ARCore on Android.	05/19/22	13:00	17:00	4	14.5	
Met with group and worked on block diagram.	05/22/22	13:00	15:00	2	16.5	
Created merge request for Unity project skeleton.	05/22/22	15:00	17:00	2	18.5	
Worked on functional specifications.	05/25/22	13:45	14:15	0.5	19	
Met with group and worked on functional/non-functional specifications, and risk assessment.	05/25/22	15:00	18:45	3.75	22.75	
Met with group and finished initial draft of project specifications and risk assessment document.	05/28/22	13:00	14:00	1	23.75	
Finalized the functional specifications and block diagram.	05/28/22	14:00	17:00	3	26.75	
Proofread the project specifications and risk assessment document.	05/28/22	18:30	21:00	2.5	29.25	

Met with group, outlined detailed design, and assigned tasks to each group member.	06/01/22	15:00	17:00	2	31.25
Started work on the high-level architecture of the AR Content Manager design.	06/06/22	13:15	13:45	0.5	31.75
Continued work on the high-level architecture of the AR Content Manager and started looking at data structures for AR content.	06/06/22	18:30	20:45	2.25	34
Finished work on the high-level architecture of the AR Content Manager and started to fill in some details.	06/07/22	13:00	16:15	3.25	37.25
Finished filling in details for the AR Content Manager high-level design.	06/08/22	9:00	9:30	0.5	37.75
Considered the performance of the AR Content Manager design and started coming up with improvements.	06/08/22	13:30	14:45	1.25	39
Met with group, went over the UI design, discussed the publish-subscribe system, and assigned new tasks.	06/08/22	15:00	16:30	1.5	40.5
Started to consider more functional specifications for the AR Content Manager design.	06/08/22	16:30	17:00	0.5	41
Worked on the interaction between the AR Content Manager, Content Filtering System, and Publish-Subscribe System.	06/08/22	19:30	20:30	1	42
Concluded that the Publish-Subscribe System will not work for our purposes.	06/09/22	8:30	10:00	1.5	43.5
Looked at alternatives for the Publish-Subscribe System.	06/09/22	14:30	16:00	1.5	45
Continued looking at new functional specifications for the AR Content Manager and the backend.	06/10/22	13:00	14:00	1	46
Looked into the amount of data stored by the AR Content Manager and sent between the frontend and backend.	06/10/22	19:00	21:00	2	48
Started a new AR Content Manager design with the new functional specifications.	06/11/22	9:00	10:00	1	49

Continued work on the new AR Content Manager design.	06/11/22	12:45	15:15	2.5	51.5
Continued work on the new AR Content Manager design.	06/12/22	9:15	11:00	1.75	53.25
Finished work on the new AR Content Manager design.	06/12/22	13:30	16:00	2.5	55.75
Met with group, came up with data types and sizes stored by the backend, and discussed the backend design.	06/15/22	15:00	17:45	2.75	58.5
Investigated issues with the backend design discussed in the last meeting.	06/16/22	13:30	15:00	1.5	60
Analyzed the AR Content Manager design and started to work on an improved design.	06/17/22	10:15	11:00	0.75	60.75
Finished work on an improved AR Content Manager design and started to consider more improvements.	06/17/22	12:15	14:00	1.75	62.5
Worked on the interaction between the user and the AR Content Manager.	06/17/22	18:30	20:30	2	64.5
Reviewed current backend design iteration, looked at pros and cons of Content Filtering System, and worked on new AR Content Manager design.	06/19/22	9:30	11:30	2	66.5
Met with group, revised backend API design, and created first draft of timeline.	06/19/22	13:00	15:30	2.5	69
Started comparing new AR Content Manager design to old one.	06/19/22	15:30	16:30	1	70
Started looking into data structures for the AR Content Manager design.	06/19/22	18:30	20:45	2.25	72.25
Continued looking into data structures for the AR Content Manager design.	06/20/22	9:15	11:30	2.25	74.5
Started solving problems in the AR Content Manager design.	06/20/22	12:30	13:45	1.25	75.75
Continued comparing different solutions to problems in the AR Content Manager design.	06/20/22	18:30	19:30	1	76.75

Continued working on solutions to problems in the AR Content Manager design.	06/21/22	8:30	11:00	2.5	79.25
Considered trade-offs between different AR Content Manager designs.	06/21/22	12:30	2:30	2	81.25
Resolved issues with the AR Content Manager final design and continued comparing data structures.	06/21/22	18:30	21:00	2.5	83.75
Continued comparing data structures for storing geographic data in the AR Content Manager.	06/22/22	8:45	9:15	0.5	84.25
Continued looking into data structures for storing geographic data in the AR Content Manager.	06/22/22	12:30	15:00	2.5	86.75
Met with group and discussed some issues with the current design.	06/22/22	15:00	18:00	3	89.75
Continued looking into data structures for storing geographic data in the AR Content Manager.	06/23/22	8:45	9:15	0.5	90.25
Compared different designs and looked at data structures for the AR Content Manager.	06/23/22	12:30	16:30	4	94.25
Continued looking at data structures for the AR Content Manager.	06/24/22	8:30	1:15	4.75	99
Started writing the final design for the AR Content Manager.	06/24/22	17:30	20:45	3.25	102.25
Finished writing the final design for the AR Content Manager.	06/25/22	9:00	14:45	5.75	108
Wrote the final design for the Content Filtering System.	06/26/22	10:30	14:00	3.5	111.5
Met with group and discussed implementation progress.	07/06/22	15:00	15:30	0.5	112
Met with group and discussed implementation progress.	07/06/22	15:00	15:45	0.75	112.75
Started to review the current UI implementation.	07/06/22	15:45	17:15	1.5	114.25
Finished reviewing the current UI implementation and reviewed the current database implementation.	07/06/22	18:45	20:45	2	116.25

Reviewed the updated UI implementation.	07/11/22	10:00	10:30	0.5	116.75
Met with group and discussed implementation progress and plans for testing.	07/13/22	15:00	16:30	1.5	118.25
Started the AR Content Manager implementation.	07/15/22	18:30	21:15	2.75	121
Continued the AR Content Manager implementation.	07/16/22	9:15	10:45	1.5	122.5
Met with group, worked on implementation, and started to prepare for demo.	07/16/22	14:00	17:30	3.5	126
Continued the AR Content Manager implementation.	07/17/22	10:00	11:30	1.5	127.5
Continued the AR Content Manager implementation and worked on getting the location service working.	07/17/22	13:15	16:45	3.5	131
Continued working on getting the location service working.	07/17/22	18:00	18:45	0.75	131.75
Continued working on getting the location service working.	07/17/22	22:00	23:30	1.5	133.25
Finished getting the location service working, continued working on the AR Content Manager implementation, and tested other parts of the implementation.	07/18/22	8:30	13:00	4.5	137.75
Continued working on the AR Content Manager implementation.	07/18/22	14:00	16:30	2.5	140.25
Finished AR Content Manager implementation for the demo.	07/18/22	17:45	19:15	1.5	141.75
Tested frontend locally and fixed bugs for demo.	07/18/22	19:45	3:30	7.75	149.5
Prepared for and presented demo.	07/19/22	8:30	12:00	3.5	153
Met with group and discussed progress.	07/20/22	15:30	16:00	0.5	153.5
Reviewed and added to progress report.	07/24/22	18:30	21:00	2.5	156

ECE498A: Student Log					
Name: <u>Aidan Foster</u>		Group: <u>2023.12</u>		Signature: <u>O Foster</u>	
By signing above, I AM stating that this is an accurate account of the tasks, dates, and times that I worked on my capstone design project.					
Task	Date	Start time	Finish time	Hours	Running Total of Hours
Project Discussion - Discuss potential project ideas	May 11, 2022	3:00 PM	5:00 PM	2	2
Meeting to narrow down and elaborate on project ideas	May 12, 2022	5:30 PM	8:00 PM	2.5	4.5
Meeting with potential consultant	May 13, 2022	1:00 PM	1:15 PM	0.25	4.75
Meeting with consultant	May 17, 2022	1:30 PM	1:45 PM	0.25	5
Project Discussion - High-level design and feasibility	May 18, 2022	3:00 PM	5:00 PM	2	7
Project Discussion - Specifications and block diagr AM	May 22, 2022	1:00 PM	3:00 PM	2	9
Project Discussion - Functional/non-functional specifications, risk assessment	May 25, 2022	3:00 PM	6:45 PM	3.75	12.75
Additional work on specs	May 26, 2022	4:15 PM	5:00 PM	0.75	13.5
Project Discussion - Finalization of specifications and risk assessment	May 28, 2022	1:00 PM	5:00 PM	4	17.5
Project Discussion - Detailed Design	June 1, 2022	3:00 PM	5:00 PM	2	19.5
Project Discussion - Detailed Design	June 8, 2022	3:00 PM	4:30 PM	1.5	21

Database option research	June 14, 2022	8:00 PM	11:30 PM	3.5	24.5
Project Discussion - Detailed Design	June 15, 2022	3:00 PM	6:00 PM	3	27.5
Work on database entry specification	June 18, 2022	5:30 PM	6:30 PM	1	28.5
Project Discussion - Detailed Design	June 19, 2022	1:00 PM	3:30 PM	2.5	31
Research: MongoDB vs Redis Benchmarking Setup and Scripts	June 20, 2022	5:00 PM	9:00 PM	4	35
Research: MongoDB vs Redis Benchmarking Setup and Scripts	June 21, 2022	2:30 PM	4:00 PM	1.5	36.5
Research: MongoDB vs Redis Benchmarking Setup and Scripts	June 22, 2022	3:00 AM	9:00 AM	6	42.5
Project Discussion - Detailed Design	June 22, 2022	3:00 PM	6:00 PM	3	45.5
Last-minute changes to database structures in Design docs	June 27, 2022	8:00 AM	9:00 AM	1	46.5
Database Coding - Get MongoDB set up, verify and access	July 1, 2022	7:30 PM	10:30 PM	3	49.5
Database Coding - Get MongoDB access in Java working, learn DB API	July 2, 2022	5:00 PM	11:00 PM	6	55.5
Database Coding - Add Topic functions	July 3, 2022	5:00 PM	9:00 PM	4	59.5
Database Coding - Add unit tests for Topic functions	July 4, 2022	2:00 PM	6:00 PM	4	63.5
Database Coding - Add in-code function documentation	July 5, 2022	6:00 PM	9:00 PM	3	66.5

Database Coding - Add User Functions	July 6, 2022	1:00 PM	3:00 PM	2	68.5
Project Discussion - Clarifying design details, updates	July 6, 2022	3:00 PM	3:45 PM	0.75	69.25
Database Coding - Research into MongoDB SpringBoot implementation	July 8, 2022	6:00 PM	9:00 PM	3	72.25
Database Coding - Experimentation with rewriting database accessor	July 10, 2022	4:00 PM	9:30 PM	5.5	77.75
Database Coding - Add functions for Locations	July 12, 2022	12:00 PM	4:00 PM	4	81.75
Database Coding - Add functions for AR_Content and User Pubs/Subs	July 12, 2022	10:00 PM	11:59 PM	2	83.75
Database Coding - Add functions for AR_Content and User Pubs/Subs	July 13, 2022	12:00 AM	6:30 AM	6.5	90.25
Database Coding - Code simplification and in-code documentation	July 13, 2022	6:30 AM	7:30 AM	1	91.25
Database Coding - Add unit tests for Users, Topics, Locations	July 13, 2022	7:30 AM	12:45 PM	5.25	96.5
Database Coding - Add testing for User AuthLocation functions	July 13, 2022	1:15 PM	2:45 PM	1.5	98
Project Discussion - Progress update, API changes	July 13, 2022	3:00 PM	4:30 PM	1.5	99.5
Database Coding - Make changes to reflect API changes	July 14, 2022	3:30 PM	4:30 PM	1	100.5
Database Coding - Add User	July 15, 2022	2:30 PM	4:15 PM	1.75	102.25

<b>Publication functions and generic get/update functions</b>					
Meeting to test implementation and integration	July 16, 2022	2:00 PM	5:30 PM	3.5	105.75
Preparation for Prototype Demo	July 19, 2022	9:00 AM	11:00 AM	2	107.75
Prototype Demo	July 19, 2022	11:00 AM	12:00 PM	1	108.75
Project Discussion - Progress Report and Revised Abstract	July 20, 2022	3:30 PM	4:00 PM	0.5	109.25
Work on Progress Report	July 25, 2022	8:00 PM	9:00 PM	1	110.25

## Appendix B: Initial Prototype Feedback Sheet

ECE498A: Initial Prototype Demonstration Feedback Sheet				
Group number (e.g., 2023.75): 2023.12				
<b>Instructions for consultant:</b> By checking the most appropriate boxes below, please provide <u>frank feedback</u> to the student group about how you think their project is progressing. At this point in the term, students should have finalized their designs and their prototypes should be at least 50% (preferably 75%) complete. Students will respond to this feedback in their Progress Report. In March next year, the students will approach you again to schedule a Final Prototype Demonstration, in which you formally assess (and assign grades) on their project and prototype.				
<b>Assessment of the level of challenge and upper-year knowledge used in the project</b>				
<input checked="" type="checkbox"/> (4) Project is significantly challenging, clearly requiring substantial 3 <sup>rd</sup> or 4 <sup>th</sup> year engineering knowledge <input type="checkbox"/> (3) Project is challenging, arguably requiring substantial 3 <sup>rd</sup> or 4 <sup>th</sup> year engineering knowledge <input type="checkbox"/> (2) Project is fairly straightforward, requiring substantial 2 <sup>nd</sup> year university-level engineering knowledge <input type="checkbox"/> (1) Project is simple, requiring little or no university-level engineering knowledge beyond 1 <sup>st</sup> year				
<b>Assessment of how complete the prototype construction is</b>				
<input type="checkbox"/> More than 90% done <input type="checkbox"/> 75% to 90% done	<input checked="" type="checkbox"/> 50% to 74% done <input type="checkbox"/> 25% to 49% done	<input type="checkbox"/> Less than 25% done <input type="checkbox"/> Impossible to judge		
<b>Your confidence that, by next March, the prototype will be 100% complete and satisfy all <u>essential</u> design specs</b>				
<input type="checkbox"/> Very high	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Unsure	<input type="checkbox"/> Low	<input type="checkbox"/> Very low
<b>Your confidence that the group is working well as a team</b>				
<input checked="" type="checkbox"/> Very high	<input type="checkbox"/> High	<input type="checkbox"/> Unsure	<input type="checkbox"/> Low	<input type="checkbox"/> Very low
<b>Your confidence that the group has put appropriate effort and time (ideally 120 hours <u>per student</u>) into the project</b>				
<input checked="" type="checkbox"/> Very high	<input type="checkbox"/> High	<input type="checkbox"/> Unsure	<input type="checkbox"/> Low	<input type="checkbox"/> Very low
<b>Other feedback to the students:</b> This is a great project incorporating state-of-the-art technologies including augmented reality, AI techniques, authentication, cloud services, databases, etc. It has the potential to be launched in the market and attract users. Keep up the good work.				
Consultant's signature: _____ Pouya Mehrannia _____ Date: 2022/07/19				