



COSC 4P02 - Software Engineering 2

Progress Report 2

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Abstract: This document will provide an in-depth update on the development progress of MuseumMate. First, the members of the team will be reintroduced, followed by a highlighting of any features that were planned to be implemented within sprints three and four, and then a detailed description of the planned features that are to be implemented in sprint five. Next, this document will provide a team self-assessment of the previous sprints, outlining individual contributions and difficulties faced. Finally, a visual component will be presented to demonstrate some key elements of the latest working system in real use.

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1 Development Team

1.1 Team Distribution and Positions

The development team is comprised of six dedicated developers and one combined scrum master and product owner.

The developers have dynamic roles, meaning that while tasks are given according to skill and expertise, every developer has equal opportunity to work on both front-end and back-end tasks, allowing the team to be robust with work allocation according to current demands. The scrum master/product owner does not contribute to development, but facilitates all scrum meetings, scheduling, and documentation, as well, acts as the interface between the development team and stake-holders (i.e., the professor and TA).

1.2 Team Members

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Scrum Master and Product Owner

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Developer

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Developer

2 Completed Sprints

The following section will break down important tasks completed in both sprints three and four. Small changes such as bug fixes and code refactoring are not present in this list due to their inherent variability and complexity, however, those actions are performed as they appear and it can be assured that they are carried out along side the implementation of bigger, more defined, tasks.

2.1 Development Break-down of Sprint Three

Sprint three proposed and integrated many key elements that address the accessibility, performance, and scalability of the system. Some of these ideas were formulated by the team but some ideas were suggested by Dr. Ezzati-Jivan. Below is a list of the tasks as well as a description of the tasks progress:

1. Populate the database with legitimate data from the NOTL museum rather than temporary testing data.
 - This task was completed on time in conjunction with the implementation of a web-scraper outlined below. The only difficulty faced with this task was the trial and error process utilized to find the best way of extracting the information from the NOTL museum database website.
2. Create a web-scraper to retrieve information from the museum database.
 - This task was done on time with for the end of sprint three. The core difficulty faced with this task was deciphering the complexity of layers that are used within

the web-page to store information (such as image links) and then extracting only the information needed.

3. Ensure the chat-bot responds to museum-related data that is retrieved from the database.

- This task was completed on time for the end of sprint three. The main difficulty faced with this task was the fragmented nature of the database and the trouble with taking a natural language input, and matching it to database entries. Most database entries lacked data for some field and thus GPT-3 was used to create a tag that encapsulates any information that does exist for each entry. This "GPT-Name" is created by prompting GPT-3 to create a 2-8 word tag for a given entry by supplying the Date, Name, Subjects, Description, and Title fields from that entry (should they exist). This method then allowed us to use a Levenshtein search algorithm to match the user input to closest GPT-Name in the database.

4. Training of GPT on data by category rather than the set of all data.

- This task was not completed as further research found empirical evidence that alluded to the fact that a prompt-based implementation could produce equivalent results regarding performance, while being more robust, over that of a fine-tuned model. For this specific chat-bot implementation, the task of dynamically pulling information directly from the database as well as adding new information to the database, further promote the use of a prompt-based method.

5. Implement text-to-speech and speech-to-text features for to facilitate variation in input modalities for users.

- This task was quite simple and was implemented in time with little to no problems. Although, this task was a part of sprint two, the task was reallocated and completed in sprint three.

6. Implementation of an A-Star algorithm for a directional component that will provide users with directions to different exhibits for aiding in navigation.

- This task has been in progress from earlier sprint two and has been difficult regarding the implementation of the graphs alongside a visual representation. A sketch of the museum was constructed with 3 exhibits and many artifacts within these exhibits. The sketch aligns with a graph that includes nodes (artifacts), paths between nodes, and path weights. An A-Star algorithm will be implemented alongside the ability for users to ask where and how to get to certain artifacts or exhibits.

7. Refining Chabot to better accommodate the directional component.

- This task has yet to be implemented as the directional component is not fully completed. Although when it is done the chat-bot will be able to ask the user where they are and where would they like to go and be presented with directions.

8. Update the user interface to meet product owners' requirements.

- This task is one that spans across many sprints as new updates are being made to the user interface in conjunction with new features being added.

2.2 Development Break-down of Sprint Four

With sprint four being the second to last sprint in the development cycle, it was mostly comprised of tasks that either needed further refinement or more time for completion, as well as some new tasks. Below is a list of the tasks as well as a description of the tasks progress:

1. Implementation of the directional component (A-Star Algorithm).

- This task was completed successfully for the end of sprint four. Throughout the progression of the directional component, a number of different obstacles were faced such as learning advanced techniques in JavaScript (which is new for most of the team), and integrating with the larger code base. However, despite these obstacles, an A-Star algorithm was constructed that can successfully find the shortest path between two artifacts in the museum. The only portion remaining

is the integration of the directional component with the database, which is almost complete.

2. Creation of a refined map to be used by users to navigate.

- This task was done with relative ease as a member of the team had previous experience with Adobe Illustrator. This map will be used to visualize the museum and visualize the paths derived from the directional component.

3. Integrate more efficient string search for the database.

- This task is still in progress as there are different methods to explore in terms of efficiency and ease of use. The goal of this task is to make the search of over 1000 records in the database as efficient as possible.

4. Convert the chat function to ChatGPT for better performance.

- This task is still in progress as other tasks have taken prioritization, however, the goal of this task is to make the chat-bot dynamic in the language model it uses for different tasks. The desired result is one that uses GPT-3, which is larger and has more parameters, for tasks such as keyword extraction and classification, but ChatGPT, which is fine-tuned to be better at creating human-like responses, for interacting with users.

5. Plan to update the general user interface.

- This task is being done as we implement new components and includes changes such as colours of website objects, fonts, layouts, images, and spacing. In previous sprints, the front end was temporary and just a means of displaying information such as our chat bot inputs and outputs. However, a finalized front end is required which is user-friendly, visually pleasing, and consistent. The planning for this design is complete and will be discussed in depth in section 3.

6. Start testing phase.

- This task was started in sprint four and will continue to sprint five. So far a batch of testers has been gathered to test out the application in phase II of

sprint five. Unit test cases have been created in order to match the expected output with the actual outcome or response from each of the features in the application.

3 Expectations for Final Sprint

This section will outline the expectations and objectives for the final sprint of the project, sprint 5. The main goal of the final sprint is to wrap up any remaining features that must be implemented from previous sprints and finalize the overall design of the application. This will be done in two phases.

3.1 Phase one

Phase one will aim to accomplish three tasks that are integral to the quality of the software:

Front-end improvements and completion This task involves upgrading the current user-interface with one that is more user-friendly, less complicated, and more visually appealing. This task will ensure that all back-end components have an attractive front-end counterpart, providing functionality to all of the systems components.

Visualization for map in directional component This task requires building a dynamic visualization component for the directional capabilities of the chat-bot. The purpose of this task is to give users an easy to follow, visual representation of their surroundings that relays the information of the path-finding algorithm in an interpretable and pleasing way.

Developer unit testing This task is one that is integral to any development process and entails the developers performing unit testing with the goal of breaking the software and finding possible inefficiencies and limitations that can be addressed. This task will be the first round of testing before phase two.

3.2 Phase two

Phase two will aim to accomplish three tasks that are needed for finalizing the software and prepare the final documentation necessary for the course:

User testing and improvements This task builds off of the final task of phase one in that the testing environment is going to be very similar, however, this testing will be done by users and the desired feedback will be focused on user experience and possible minute changes.

Final report This task is required of the course and a final report will be created that encapsulates all elements of the project to the specifications asked of by Dr. Ezzati-Jivan.

Final presentation and release This task is also required and involves two components: first, a full presentation of the software to the TA of the course demonstrating how the software works and how it was developed, and second, the release of the software for the purpose of assessment by Dr. Ezzati-Jivan and/or the TA.

4 Encountered Issues and Team Contributions

This section encompasses any issues encountered by each team member, as well as highlighting their contributions and achievements to the project so far.

4.1 Contribution chart

Team Contributions and Issues Encountered Sprint 3 & 4			
Name	Role	Contributions	Issues Encountered
Fahad Arain	Developer	<ul style="list-style-type: none"> • Web scraper for museum database • Code refactoring and refinement • Pulling data from database to chatbot • Working on video URLs with Jordan 	<ul style="list-style-type: none"> • Finding way to connect database with chatbot, converting JSON to database
Maheen Samad	ScrumMaster & Product Owner	<ul style="list-style-type: none"> • All documentation • Progress Report 1 • Progress Report 2 • Product backlogs • Hosted all meetings, documented tasks done. • Set out sprint requirements and user stories 	<ul style="list-style-type: none"> • Changing requirements from professor feedback
Robert Morabito	Developer	<ul style="list-style-type: none"> • Pulling data from database to chatbot • Directional component integration • Map for UI • Integrate efficient string search for database 	<ul style="list-style-type: none"> • Lack of planning in database and chatbot integration causing redo of already integrated parts
Jordan Bharati	Developer	<ul style="list-style-type: none"> • Front end implementation of all tasks • Outputting photos as a response from chatbot • Working on video URLs with fahad 	<ul style="list-style-type: none"> • Finding way to implement a way to output videos
David Bailey	Developer	<ul style="list-style-type: none"> • Direction component using a star algorithm. • Implement directional functionality. • Found path finding algorithm. • Use base map to generate 	<ul style="list-style-type: none"> • Implementation of A star algorithm to account for created
Sarah Howcroft	Developer	<ul style="list-style-type: none"> • Gather real life testers. • Create test cases for application. • 	<ul style="list-style-type: none"> • No issues encountered
Dana Dobrosavljevic	Developer	<ul style="list-style-type: none"> • Gather real life testers. • Pulling data from database • Edited progress reports • Created test cases for application 	<ul style="list-style-type: none"> • Creating test cases for an ongoing project

Figure 1: This chart outlines each developer, their self-assessed contributions, and their self-assessed difficulties

4.2 Github

Below are two links which correspond to the two Github branches of the project (testing and main) showing the commits made by each team member, as well as a final link that corresponds to the entire project. The testing branch has the larger number of commits as it is the primary working branch, which then periodically gets transferred to main.

- Testing:

<https://github.com/EckhoeE/museum-mate/commits/testing>

- Main:

<https://github.com/EckhoeE/museum-mate/commits/main>

- All deliverable code and documents will be uploaded to the following GitHub link below:

<https://github.com/EckhoeE/museum-mate/>

5 Current Working System

Below is a collection of images showing the current version of the software being used in a variety of ways. Each image has a caption describing its context.

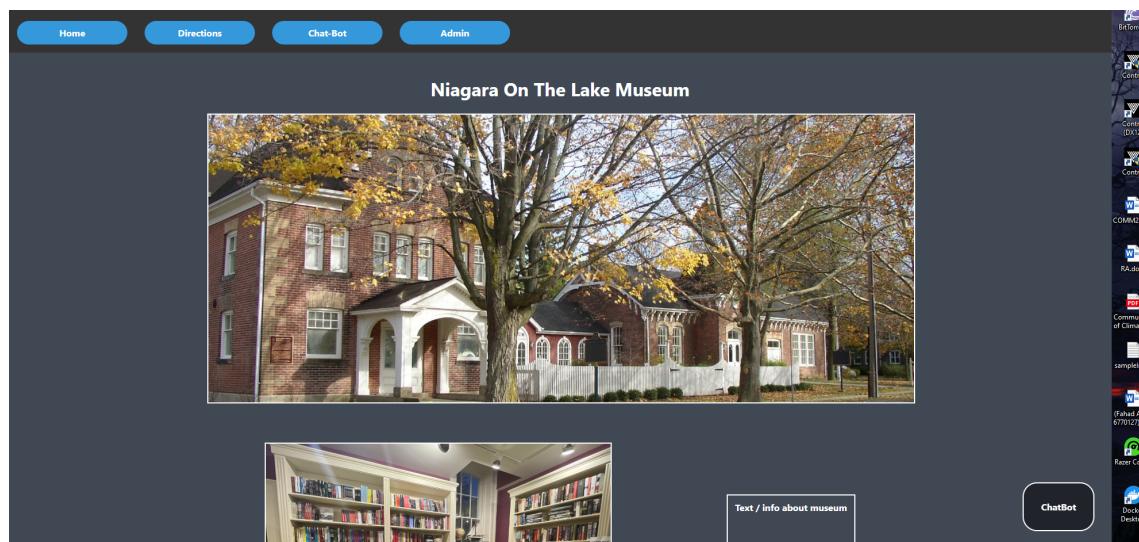


Figure 2: Museum Mate homepage

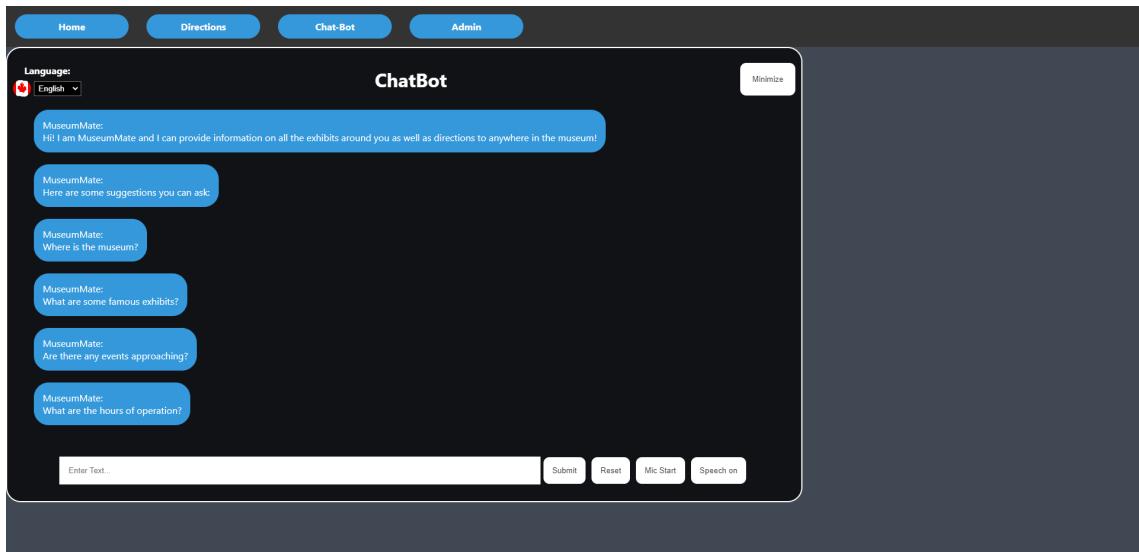


Figure 3: Chat-bot page

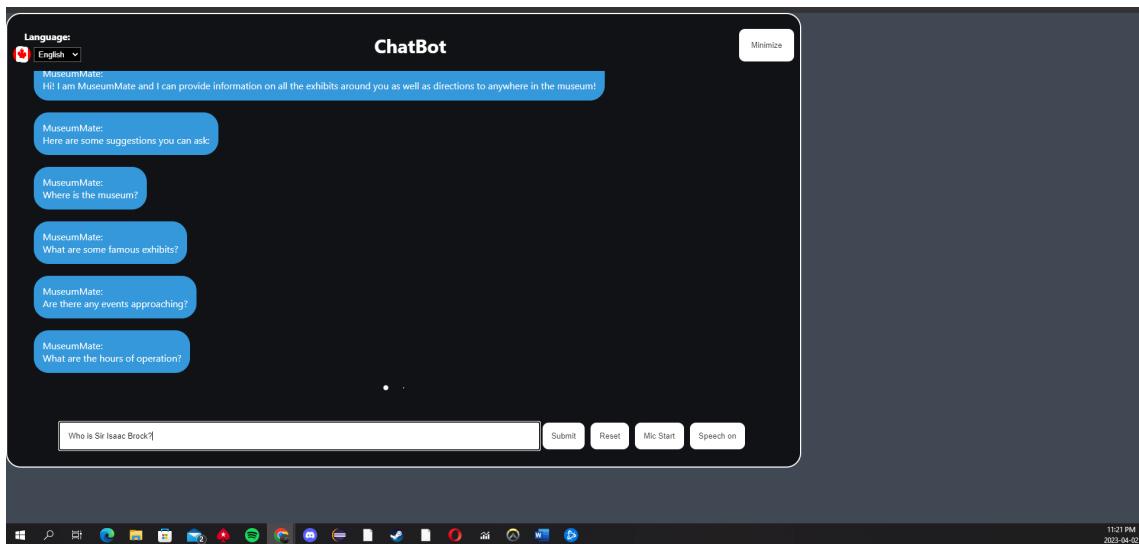


Figure 4: Entering input to chat-bot

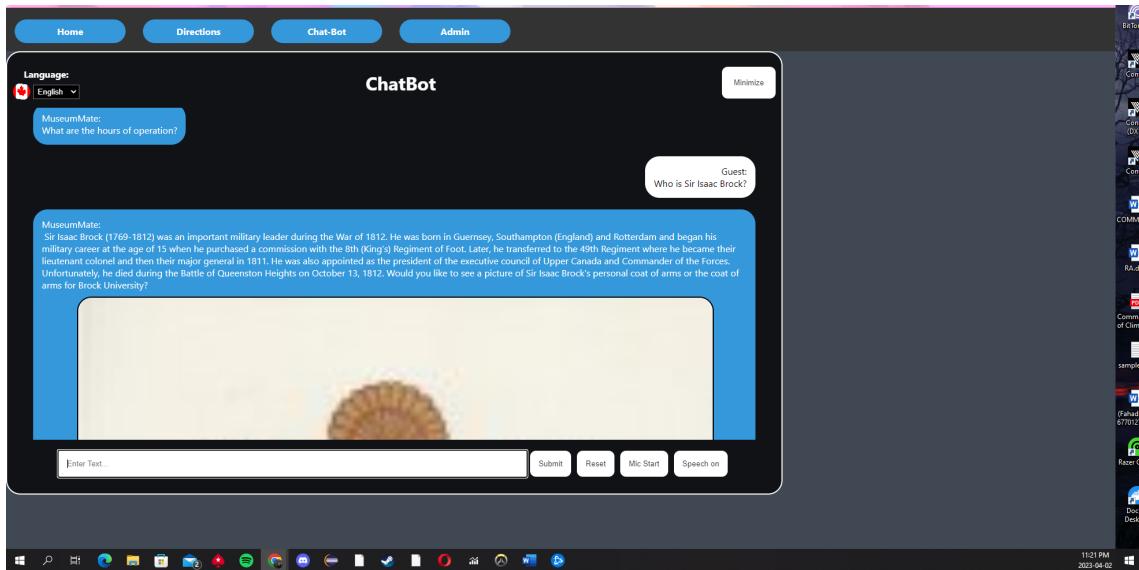


Figure 5: Displaying response with image

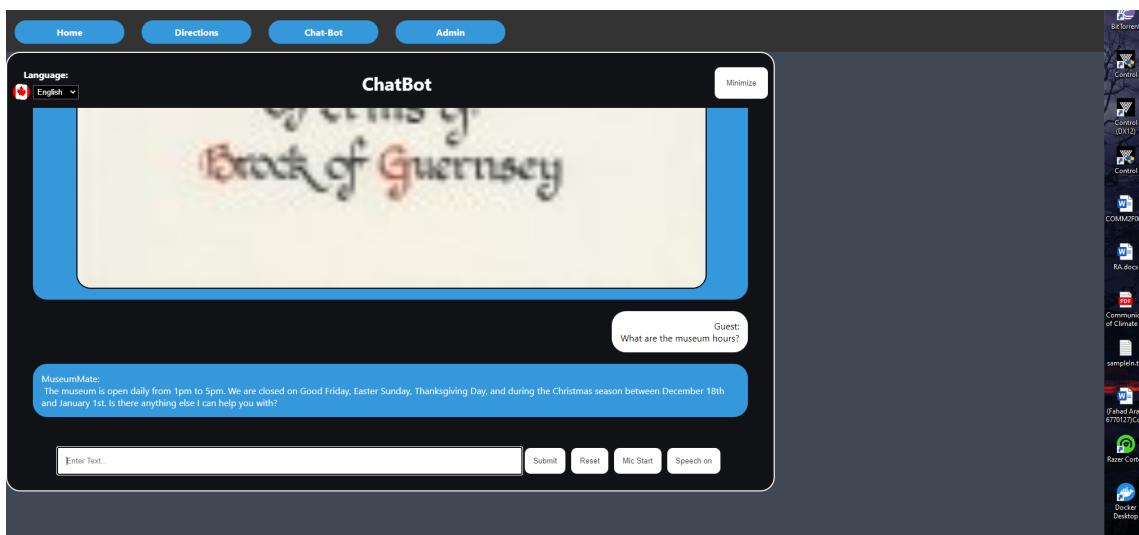


Figure 6: Displaying museum information

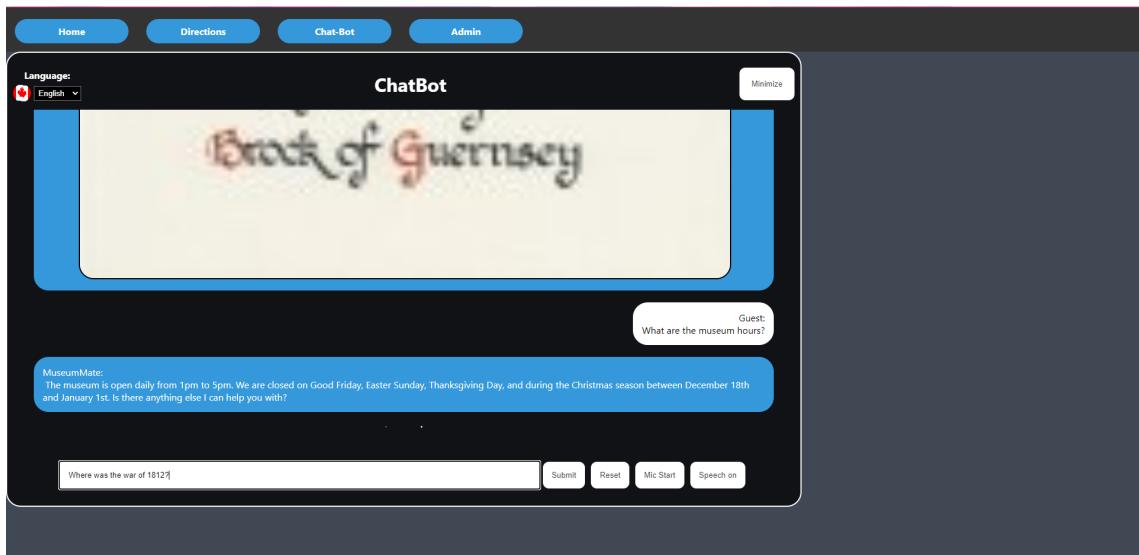


Figure 7: Searching using dates



Figure 8: Response using dates

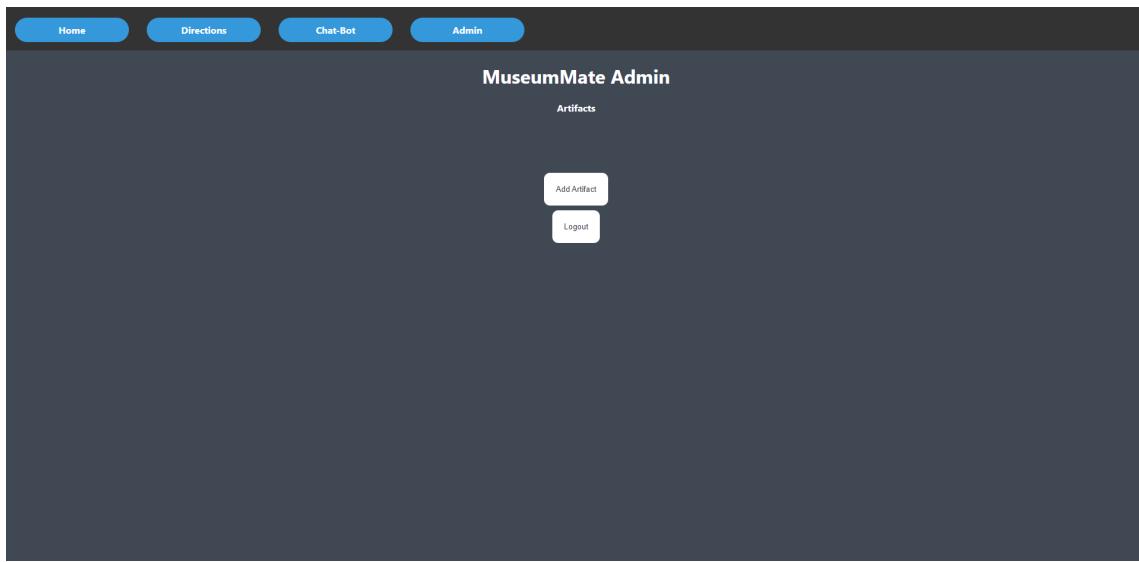


Figure 9: Admin login page

A screenshot of the "Add Artifact" form within the MuseumMate Admin application. The form is contained within a white rectangular box with a thin black border. At the top of the form, the title "Add Artifact" is centered in bold black font. Below the title, there are seven input fields, each with a placeholder text and a corresponding label: "Enter Name", "Enter exhibit description", "Enter date", "Enter Object ID", "Enter Names of People", "Enter the Subject", and "Enter the Valid Image URLs". Each input field is represented by a white rectangular box with a thin gray border. At the bottom of the form is a large, solid black rectangular button with the word "Add" written in white.

Figure 10: Form for adding new artifact

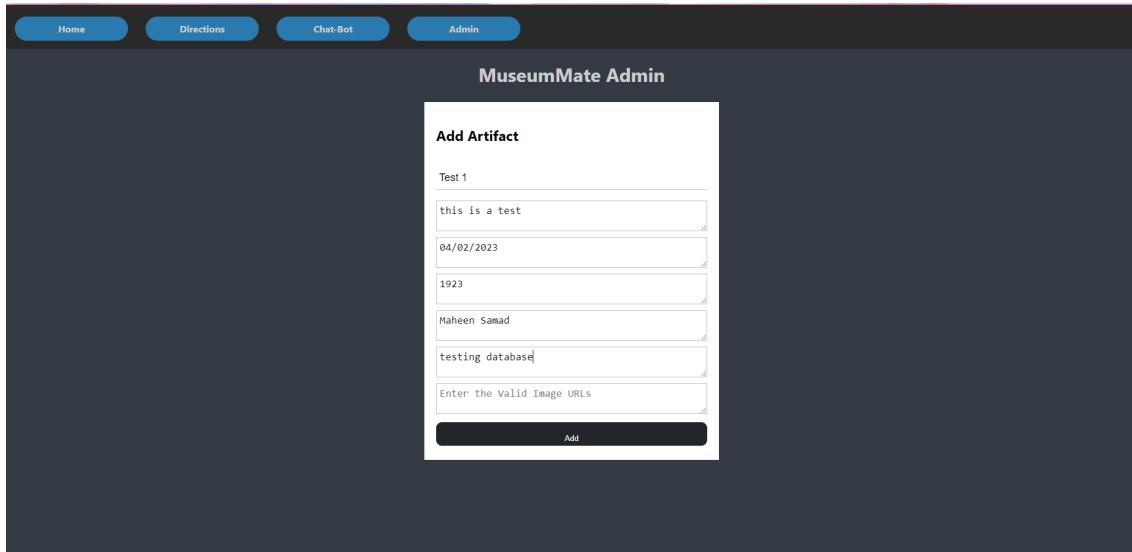
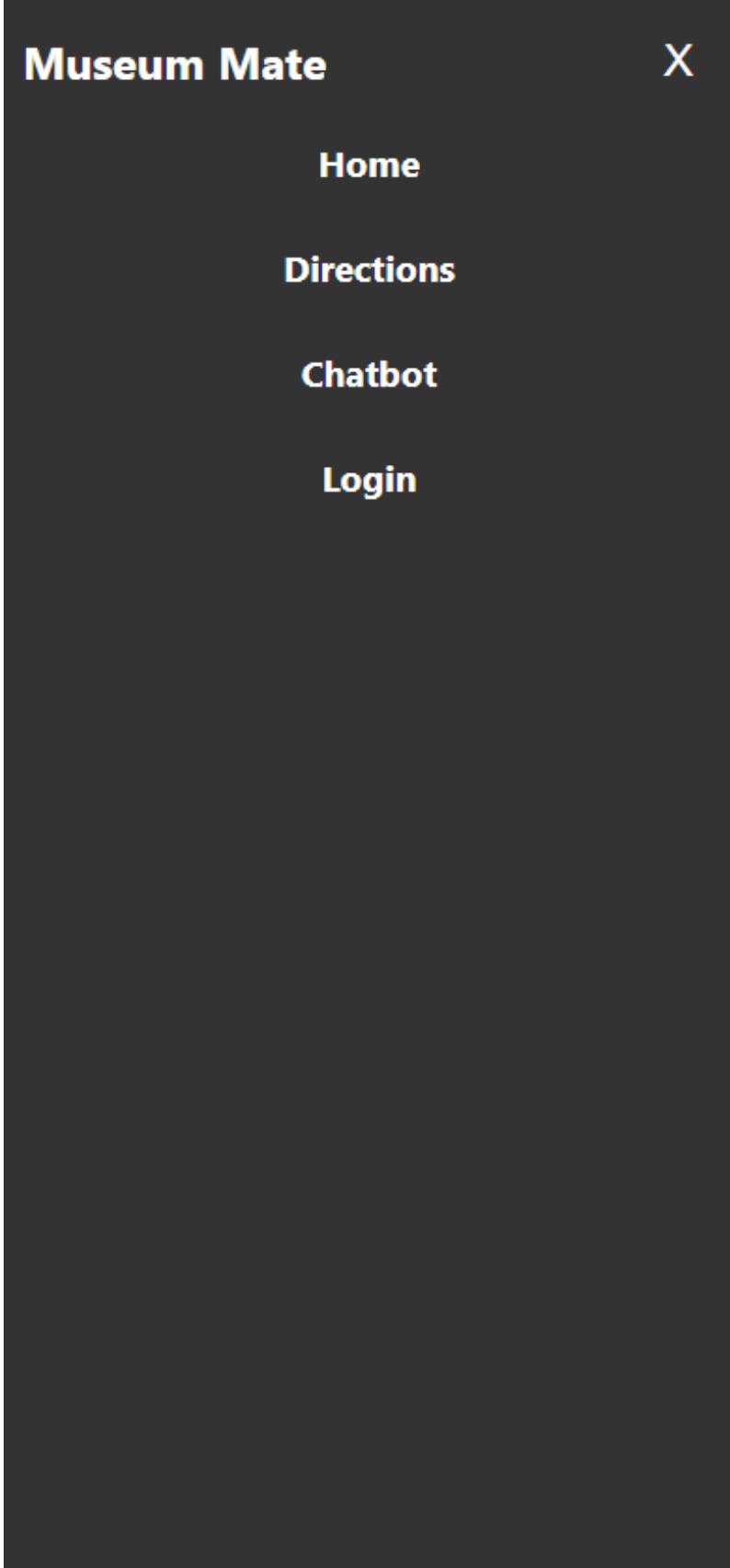


Figure 11: Filled out information for data

ID	Date	Description	GPTName	ImgUrl	ObjId	People	Subject	Title
FDAB8745-696E-443E-BFEB-85500518	04/02/2023	this is a test	Test 1: 04/02/2023		1923	Maheen Samad	testing database	Test 1
FDC45B46-ACAF-4E38-BF52-33353132								
FDEE64F8-39DE-4023-965C-71130527								
FDF12591-187A-46F5-8A7C-86137590								
FDFF7FA3-7FBF-4BF8-8D8E-09039082								
FE68B047-F0B5-4765-ACCB-21342434								
FE936D47-0E7E-4A20-8448-83600128								
FEA99FA5-9380-4EA6-A6FB-21446951								
FEDA6796-D7DF-45CA-9F50-5018A075								
FF18AD07-E8D3-4791-AB71-58475254								
FF2CE0D2-A912-42BC-91AB-93296321								
FF748A62-A511-4870-8F19-63020731								
FF837939-9007-43BD-A0B0-84217694								
NdHm51o1KKq0HhAxycfV								

Figure 12: Database view of form added



Museum Mate

X

Home

Directions

Chatbot

Login

Figure 13: Mobile direction tab

Museum Mate



you're a local resident or a visitor from out of town,
we invite you to stop by and discover the fascinating
history of this charming and historic community.

Hours

Monday 1pm - 5pm
Tuesday 1pm - 5pm
Wednesday 1pm - 5pm
Thursday 1pm - 5pm
Friday 1pm - 5pm
Saturday 1pm - 5pm
Sunday 1pm - 5pm

Location

43 Castlereagh St, Niagara-on-the-Lake, ON L0S 1J0

Phone: (905) 468-3912

Email: contact@nhsm.ca

Upcoming Events

No upcoming events at this time.

Chatbot

Need help exploring our museum? Chat with Museum Mate! our AI-powered chatbot that is ready to answer any of your questions, from administrative to additional information about any artefacts you are curious about!

About

Copyright
information

ChatBot
Contact information

Figure 14: Mobile museum information

Niagara On The Lake Museum



Welcome to the Niagara on the Lake Museum, a place where history comes alive! Situated in the heart of one of Canada's most picturesque towns, our museum showcases the rich heritage of Niagara on the Lake and the surrounding region. From Indigenous history to the War of 1812, and beyond, our exhibits offer a fascinating glimpse into the people, events, and cultural traditions that have shaped this area over the centuries. Whether you're a history buff or simply curious about the past, we invite you to explore our collection of thousands of artefacts, documents and photographs, and discover the stories that make Niagara on the Lake such a unique and special place.

ChatBot

Figure 15: Mobile home page

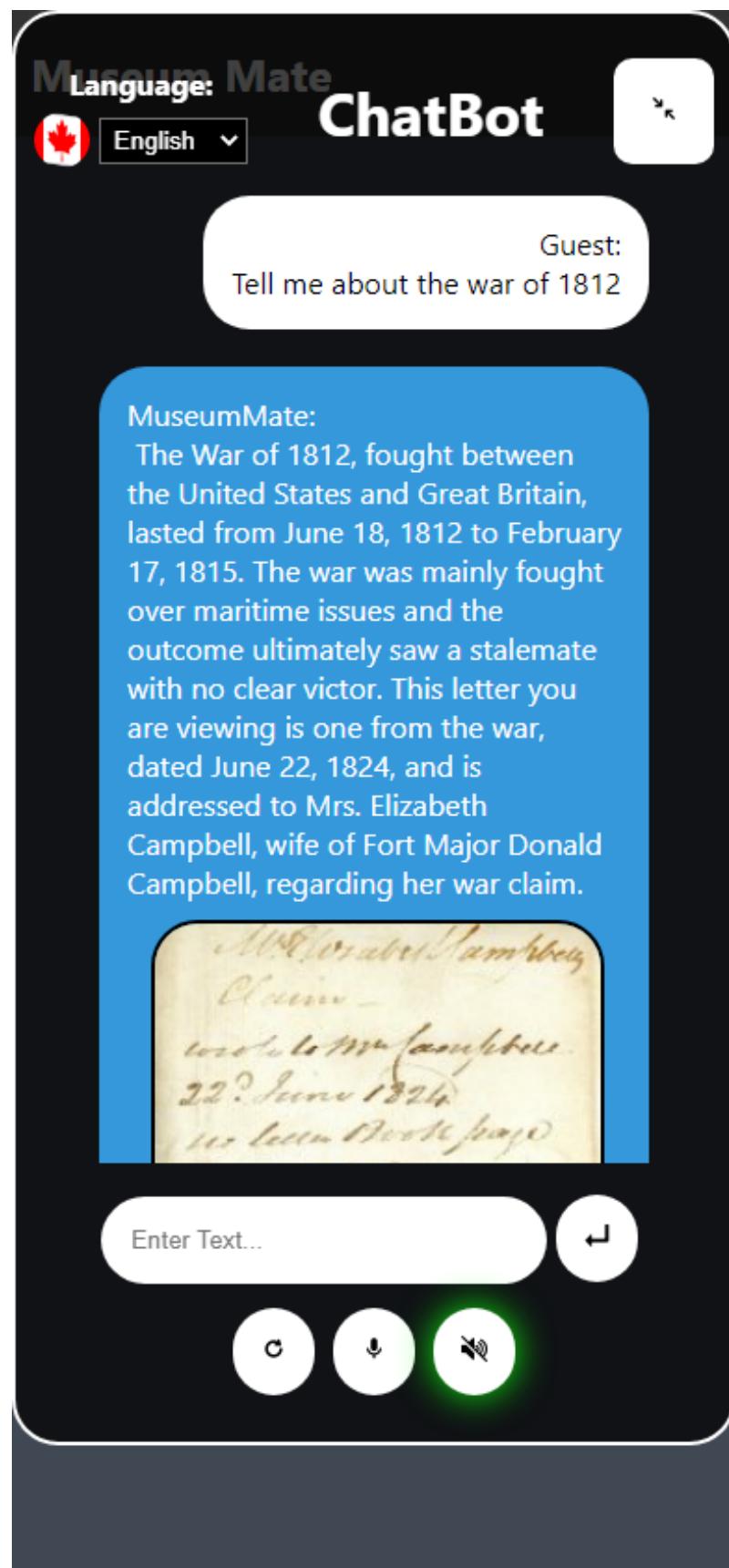


Figure 16: Mobile chat-bot