COSC 4P02 - Software Engineering II

Progress Report - II

April 2nd, 2023

Group Members

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Akshar Patel	**Product Owner/Developer**	**ap18zr**
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Aum Pandya	**Developer**	**ap19xt**
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Introduction

The NOTL museum is a popular tourist destination for the NOTL region that attracts a lot of visitors. The museum showcases the rich history and culture of Niagara-on-the-Lake, and our project aims to enhance the visitor experience by creating an augmented reality (AR) application. The AR app will provide an interactive and immersive experience for visitors, allowing them to explore and learn about the exhibits in a more engaging way. Our team comprises seven members, each with unique skill sets and expertise, including software development, design, project management, and content creation. We have been working collaboratively to ensure that each team member's contributions align with the project's objectives and milestones. In this progress report, we will discuss our methodology, including the tools and technologies we are using, as well as the progress made so far. We will also outline the challenges we have faced and our plan for overcoming them. The purpose of this report is to provide an overview of our project's progress and demonstrate our team's work, including our design and development processes. Finally, we will lay out a plan to conclude the development process of the AR app and deliver the final product to the NOTL museum. We are excited about the potential impact of our project and look forward to sharing our progress with the museum staff and visitors.

Progress Summary

In the month since our last progress report, the team has made substantial progress on the Augmented Reality (AR) app for the NOTL museum. Building upon our previous achievements, we have continued to develop and refine the AR app to improve the museum experience for visitors.

Following our decision to switch to Unity, the team has overcome the learning curve and made significant strides in the development process. The app now includes enhanced AR functionality and accessibility features that cater to a wider audience.

Key Accomplishments since Progress Report 1:

1. Creating realistic displays for the gun, uniform and battleground scenes.

Figure 1.1: Badge from War of 1812

Figure 1.2: Badge from War of 1812

Figure 1.3: Canadian Soldier’s Uniform

Figure 1.4: Flintlock Pistol

Figure 1.5: Brown Bess Gun

2. Completing individual pop-up cards for each artifact, providing additional information to visitors.

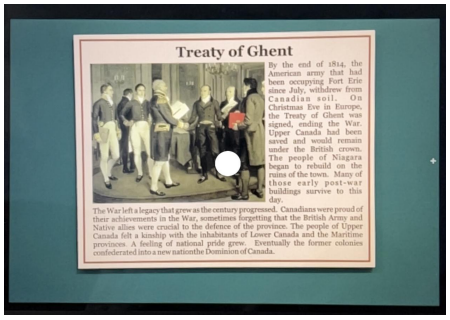


Figure 2.1: Button appears once artifact is detected

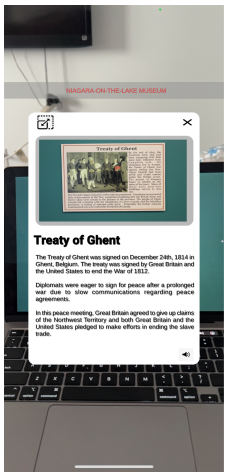


Figure 2.2: Pop-up with more information appears once button is clicked

Figure 2.3: Maximized card displayed when maximize button (top-left) is clicked

3. Scanning all artifacts and creating corresponding 3D models for use in the app.

   The following google drive link has all 3D models which we are going to use for our app. We have also attached some screenshots of the model below.

   https://drive.google.com/drive/folders/1PCv3rFjpGOsJWzGda5MU7kGKsrOR6K7r?usp=share_link

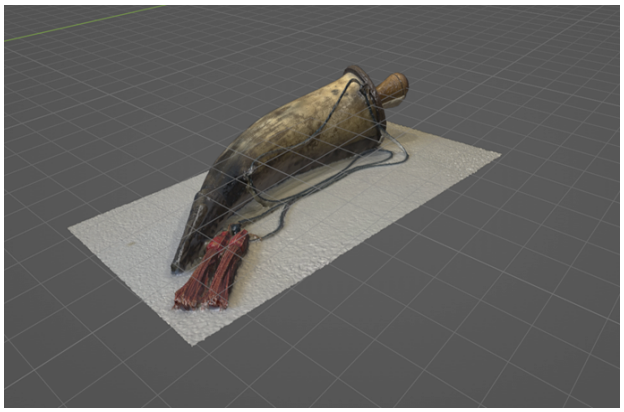


Figure 3.1: Powder horn

Figure 3.2: Axe

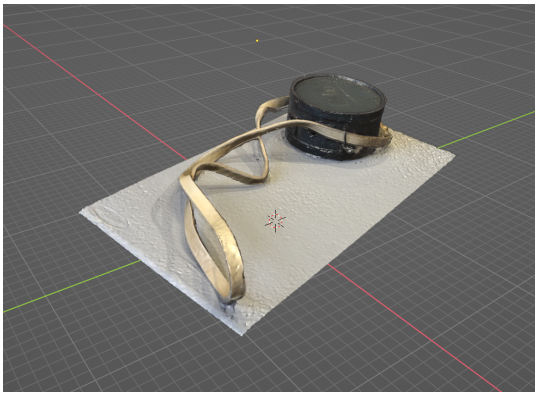


Figure 3.3: Canteen

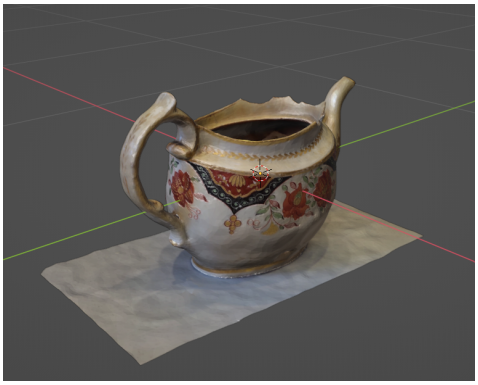


Figure 3.4: Teapot

Figure 3.5: Sir Issac Brock Statue

4. Creating a demo battle scene (The soldier models will be replaced with one that we have made, the current ones are temporary to create animations and battle scene)

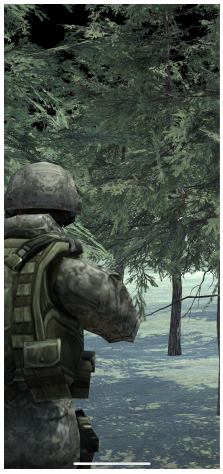


Figure 4.1, 4.2, 4.3: Battle scene screenshots

Figure 4.4: Reference map

**We are using the map shown above in Figure 4.4 as a reference to create the battle scene terrain, while also consulting with museum staff.

Current Tasks in Progress:

1. Refining the voice model for the voice-over, which will be used in the text-to-speech feature.
2. Testing the app on various devices and platforms to ensure compatibility and seamless performance.
   ** currently running it on IOS platform only (includes IPad Pro 2019+, iPhone 12+)
3. Creating the final battle scene - terrain, soldiers, animations.

Future Work:

1. Expanding the information provided by the app through additional research and collaboration with museum staff.
2. Creating an animation to tell the story of one of the battles fought near Brock university.
3. Further improving accessibility features to accommodate a wider range of users, including those with disabilities.
4. Continuously updating and refining the app based on user feedback from the museum staff.

Overview

The team has made significant progress in developing the AR app since the last progress report. We have successfully integrated enhanced AR functionality, accessibility features, and user experience improvements into the app. Our future work will focus on refining the app, expanding its content, and ensuring it remains a valuable tool for museum visitors.

Risks and Mitigation

As we develop the AR app for the NOTL museum, we are aware that historical accuracy is of utmost importance. Inaccurate or incomplete information can detract from the visitor experience and potentially harm the museum's reputation. Additionally, there is a risk of misrepresenting historical events or cultures, which could lead to misunderstandings or misinterpretations. To mitigate these risks, we have been working closely with museum staff to ensure that our content is well-researched and accurately represents the history and culture of Niagara-on-the-Lake. We have also implemented a review process where all content is reviewed by multiple team members before being finalized. This approach ensures that our app represents the historical events and artifacts in a respectful and accurate manner, while also providing an engaging and informative experience for visitors. By working closely with experts and taking a rigorous approach to our content development process, we are confident that we can mitigate the risk of inaccurate or misrepresentative historical content in our app.

Issues and Fixes

During the course of our project, our group faced various obstacles. One issue we encountered was incompatibility between our personal computers and the photogrammetry software needed to create 3D models. To resolve this problem, we made use of the Makerspace computers to advance our work. Additionally, learning Blender proved to be time-consuming and difficult due to its intricate nature. However, by maintaining open communication and working together, we managed to overcome these challenges. Despite the hurdles, we completed the task successfully and gained important insights regarding time management, collaboration, and adapting to new software.

Furthermore, we experienced scheduling difficulties with the Museum manager. We had arranged a time to photograph artifacts, which was essential for building the 3D models. Yet, on the day of our appointment, the manager rescheduled for the following week, leading to a delay in our project timeline. This unforeseen postponement affected our ability to meet the project deadline, requiring us to modify our workflow accordingly. Looking back, we could have foreseen possible scheduling conflicts and cooperated more proactively with the Museum staff to minimize delays.

Despite this obstacle, we managed to overcome it through efficient communication and adaptability. This experience has highlighted the significance of proactive planning and contingency management in project management. We have learned to be more aware of potential barriers and to take a proactive approach to lessen any issues that may emerge in future projects. We are confident that these lessons will prove beneficial in our upcoming endeavors and will better prepare us to tackle any challenges we may face.

Contributions and Achievements

Parth Patel, Akshar Patel and Sneh Patel

Akshar, Sneh, and Parth were part of the team that created the battleground scene within the app.

Akshar's role was to create the terrain using the actual NOTL map provided by the museum employee. He communicated with the museum employee to ensure the accuracy of the map and utilized his skills in Unity and terrain creation to create a realistic scene. Akshar worked with Naitik and Darshak to create 360° 3D models of artifacts using models created from photogrammetry.

Sneh's contribution to the project was adding water effects to the river on the terrain using Unity's render pipeline URP. He created a realistic water shadder that is used to create the river in the terrain Akshar created. Sneh worked with Akshar to integrate the water effects seamlessly with the terrain he created. His attention to detail resulted in a more realistic scene.

Parth created the animations and camera movements for the soldiers attacking the enemies in the battleground scene. He utilized his skills in Unity's animation system to create movements for the soldiers that were realistic and lifelike. His work added a dynamic element to the scene, making it more engaging and interactive for the user. Parth also collaborated with Naitik and Darshak to create 3D models of artifacts using photogrammetry.

Together, Akshar, Sneh, and Parth's contributions resulted in an immersive battleground scene within the app. Their skills and attention to detail helped to create a scene that was both realistic and engaging for the user. The scene offered an exciting and interactive experience for the user, enhancing the overall appeal of the app.

Anishka Shetty and Aum Pandya

For our AR app development project, our contribution was the creation of the cards for each artifact that contained additional information on each artifact. There were around 25 artifact cards to be created. After both of us separately came up with a few different card templates, we got the team's feedback and narrowed it down to one template which was to be used for all the cards. Then the card creation and research process started until all the cards were complete.

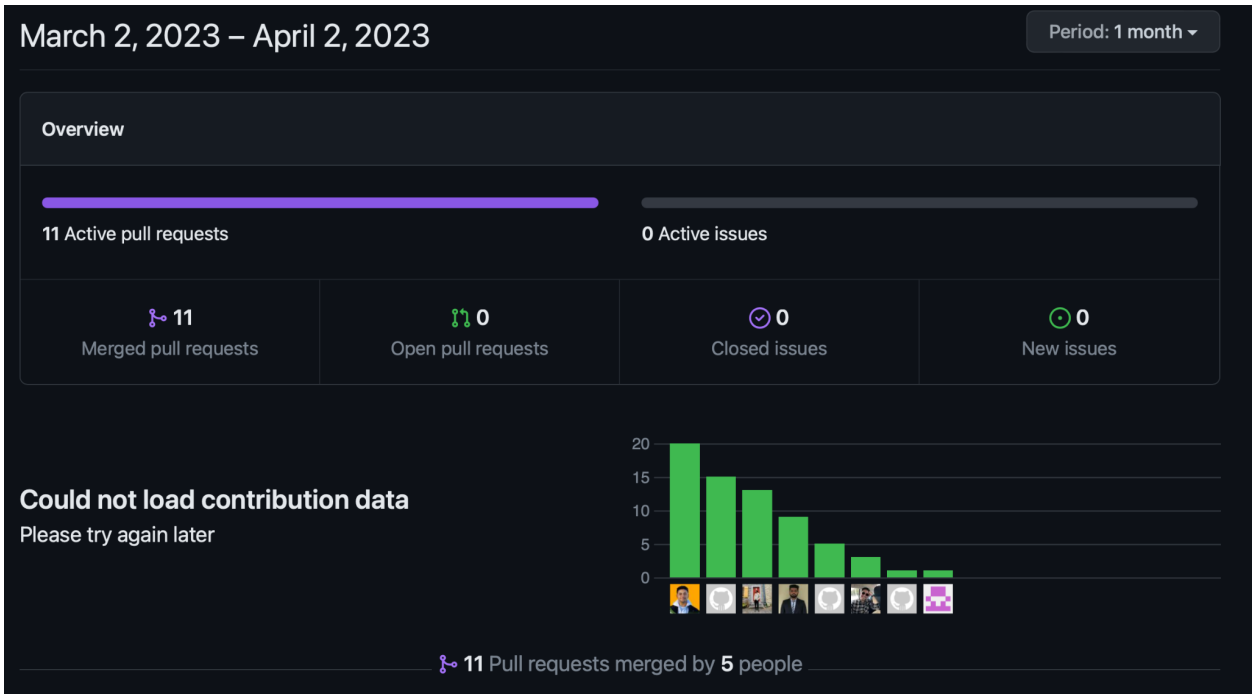
Anishka: After the cards were filled with their corresponding artifact information, I added the required button functionalities to all the cards - Maximize Card, Close Card, along with the icon that is to be displayed when the artifact is detected which opens the pop-up when clicked. Our team wanted to include an accessibility feature in order to make our app beneficial to a larger audience. A feature we were planning to add to the cards is a Text-to-Speech feature which allows the user to listen to an audio (for example, the text written on a poster or on the card). In a past sprint, I worked on finding a way to get this feature to work for a card. Currently, I have it working to play the audio, but more needs to be done next such as allowing the user to stop or pause the audio as it is currently just playing the full clip till complete.

Aum: After the cards were filled with their corresponding artifact information, I encountered an issue with the template while merging our cards, which led to a need for modifications to be made to my existing card designs to incorporate additional functionalities as per Anishka's template. Subsequently, our team decided to enhance the user experience by adding sources to the cards, which would allow customers to access more information by clicking on a button/hyperlink. To ensure the accuracy of the information presented on the cards, I invested a significant amount of time and effort in cross-verifying all the information from various sources. This process was quite challenging as some of the information was not easy to find and verify. Additionally, I worked on adding sound effects to the app, such as the original battle audio of gun firing and commanding audios, wherever necessary. In order to provide users/customers with a more immersive experience, I also made efforts to gather additional photos for the posters, allowing them to view different images and gain a deeper understanding of the history of the war. Overall, my contributions to the project involved adapting to the template modifications, adding sources, verifying the accuracy of the information, and incorporating sound effects to enhance the user experience.

Naitik Chovatiya and Darshakkumar Bambharoliya

As a part of a team of two, our contribution involved creating 3D models of various artifacts in a museum. We had a total of 18 models to build and had to clean them using Blender, which was a time-consuming process. However, we were determined to deliver high-quality results, which is why we decided to leverage the resources available at Makerspace (Brock University). Using their computers allowed us to significantly boost our progress and work more efficiently. We used MetaShape by AgiSoft to build the models and Blender for the final touch-ups. Collaborating with my teammate was also crucial to our success as we constantly communicated with each other and provided feedback on our work. Overall, it was a challenging but rewarding experience, and I am proud of our team's efforts and accomplishments.

Github Logs


March 2, 2023 – April 2, 2023
Period: 1 month
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11
Merged pull requests
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Open pull requests
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Closed issues
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New issues
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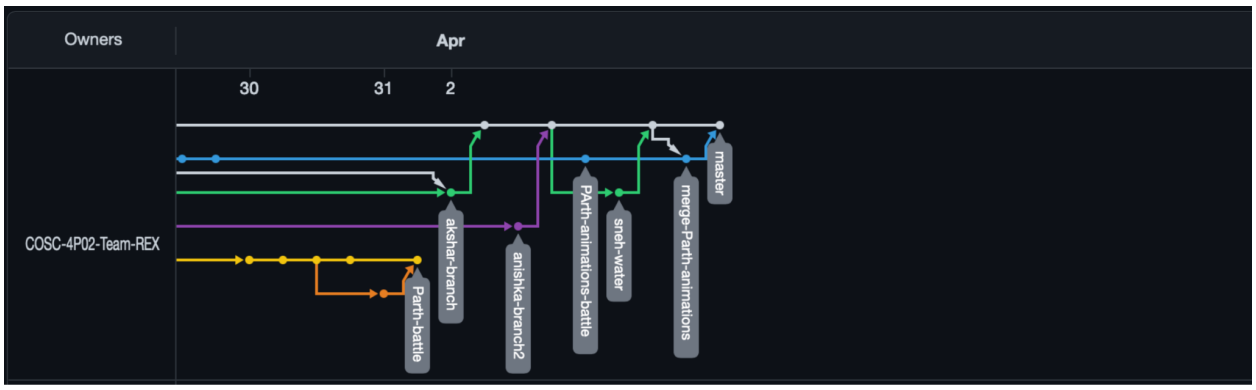
20
15
10
5
0
11 Pull requests merged by 5 people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anishka-branch2
PArth-animations-battle
sneh-water
merge-Parth-animations
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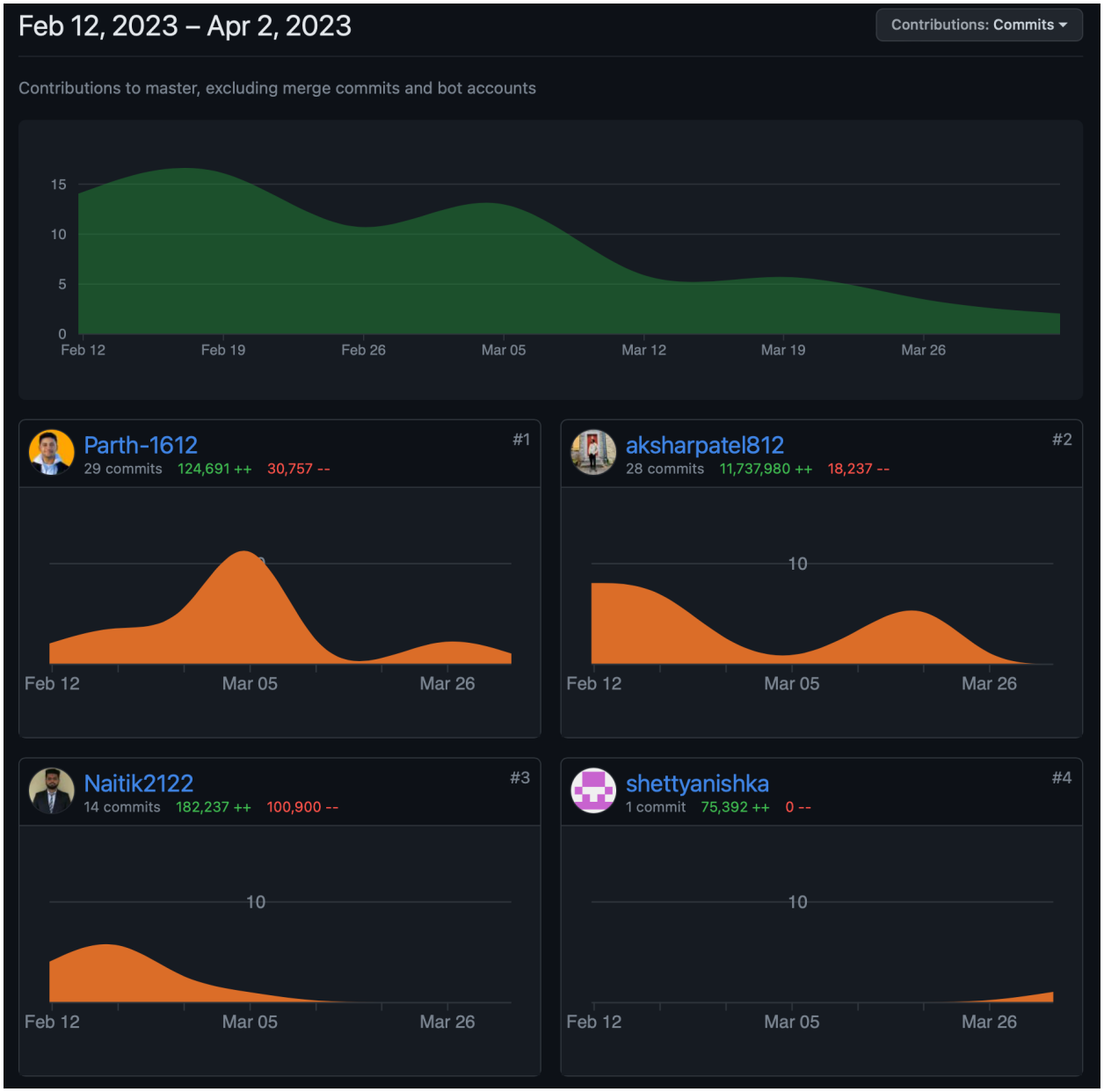
Feb 12, 2023 – Apr 2, 2023
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Contributions to master, excluding merge commits and bot accounts
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10
5
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Feb 12
Feb 19
Feb 26
Mar 05
Mar 12
Mar 19
Mar 26
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#1
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Feb 12
Mar 05
Mar 26
aksharpatel812
#2
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Feb 12
Mar 05
Mar 26
Naitik2122
#3
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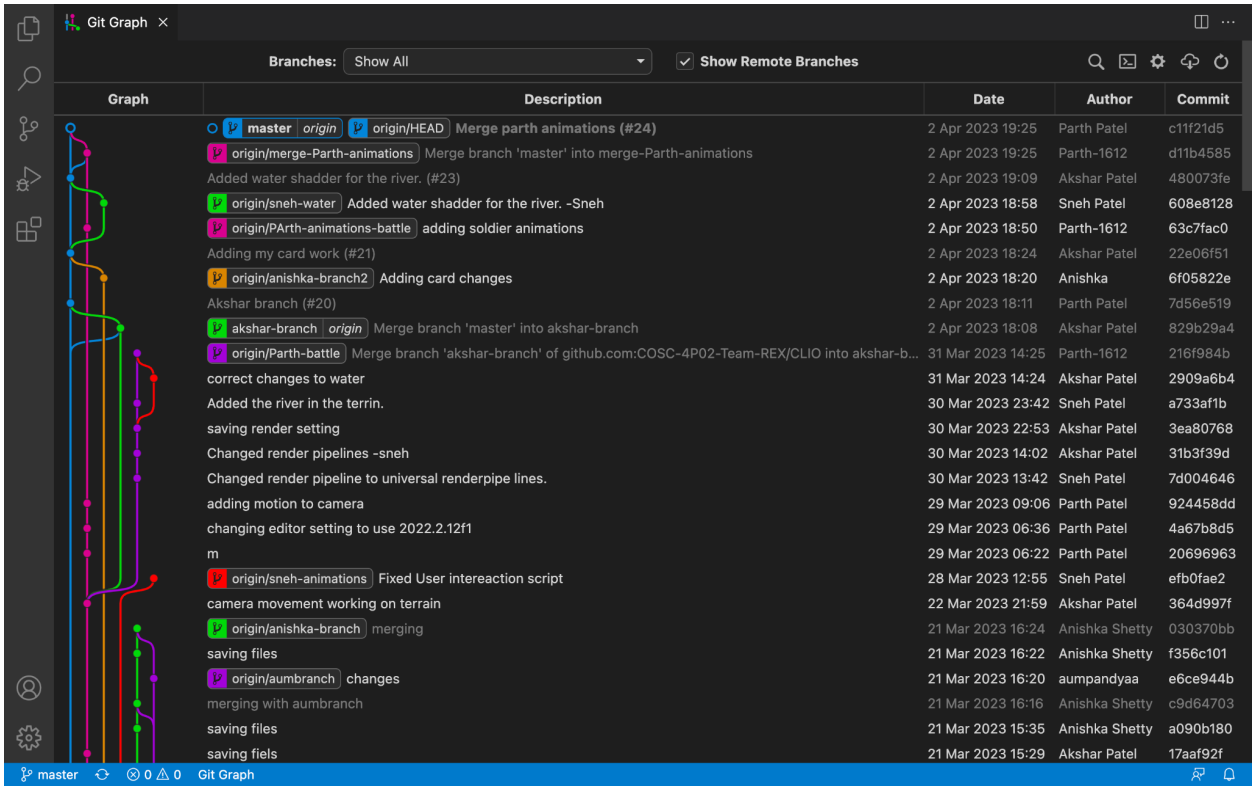
Feb 12
Mar 05
Mar 26


Git Graph
Branches: Show All
Show Remote Branches
Graph
Description
Date
Author
Commit
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origin/merge-Parth-animations Merge branch 'master' into merge-Parth-animations 2 Apr 2023 19:25 Parth-1612 d11b4585
Added water shadder for the river. (#23) 2 Apr 2023 19:09 Akshar Patel 480073fe
origin/sneh-water Added water shadder for the river. -Sneh 2 Apr 2023 18:58 Sneh Patel 608e8128
origin/PArth-animations-battle adding soldier animations 2 Apr 2023 18:50 Parth-1612 63c7fac0
Adding my card work (#21) 2 Apr 2023 18:24 Akshar Patel 22e06f51
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Akshar branch (#20) 2 Apr 2023 18:11 Parth Patel 7d56e519
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Changed render pipelines -sneh 30 Mar 2023 14:02 Akshar Patel 31b3f39d
Changed render pipeline to universal renderpipe lines. 30 Mar 2023 13:42 Sneh Patel 7d004646
adding motion to camera 29 Mar 2023 09:06 Parth Patel 924458dd
changing editor setting to use 2022.2.12f1 29 Mar 2023 06:36 Parth Patel 4a67b8d5
m 29 Mar 2023 06:22 Parth Patel 20696963
origin/sneh-animations Fixed User intereaction script 28 Mar 2023 12:55 Sneh Patel efb0fae2
camera movement working on terrain 22 Mar 2023 21:59 Akshar Patel 364d997f
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saving files 21 Mar 2023 16:22 Anishka Shetty f356c101
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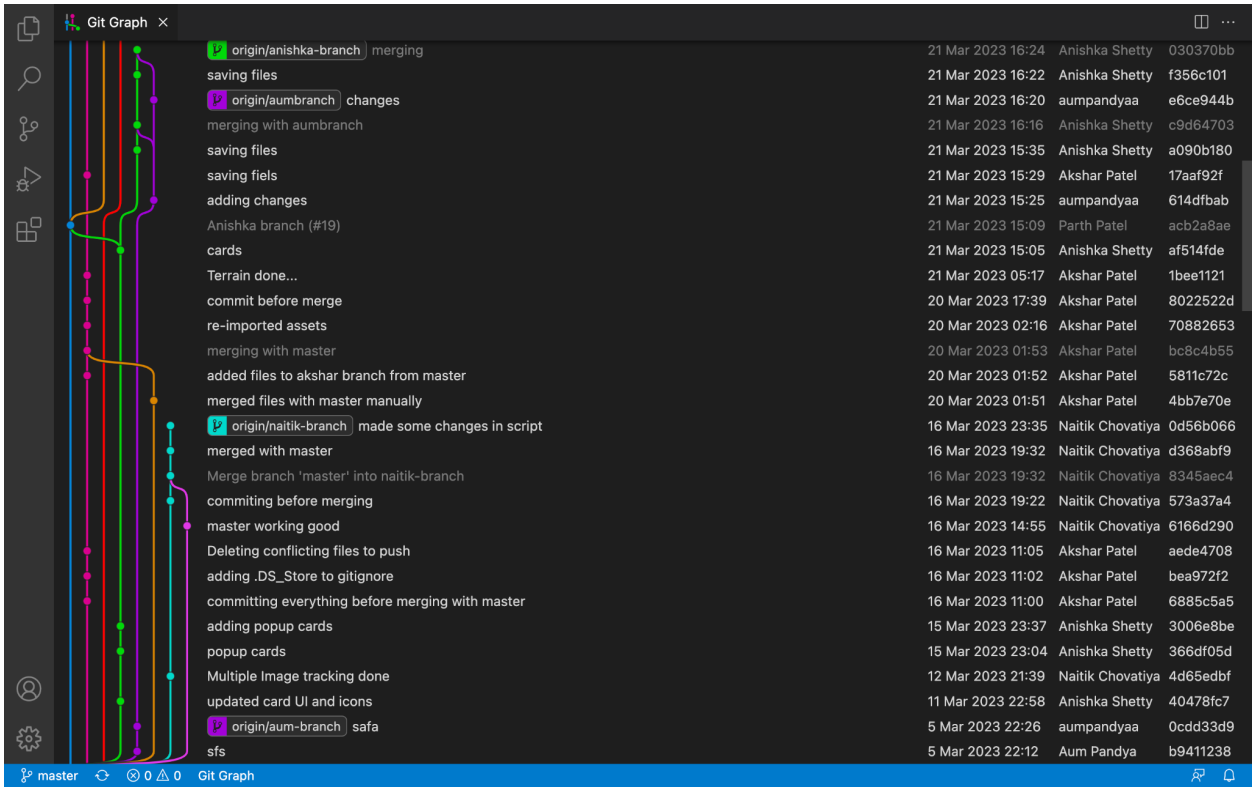
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cards 21 Mar 2023 15:05 Anishka Shetty af514fde
Terrain done... 21 Mar 2023 05:17 Akshar Patel 1bee1121
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committing everything before merging with master 16 Mar 2023 11:00 Akshar Patel 6885c5a5
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popup cards 15 Mar 2023 23:04 Anishka Shetty 366df05d
Multiple Image tracking done 12 Mar 2023 21:39 Naitik Chovatiya 4d65edbf
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Git Graph