**Jurassic Park**

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# Introduction

Many a times when we think about fossils, we think about dinosaurs, the amazing creatures that once inhabited earth. There is growing sense of interest among people especially the younger generation to learn more about dinosaurs and how these creatures have gone extinct. With the advancement in technology virtual reality can really help comprehend and learn in-depth about these creatures.

This idea was derived from a project called ‘skin and bones’ lead by the Smithsonian museum of natural history located in Washington DC where an AR version of the app has been built and it has attracted a lot of attention recently. This app is a perfect blend of combining old fashioned museum visits with newer technology such as AR/VR to give users the best experience.

The Application development involves the creation of a scene where the user will be able to walk into the room which contains the dinosaurs where he/she will be able to learn more about them through audio books which have been downloaded specifically for the specific species of dinosaur on display. Switches will be added so that the user can turn on the audio book and more features such as videos and bots have been added to make the scene more interactive.

There have been certain changes that have been made to the project since the start of development and some elements which have not particularly worked in a VR headset mostly due to the unavailability of certain software and the VR headset itself. All in all, the project has taught me many things and I would like to add that I have a newfound sense of respect for graphic designers and game content creators, it is certainly not an easy profession.

# VR Application Design

## User interaction

Keeping is the user occupied when using the application is a real challenge. This can be achieved by using the state change features in AWS Sumerian. Behaviors such as transitions and play/pause music have been added, this was achieved using action listeners. Lights are turned on or off when the switch is toggled along with the music. The default lights will be turned off when performing this action. Listeners such as tween rotate have been used and gives the effect of objects moving when interacted with, for e.g. The switch tween rotates by a certain degree when the user clicks on it, unfortunately though there were many bugs encountered when adding this feature and it mostly does not work on the oculus quest.

Graphical user interface, application, Teams

Description automatically generated

### Image 1: a state machine to toggle the switch up and down

## Improved graphics

A lot of stress was given on making the dinosaurs look as realistic as possible. Many websites such as turbosquid, google poly and free3d.com provide a wide variety of objects that can be added and used to the scene but most of them aren’t free. Some objects which have inbuilt movement features can cost up to $899 a piece!!! After a lot of searching and downloading I managed to download a few free ones and textures were added to it so that it looks as realistic as possible (Image 2 shows the texture adding feature in AWS Sumerian). Overall, the final quality of graphics was good considering that not a penny was spent on it (Image 3 shows a detailed view of one of the dinosaurs)

Graphical user interface, application

Description automatically generated

### Image 2: Adding texture to the object

A dinosaur on a table

Description automatically generated

### Image 3: A detailed view of the object after adding custom graphics

## Adding sounds

Adding sounds such as audiobooks, instructions on how to navigate in the scene improves the user experience in a way and reduces the users burden to look around and look for instructions. Some of the apps that I came across were really confusing to the user and especially considering an VR environment its nauseating. This has been made easier by adding audiobook instead of text and it does improve the scene (Image 4- Adding an audiobook into the scene)

Graphical user interface, application

Description automatically generated

### Image 4: transition for adding audiobook into the scene

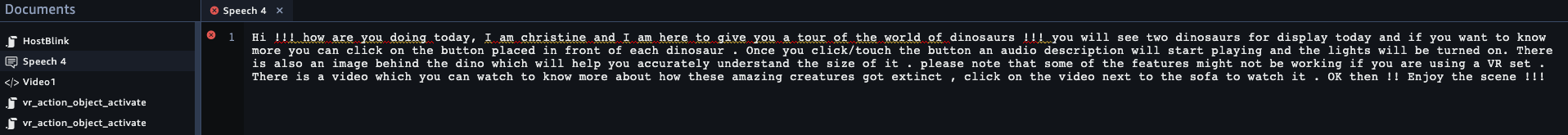
## Environment (skyboxes)

Setting up the scene involves a adding a skybox as well. The one chosen for this project was one of the assets available in AWS Sumerian and it adds a jungle environment into the scene making the background look attractive.

## Bot Christine

A Bot has been added with a speech text and will introduce the users to the scene and provide a map of how the scene is going to be played. This feature can be used to add some description about the fossils as well. The initial plan was to make it interactive in a way that the bot will be able to respond to specific questions for the user, but it has been kept under future scope for now. (Image 5- Shows the bot Christine added to the scene along with the speech text)

A person holding a football ball

Description automatically generated 

### Image 5: Bot Christine along with the speech text added

# Integration

AWS Sumerian was used to build and deploy the project. This software simplifies the creation of VR content and is rightfully the first choice for many who are new to this domain. It also makes the deployment or publishing the app easier since it is cloud based platform. All you need is an AWS account and you are good to go. Plenty of documentation is available online and many tutorials add points to this. However, there are plenty of downsides to using this such as high CPU memory consumption and a very low FPS making it tuff for users to enjoy the scene. It also uses specific version of browser and is subject to frequent browser crashes. All in all, it is a good start point and a beginner’s tool more or less.

# User Experience

Feedback was taken from my classmates on how more features can be added in making the project better and since we also had the opportunity to view projects that our peers had made it gave me ideas to make the scene better for e.g. Adding a bot was not on the agenda in initially but it was added after an interaction with one of our group mates.

# **User Guideline**

The user will be guided by a bot on how to navigate through the scene. The basic idea is that there is a switch/button placed in front of every dinosaur in the scene and once the users clicks on it an audiobook is started in the background explaining about that particular dinosaur under the spotlight. A Video link has also been added to shed light on how the dinosaurs became extinct.

Conclusions

The project was built and executed using AWS Sumerian which as described is a great tool for building and deploying VR apps. A lot of time was spent on designing and developing the objects from various sources available online. Some of the features do not work on the Oculus quest and bugs need to be fixed in order to achieve the best output and some features which were initially included such as movement associated with objects and more transitions could not be added due to the time limitations. All in all, it is a great start and I am definitely looking forward for more VR development in the future.

Appendix I: Lessons Learned

This project was really a challenge for me considering the fact that I am very new to graphic design and development, this project stretches my domain knowledge beyond python programming and web development, but I am really happy with the end product. I would like to also add that it wouldn’t have been possible without a platform like AWS Sumerian. It cuts all the unnecessary overheads of creating a package for deployment and writing hundreds of lines of code to perform simple operations such as collider activate. Having said this, the project turned out to be one of the best one’s that I have worked on in quite some time. It was tedious and sometimes took hours to get a single object right, downloading and finding the resources online was one of the most time-consuming processes especially if you want it to be free. There were also challenges that I faced with the browser compatible with Sumerian. It consumes about 3-4 GB of RAM when running and I personally feel AWS Sumerian as a tool needs a lot of improvement in optimizing and making sure that the browser does not crash when playing a scene. Also, not owning a VR headset has its own disadvantages since you cannot test it as you build it on the fly, this makes it very difficult in the end to integrate and make the VR work very difficult. All-in-all, it was a great experience and I am looking forward to working on my next VR project in my future.

Appendix 2: Feedback to the instructor

The platform used was AWS Sumerian and as described in the appendix section it comes with its own advantages and disadvantages. I can however vouch for that fact that Sumerian makes it very easy for first time developers to create content than any other tool but those with some experience can definitely go for other tools that are available in the market.

Project groups really helped me in discussing and making my project better. I learnt many new features which my other classmates discussed during the meet and it couldn’t have been better considering the fact that we were all working from home, I too was able to give my feedback to them during development making it easier for them as well. This course made use of blackboard as a platform in the most efficient way possible, be it making virtual groups or adding discussions during the class.

Appendix 3: Classmates' VR app Evaluation

1. Corn Maze

The project is simple yet elegant and has been built with a lot of emphases on making the corn maze look as realistic as possible. This makes the best use of VR technology allowing users to use teleportation to navigate through the maze. The design features such as sound and a transition (ringing the bell in the end) makes the user experience interactive and keeps the user occupied. The corn maze is a tuff one though and might make the user feel nauseated at times, but this is very well balanced by making navigation easier with a few hints here and there.

A picture containing grass, sitting, table, monitor

Description automatically generated

1. Escape to Hogwarts VR

This is definitely one of the best VR projects made with Sumerian. It is very detailed, and the background story adds a sense of excitement to find the items and move to the next stage of the game. Many objects have been added and the transitions are very impressive. The audio description on entering the scene really makes it easy for the user to understand the rules of the game. The concept is really well thought about the graphics are all true.

A picture containing book, shelf, indoor, monitor

Description automatically generated