# Implementation of Chatbot using Virtual Reality

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**Abstract -** *The need of resolving queries and complaints increased as the number of consumers increases for the particular company. Therefore, the implementation of the chatbot is done in order to cope with the ever-increasing demand for customer support. Virtual Reality Chatbot provides a better solution to this problem as the customer feels that they are actually interacting with the Customer Support. This project presents the Virtual Reality Chatbot which supports video capability and interaction through speech recognition and gestures. Problems in interactivity can be resolved by the usage of Virtual Chatbot.*

***Key Words*: Virtual Reality, Amazon Web Services, Virtual Chatbot, Blender, WebVR**

## 1. INTRODUCTION

Virtual Reality, one of the leading evolutionary technologies, was developed by mainly keeping interactivity and people in mind. So, People get to experience the technology which provides a user interface with high interactivity and happily enjoy their joyful moments with Virtual Reality. Currently, Virtual Reality is implemented as a form of basic User Interface in popular applications and most importantly, Video Games. Similarly, Chatbot is created for resolving queries about a particular thing, therefore minimizing the hassle of asking basic questions to the customer care of any company. Even though, the combination of Virtual Reality and Chatbot may be a bit unnecessary, highly interactive Virtual Reality makes the chatbot more interesting and engaging.

## 2. OVERVIEW OF VIRTUAL REALITY CHATBOT

## 2.1 DESIGNING THE CHATBOT

Designing of Chatbot in Virtual Reality requires the usage of modeling the environment and character with Blender / Unity / Unreal Engine to deploy it into "AWS Sumerian", which is useful to connect with the chatbot. Gestures and Speech are already available in Sumerian, making it much easier to increase the interactivity of chatbot.

## 2.1.1 VIRTUAL REALITY CHATBOT ENVIRONMENT MADE IN BLENDER

## 2.1.1.1 OPTIMIZED MESH

Basically, a mesh is made out of primitive shapes like cubes and cylinders and then edited, so mesh density is a major factor in rendering.
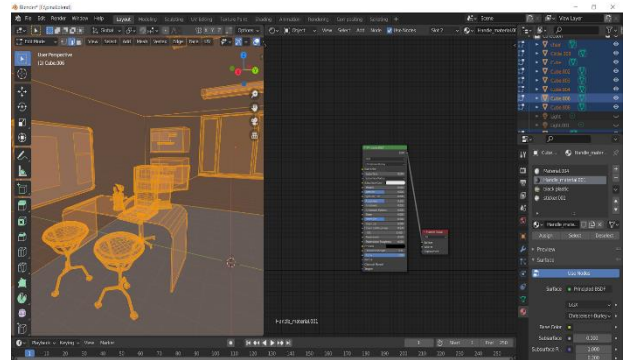


Fig. 1: Mesh Optimizing in Blender

Since AWS Sumerian is an online VR (Virtual Reality) and AR (Augmented Reality) creation tool it is important to note the mesh of the environment, the environment created is made sure to be less dense as possible to run the environment online on the web and reduce the render time.

## 2.1.1.2 OBJECT NORMALS

Normals of an object determine how the objects are supposed to bounce light and how the objects' shading looks. So, it is important to look at the normals of the object are facing the right way.
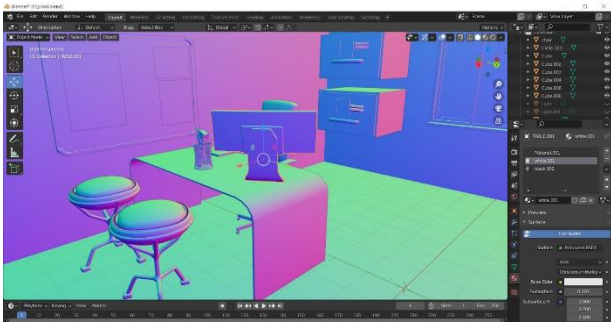
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Fig. 2: Object Normals using Blender

### 2.1.1.3 FACE ORIENTATION

Wrong face orientation of the mesh may cause issues like the back culling effect which causes object certain faces to become invisible when the camera is moved to a certain axis so it best to check face orientation properly and correct disoriented faces.
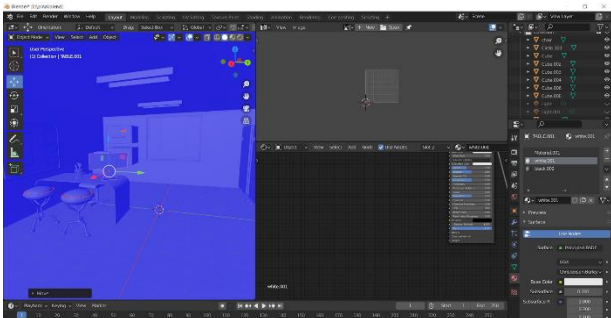


Fig. 3: Orienting Faces in Blender

### 2.1.1.4 TEXTURING AND PREVIEWING FINAL ENVIRONMENT AND EXPORTING

After basic texturing and baking texture, the models are previewed and exported in .FBX format to AWS Sumerian.
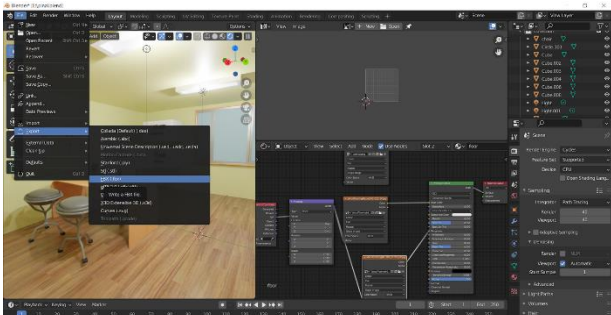


Fig. 4: Texturing Environment in Blender

## 2.2 DEVELOPMENT OF THE CHATBOT

The Development of this Virtual Reality Chatbot is mainly done with *Amazon Web Services (AWS)* for better flexibility and consistency.

### 2.2.1 AWS Lex

By the usage of *AWS Lex*, an efficient chatbot can be prepared to answer, from the most basic queries to the advanced queries. This can be used alongside *Lambda* to create the chatbot for various situations.

### 2.2.2 AWS Lambda

Lambda Functions are the functional part of the Chatbot developed with Lex. Since, it supports most of the programming languages (Java, JavaScript, Python etc.,), Lambda functions are easy to implement and deploy.

### 2.2.3 Docker (Optional)

Docker can be used to create .zip files of external libraries in order to increase the functionality of *Lambda* Functions. It is purely "optional", as *Lambda* supports almost all essential libraries.

## 3. EVALUATION OF VIRTUAL REALITY CHATBOT

Structure-wise, virtual reality chatbot follows generic chatbot architecture which is given in the following figure.
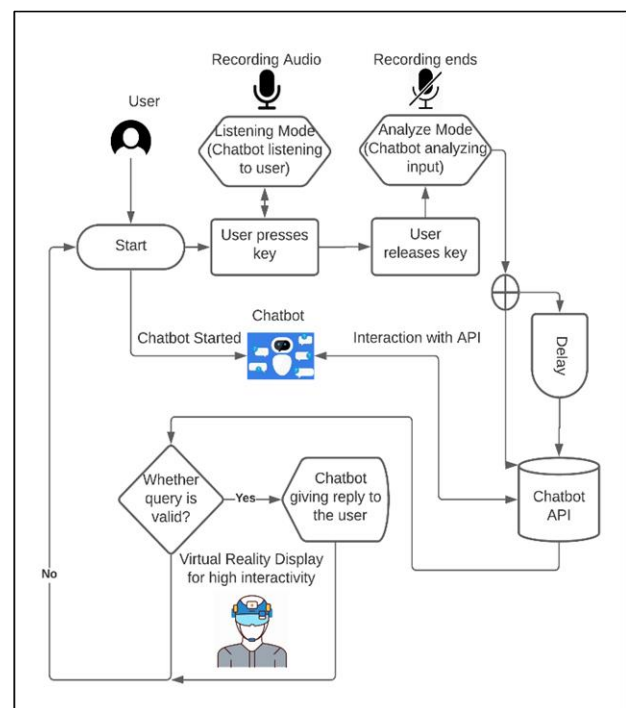


Fig. 5: Architecture of Virtual Reality Chatbot

Performance-wise, this Virtual Reality Chatbot runs on "WebVR", which is compatible with most browsers like Google Chrome, Mozilla Firefox, Supermedium. Using VR Headset is optional, making it accessible for mobile devices too.



Fig. 6: Virtual Reality Chatbot in Mobile Phone

Currently, Oculus Go, Google Daydream, Samsung Gear VR, HTC Vive, Google Cardboard, Lenovo Mirage(discontinued) are the supported VR Headsets for this Virtual Reality Chatbot.
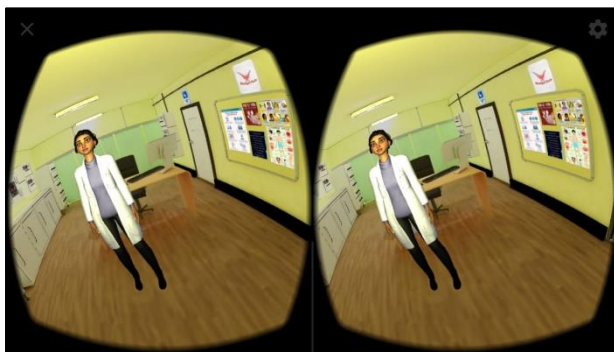


Fig. 7: Accessing VR Chatbot using VR Headset

## 4. SOFTWARE AND HARDWARE REQUIREMENTS

1. AWS Sumerian. (Development)
2. Blender. (Modeling)
3. Android 6.0 or Higher.
4. RAM: 2 GB
5. Gyroscope (For Better View of the Environment).
6. VR Mount.

## 5. ADVANTAGES OF VR CHATBOT

Virtual Reality Chatbot provides much more lively interaction that pleases the user. Therefore, the user can able to ask the queries easily and understanding the replies more easily at the same time due to the high interactivity and visualization provided by the Virtual Reality Chatbot.

## 6. FUTURE WORK

Currently, WebVR has some compatibility issues in low-end mobile phones which might affect the usage of Virtual Reality Chatbot in certain devices. In the future, however, this can be reduced since WebVR is a technology that receives updates continuously. So, the compatibility disadvantage currently it has, can be changed into an advantage too.

## 7. CONCLUSION

By the application of Chatbot to Virtual Reality, technology and usability can be increased for the greater good. Lively interaction leads to customer satisfaction and faster resolving of queries. As Virtual Reality is an evolving technology, these types of chatbots will get more improvements as time progresses.

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