Indian Institute of Technology Jodhpur
Department of Computer Science and Engineering

B.Tech Project Report

Title of the B.Tech Project: 3D User Interface for the Google Search in Virtual Reality.
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Abstract

The main aim of this B.tech project is to bring normal google search results into interactive virtual reality. To make google searching more interactive and make the user feel that they are actually into the google and feel realistic instead of viewing a single screen in front of them.
To create this type of environment we selected Unity3D which is the world largest Game Engine which supports Virtual Reality, google cardboard and Android so we can easily deep into virtual reality and create a nice virtual reality app that will be able to run anywhere with a headset and feel the 3D world in front of ourselves.
This is mainly done by two steps making Plugin for the Unity3d and use that plugin to showing results in VR.

Motivation

Virtual reality is one of the most emerging technology and it is expected to have high demand in many domains in up coming future. It is the use of computers technology to create a very simulated 3D environment and imerses the user into virtual world.
For browsing and opening many tabs in Google search we do not need to click on next tab button every time instead we have to just turn our head a little and a new screen will be there.
VR headset is a device used to stimulate our senses together in order to create the illusion of reality.By designing aircraft in Virtual Space we can explore a virtual mock-up of the entire aircraft and can work to find and resolve issues faster than usual. for example, Oculus Rift, HTC Vive,Oculus Go,Samsung Gear VR,Google Cardboard etc.

Technology & Requirement

- ❏ Unity3D Editor
- ❏ Android SDK
- ❏ Google VR SDK
- ❏ Newtonsoft.json
- ❏ Visual Studio
- ❏ Google Api key
- ❏ Custom Google Search API
- ❏ Google Cardboard VR Headset
- ❏ Android Mobile

Methodology(Solution)

The solution for this project is divided by mainly three steps as following:

1. **Building Plugin For the Unity3D**

   For building Plugin for unity3D we did the following steps:

   - Started with creating a project named *SpraiseHtml* of class Library using(.NET Framework) on Visual Studio 2017
   - Adding References of UnityEngine.dll from Unity into our project
   - Adding Newtonsoft.json framework via `*Manage NuGet Packages*` to store and manipulate json data
   - We have created our credentials for requesting and scraping the google results,Such as Google api key & custom search api key
   - Use the Credentials and make method `*Search and next Page*` for class 1
   - Build our library
   - Find all .dll files generated by building the library in bin/release
   - Our Plugin is ready

2. **Use that Plugin in Unity3D**

   For using the Plugin we have created on Visual Studio we did following steps:

   - We copy all .dll files generated by building library into Unity Assets/Plugins/Dll Folder
   - In MainScript we use the plugin by adding on top `Using Spraise Html`
   - Make Instance of `class 1`
   - Call methods of `class 1`.

3. **Create 3D user interface in Unity3D**

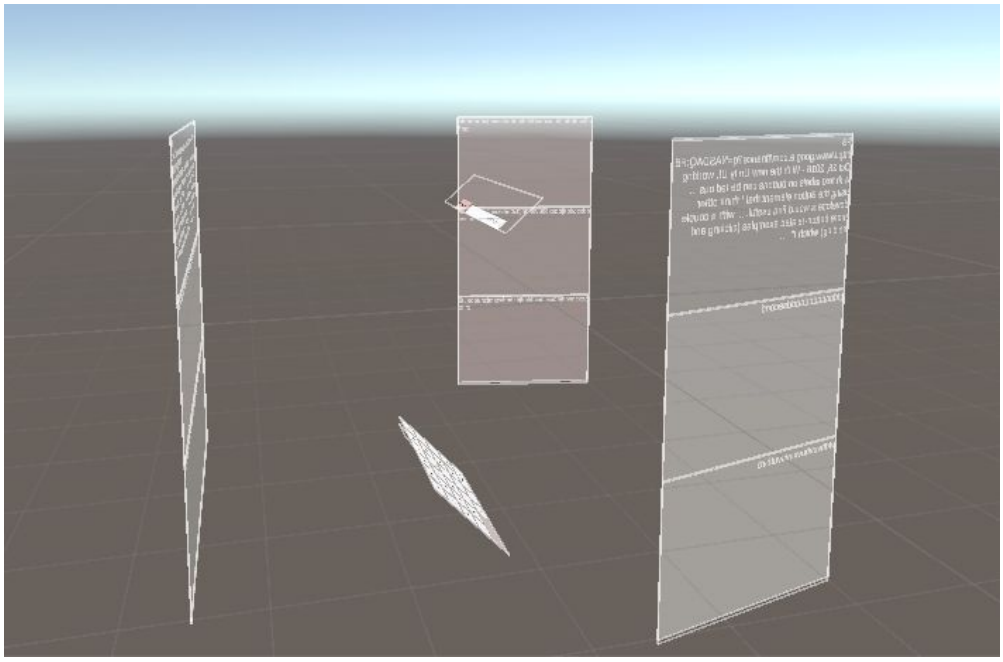
   This is the creative part of the project showing results into virtual world.

   We did the following thing to show results:

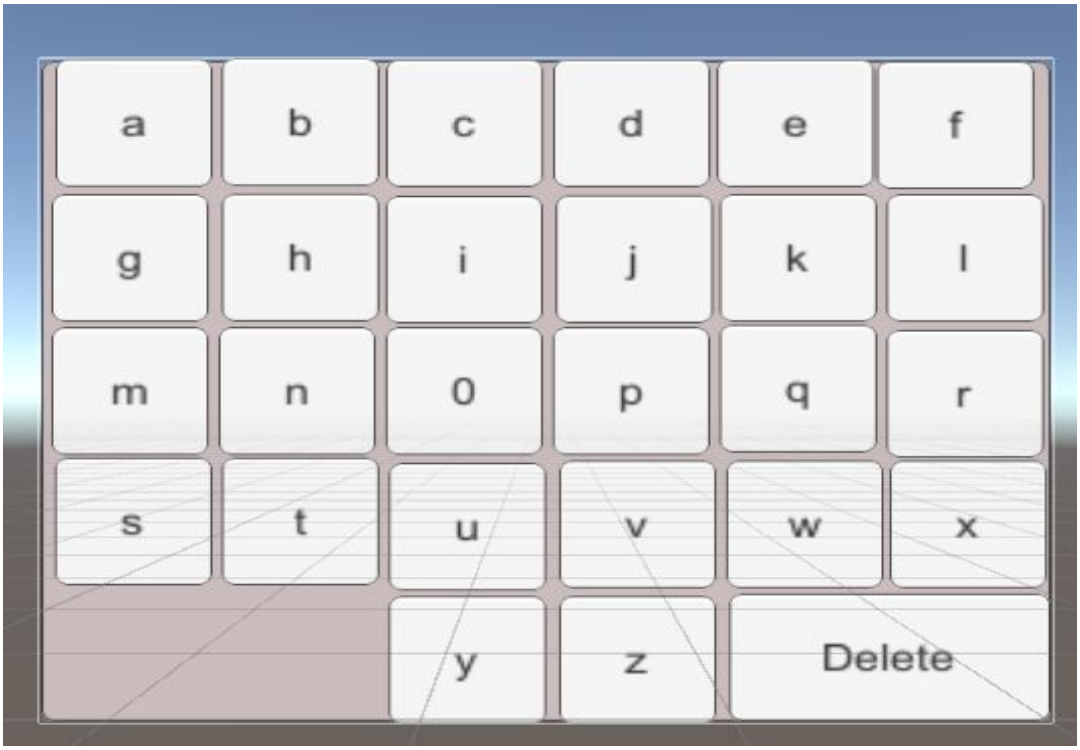
   - Start with Creating Project on Unity3D named *'Sdd'*
   - Import Google VR Sdk for running our app on Google CardBoard
   - Use CrEdit Emulator, GvrEventSystem, GvrControllerMain, GvrInstantPreviewMain, GvrControllerPointer, GvrRecticalPointer from Google Vr for Handling head move, click, other event for running smoothly our app in VR Headset.


Center
Local
Hierarchy
Create
test2
Directional Light
EventSystem
GvrEditorEmulator
GvrEventSystem
DemoSceneManager
GvrControllerMain
GvrInstantPreviewMain
Player
Main Camera
GvrReticlePointer
GvrControllerPointer
ControllerVisual
Laser
Reticle
firstPage
secondPage
thirdPage
Panel1
Text
Panel2
Panel3
InputField
InputField
Placeholder
Text
Search
Text
Manager
KeyBoard
Canvas
NextPage
Button

❖ Created our scene .



❖ Created Virtual Keyboard for taking input from user via retical.



❖ Created Search Box and Button and attached all related script to all buttons and all.

Efforts for achieving our goal

1. **Unity3D**

   Listing all what we learn in Unity3D

   ➢ Basic of Unity

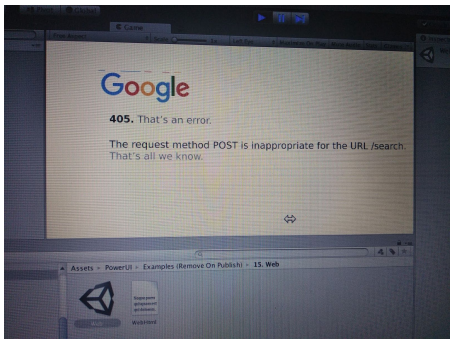
   ➢ c# for scripting in Unity

   ➢ How to enabling virtual environment for android

2. **PowerUI**

   ➢ First we thinking to use this framework for browsing because we see that it support HTML and opening any website by link, and also we know that any google works by running Html.

   ➢ When we open the google link and try to search anything it shows *405 error Method Not allowed.*



   ➢ *Later we came to know that it is UI framework not a browser.*

3. **Desktop App using chromium backend :**
    - ➢ Learn Basics of .Net framework and chromium backed and made a desktop browser thinking that it can be easily implemented in unity3d for VR but it did not work.

4. **Android Plugin for Unity using webview**
    - ➢ Learn Basics of Android Studio
    - ➢ Java
    - ➢ Use webview into our Project and Gradle Build
    - ➢ Make Plugin for unity by using .aar file in the location “”
    - ➢ Put .aar files in Unity at location `*Assets/Plugin/Android*`
    - ➢ Call the methods of plugin into unity script
    - ➢ It’s running in unity but cannot able to render in virtual reality.

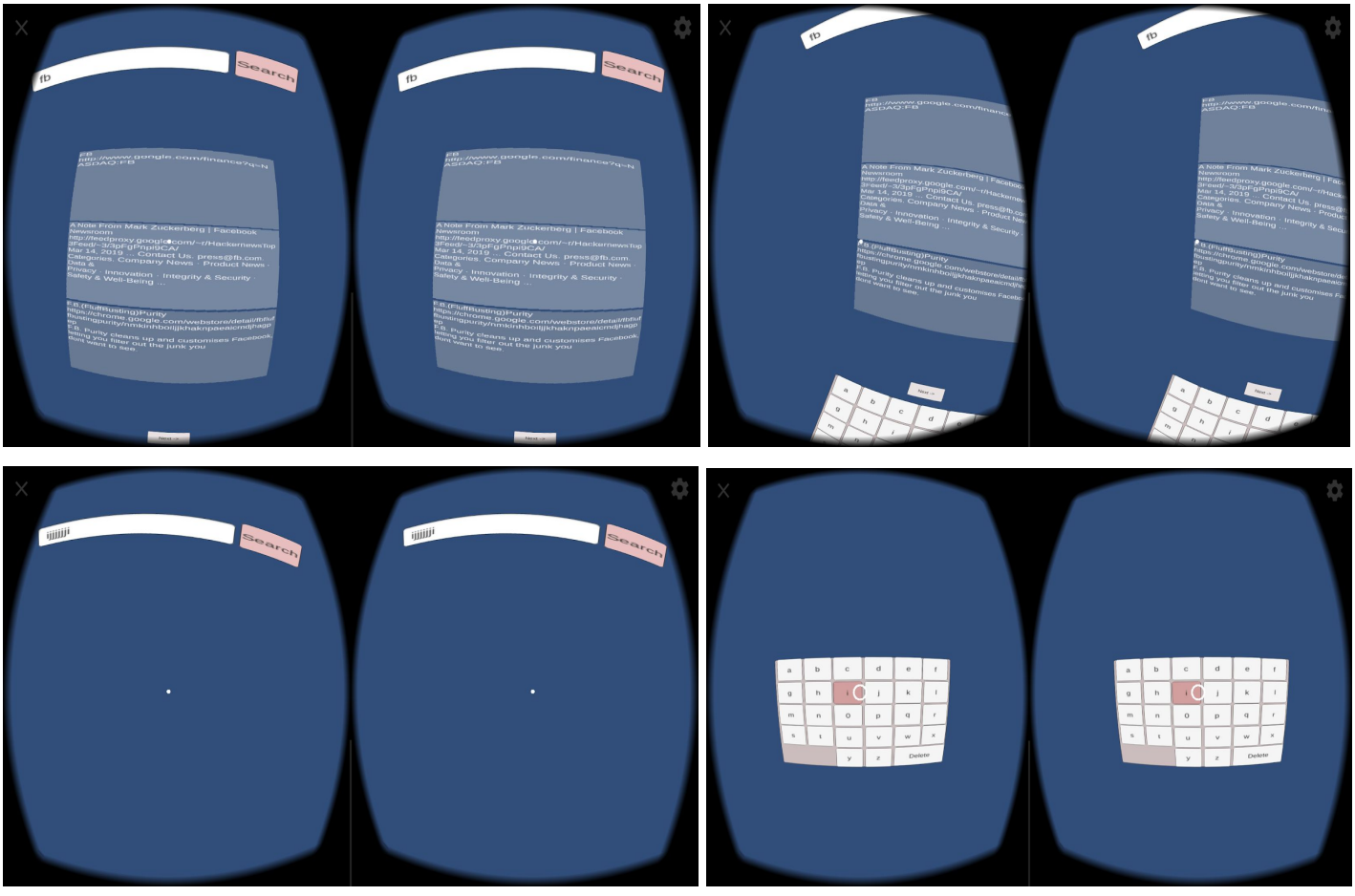
5. **HtmlAgilityPack Web Scraping**
    - ➢ It is c# library for scraping data from the internet ,and it is added to project by *Manage NuGet Packages.*
    - ➢ Now we are trying to scrap title, link, and snippet from the google result (i.e https://www.google.com/search?q=google) and show the results in VR by make Plugin for the Unity (as described in Methodology)
    - ➢ First day It working all good no problem
    - ➢ But later day we got *504 error* means Service Unavailable
    - ➢ Our IP address is block and restricting us for such scraping for security reason by google.
    - ➢ So we go for using Custom Google Search api

6. **Custom Google Search Api**
    - ➢ Google Provide a safe Custom Search api for scraping google results
    - ➢ So we use it to get safe google results and proceed to make plugin and use it in unity (as described in Methodology).

Conclusion

To make 3D user interface for Google search in Virtual Reality and make the user feel that they are actually inside some other realistic environment instead of viewing a single screen in front of them.For this we made plugin in Android Studio and use this plugin in unity3d and created 3d user interface.

Here are some screenshot of vr app:



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