Business Academy Southwest

Report

on

AR/VR Exam project

by

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1 semestr

submitted to

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Introduction

“Augmented reality (AR) - is the ability to insert an overlay digital and virtual information into the real world.”[1] The first real world application was the heads-up display in fighter jets, all information about flight was on the transparent glass screen. At now days the most common and popular use of AR technology is in the car. The Heads-up display helps not to interrupt vision of driver from the driving. That technology increase safety on the road. All the necessary information for driving is shown on the windshield, such as: speed, navigation. The AR is still relatively new and developers are still working on applications for the masses. Augmented reality, unlike virtual reality, combines the real world and the virtual one by superimposing virtual objects in the real world. Augmented reality devices such as: "Google Glass", "Microsoft HoloLens" - are able to design a virtual image in real time using real-world space. Also, programs for creating augmented reality are being developed for smartphones.

There are several categories of augmented reality technology exist, each with varying differences in their purpose and application use cases.

Object recognition technology

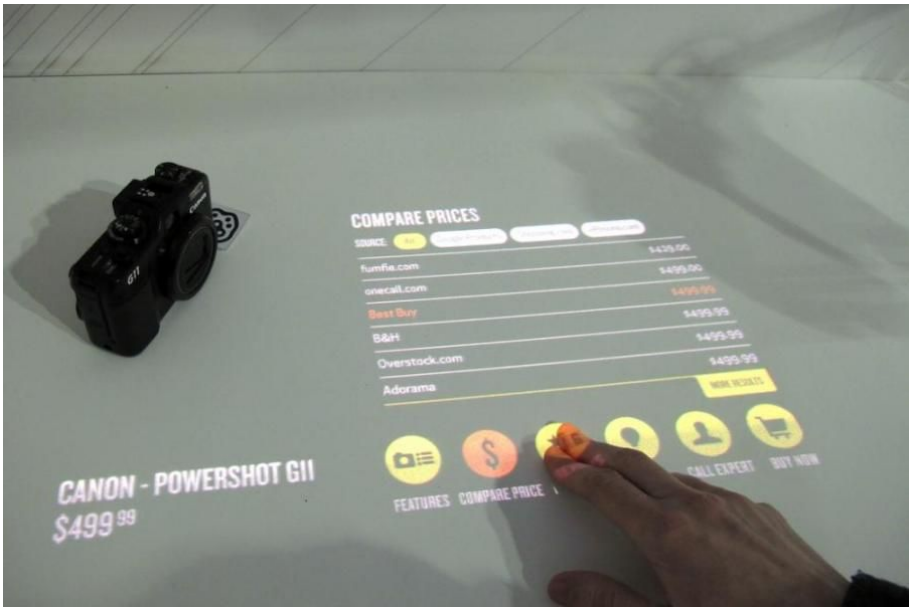
Object recognition technology is based on identify of objects. Despite of what type AR technology do you use, all other types do use some type of recognition system to detect the

type of object. Perhaps you didn't know, but when you use your phone to scan the QR code or Barcode using the camera, it means that you are using this type of AR. Also "Object recognition" uses for recognizing and replacing the object with something else. In my project i used exactly this approach..

Location based Augmented Reality

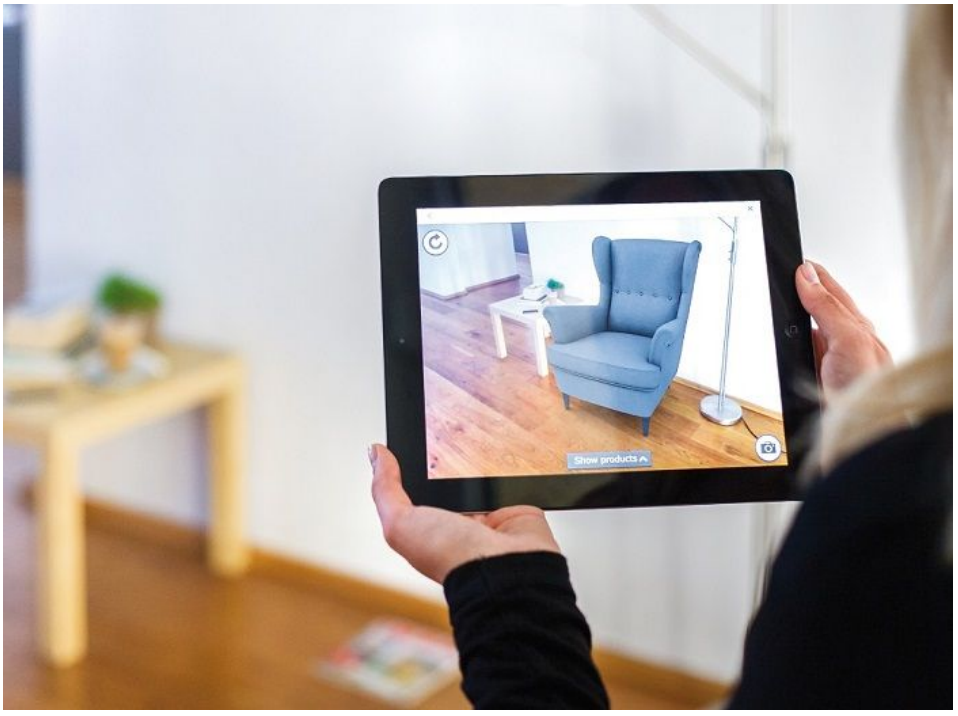
Location based AR it the most widely implemented applications of augmented reality. This approach works by using: GPS, digital compass, velocity meter, or accelerometer which is embedded in the device to provide data based on your location. Usually this approach uses for travel or museums application guide .

Projection Based Augmented Reality



Projection based AR - use projection onto surface for interaction with virtual world. Compared to regular app on phone, this type of AR looks more attractive and complicated, because we need projector that will produce artificial light. One of the most common approach to interact with virtual object is by touching the projected surface by hand.

Superimposition Based Augmented Reality



“Superimposition based augmented reality either partially or fully replaces the original view of an object with a newly augmented view of that same object. In superimposition based augmented reality, object recognition plays a vital role because the application cannot replace the original view with an augmented one if it cannot determine what the object is.”[2]
As an example, when i was in the Rijksmuseum muzeum, i used virtual guide app. I walked around the showrooms and the app automatically determined where I am. It automatically turned on a virtual guide and told about painting or exhibits near which I was or pointed by camera for recognition.

Purpose

In my report i will explain how to involve people who are older than 16 years in the Lego products. During "Lego Life - Project week" we had the task of attracting the attention of Lego fans who had already grown up. But how can we return the interest of fans, if Lego - is

a company focused on children? For a long time, I've been thinking about how to improve any products from Lego to increase the interest of the older generation. I realized that this is not possible. To understand what the client wants, you must think like a client. So I began to explore what people usually do when they are 16 or older in their spare time. and how their interests can be combined with the production of Lego. In addition to the fact that Lego produces toys, they also develops games. As for me, the best idea to involve the interest of fans is the use of new technologies. On the example of "Lego Worlds" I want to realize my project.

Using the technology of augmented reality in my project allows to involve fans in almost all Lego products. The main idea is the ability to use the QR code to get additional content in games such as “Lego World”. For example, you buy a Lego toy, a magazine, or you are just on the Lego website. In the box or on the page there may be a QR code that you need to scan using your phone.

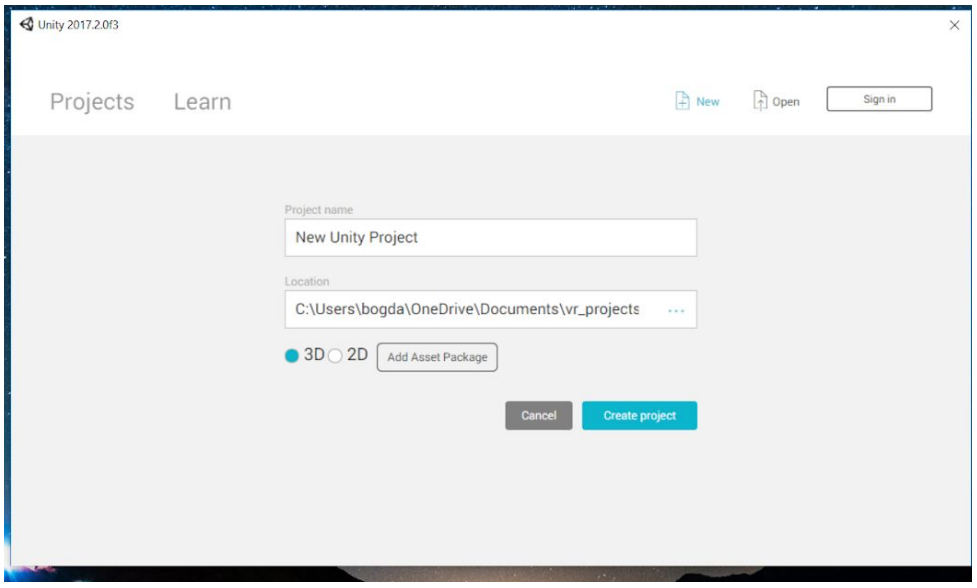
Methodology

To build an AR application I used the Unity game development platform with Vuforia SDK. Vuforia is a software platform for creating Augmented Reality apps. Developers can easily add advanced computer vision functionality to any application, allowing it to recognize

images and objects, and interact with spaces in the real world. The Vuforia platform supports AR app development for Android, iOS, and UWP devices.

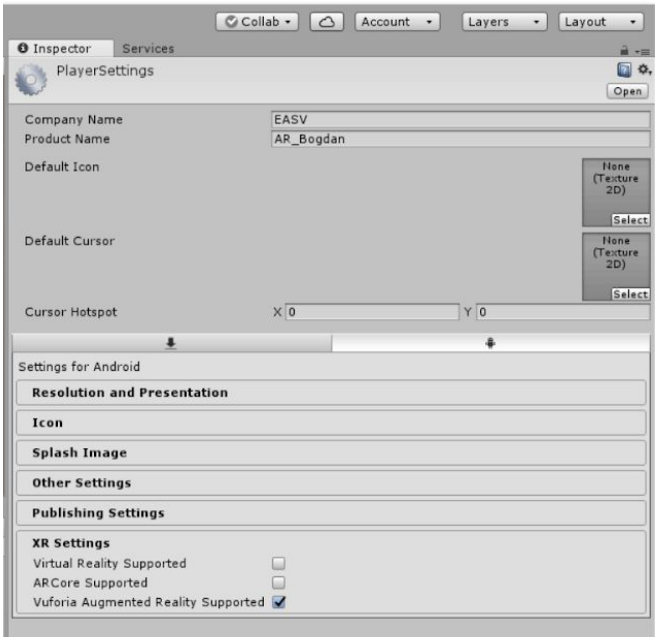
Application Development Process

1. The first step is the creation and configuration of the project in the Unity. Open Unity and press **New** button to create a new project.

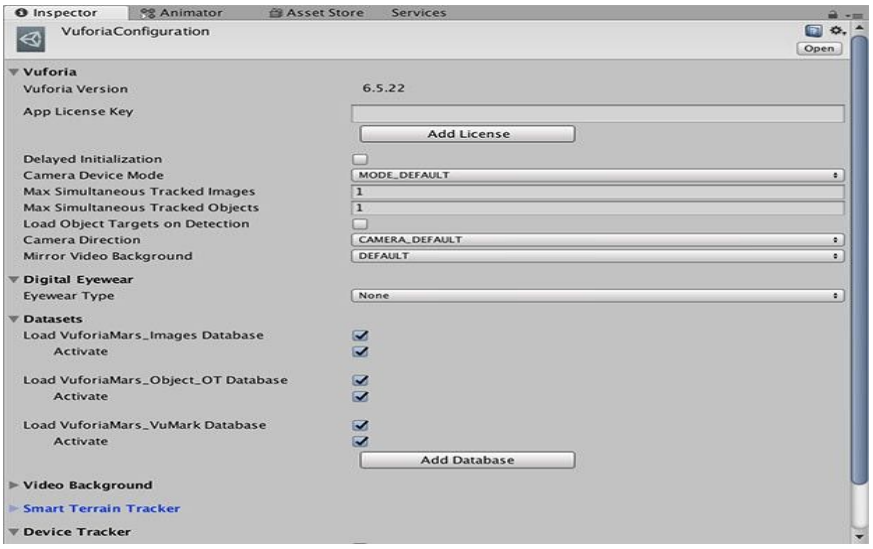


In the **GameObject** section choose **Vuforia - AR Camera.**

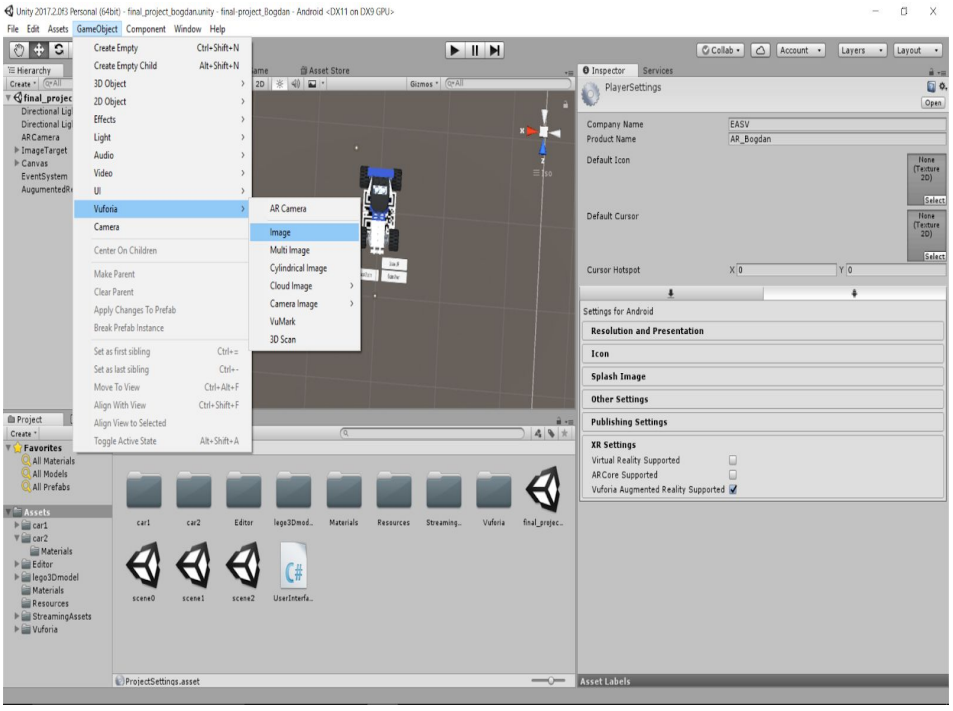
2. In the second step, it's necessary activate Vuforia SDK in the "**Player settings**" section, in "**XR Setting**" you have choose "**Vuforia Augmented Reality Supported**".



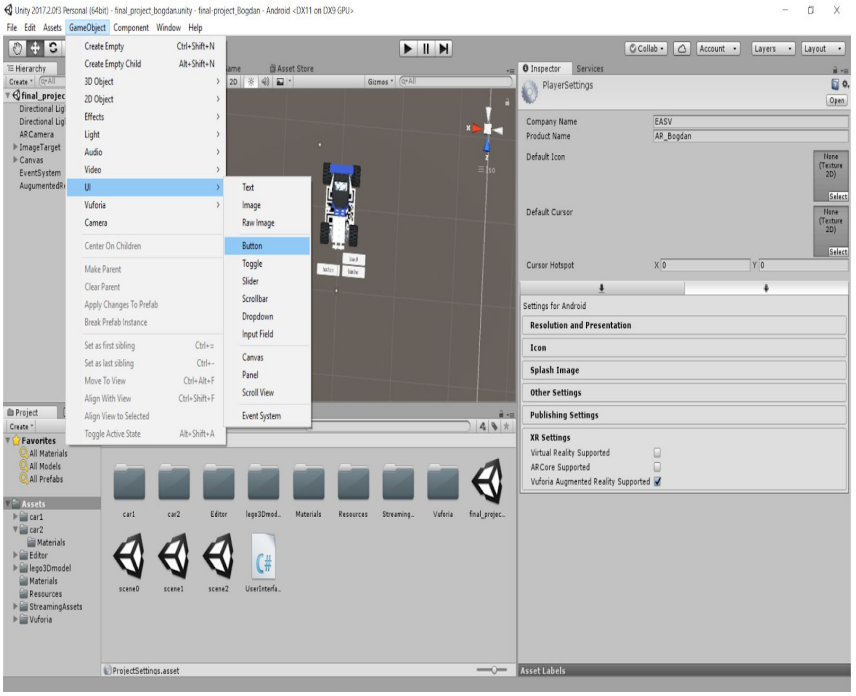
3. To set up the image target you need to create a database on the site of the Vuforia. You will also need to copy the license key on the site and copy it in ARcamera-Inspector-Configuration.



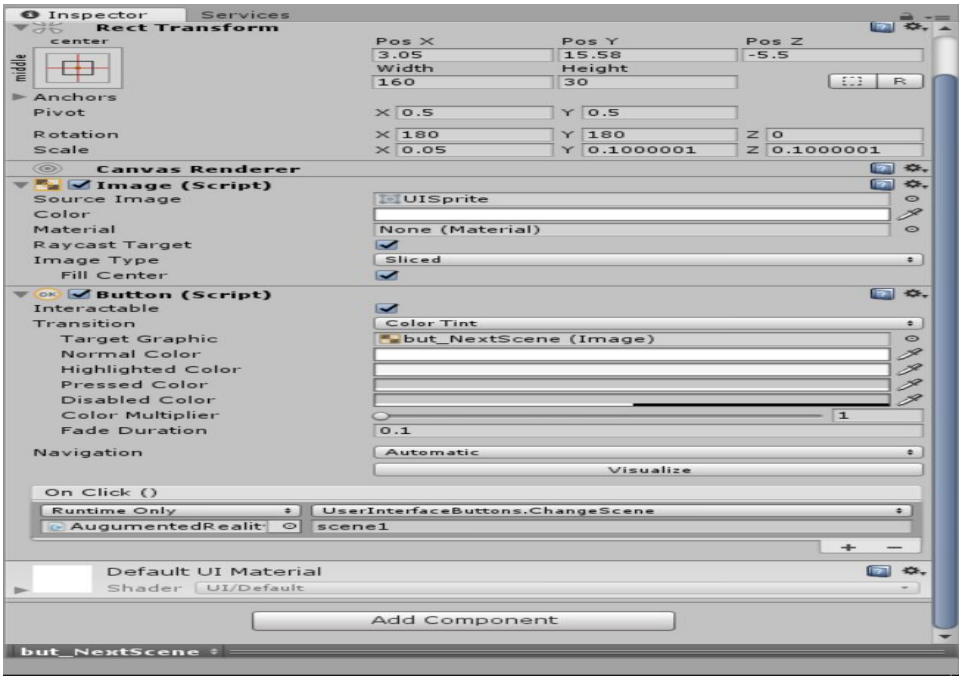
4. Adding targets. “You can add Vuforia targets to your scene by selecting the associated Game Objects in the **GameObject> Vuforia** menu. A target Game Object will added in your scene hierarchy and be visible in your scene. Each target object can be configured in the Inspector. Select the database and target name for the target you want to use.” [3]



5. To add buttons on scene, we should go to GameObjects > UI > Buttons.



6. After we added the buttons, the next step is to configure the buttons so that you can change the 3d models on the scene. “Go to button settings, **inspector>Button(Script)** and add **onclick()** function with **UserInterfaceButtons.ChangeScene** script, write on the field name of scene that you need.”[4]



Conclusion

Experts predict the AR market could be worth £122 billion by 2024. So, is the start of something big or will it prove to be just a passing phase?[5] The largest companies in the world are promoting AR technology. Google has its own “ARcore” api, Apple has “ARkit” and Microsoft has “HoloLens”. The market is developing more and more every year, but not as fast as we would like. Yet AR technology requires very powerful equipment, even new phones are still struggling with this. But I hope that in the near future we will be able to get on with inexpensive and more high-quality AR/VR technologies.

Sources

1. http://insightssuccess.in/the-world-of-augmented-reality/ page 3
2. http://www.realitytechnologies.com/augmented-reality gape 5
3. https://library.vuforia.com/articles/Training/getting-started-with-vuforia-in-unity-2017-2-beta.html page 8
4. https://forum.unity.com/threads/ui-canvas-button-and-augmented-reality-with-vuforia.369226/ page 9
5. http://www.bbc.com/news/av/technology-41419109/what-future-for-augmented-reality page 10

References

(use this qr code for project)