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Augmented Reality based Car Manual System

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Abstract: -

As we all are aware that Augmented Reality is soon going to flourish. It is used in almost every field and it is important for an Engineer to know more about Augmented Reality. We can see that the children's can learn more and try to remember more if there are images and videos shown to them in the same way if we want to remember anything we can just scan the application read all the details check the picture displayed and apply that knowledge physically in the real world. Our mirror neuron system suggests that we can connect with each other and with our work much better if we can see each other faces and hands in 3d. Like Iron man we will be surrounded by data in 3d models that we can actually grab and interact with it. Soon Augmented Reality will surpass the current 2.6 billion smartphone users in the world.

Literature Survey: -

Most of the information is gained from AR/VR implementation from latest research papers[1-4]. Most of the information is available on the software itself once we download the Unity Engine and Vuforia software the whole SDK as well as the manual is available. With practice of creating small 2D games I started to create my own VR/AR game in Unity [1-4]. As mentioned earlier we all had played games in our childhood so we can say this was the motivation towards developing our own game according to our choice and according to our requirements and needs. We have interest in playing games as well as people around me wanted to develop a game for them. In Life everyone is motivated with some or the other person or a film maker or elder brother/sister. We have our role models in Life. They are the only reason which help us to keep going no matter what all the odds we face. The motivation behind doing this project is to create something of my own after which I can proudly say that this is something which I have developed with all my efforts and hard work. Currently Jio has designed its own Jio Lens which are based on Augmented Reality and all small games are going to be included in that so the user of any age group can play the game without any hesitation. The idea of Car Manual System was first adopted in India by Hyundai Cars and now it has flourished in the market and almost each company sooner or later are going to adopt this idea [1-4]. Also, role of Machine learning in said project work is increasing day by day[5-26].

Proposed Work:

1. Block Diagram:

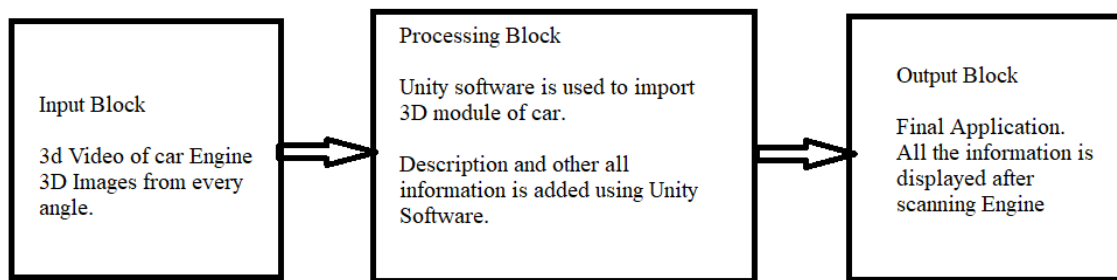


Fig 1 Block Diagram

The above block diagram shows the interfacing between input, processing block and output. In the block diagram the input block contains of the 3D images and video of car engine. The 3D scan is done with the help of an application named polycam. The input processing block is the main backbone of this application all the operations are performed in this block which is Unity Software SDK. After all the changes as well as after adding all the images and description to the application a build is generated which is in the form of apk. Then with that link the application is downloaded and installed in android phone. And then the scanning is done.

2. Creation of 3D Model: To get started with the project the first thing that required was the 3D model of the car. So I took the scan of my car which is Maruti Suzuki Swift Dzire through an application. And after scanning the model was imported in Unity Game development software.
3. About Unity: The project report is been divided into different point and parameters. The project report covers all the description, Details, Implementation, Programming, Diagrams, Flowcharts related to the project. Starting from the scratch I have learned this Software called Unity with the help of an online Platform which is Udemy. So it consisted of different topics related to development of Game using Unity Software. I have used Unity Engine to develop this game because it's effectiveness and free of charge. Downloading and User Interface is primary part of the work. Then there was a basic lecture of how to place a 3d object in Unity and then how we can change its size and shape. Then I saw different lighting effects on the placed 3d shape and side by side I kept on checking the camera angle so that the game can look fantastic once it is implemented and completed fully. Finally in this lecture I studied the physics and material so to actually get a clear idea of how the game will look in the real world. This was all learned in the First Chapter and can be considered as background for developing a game.

- The topics that were all covered are:-
- Basic Plat former
- Top Down Shooter
- Top Down Shooter with AI
- Main Menu, Localization & Game Loading

- Third Person Shooter
- 2D Action Game



Fig 2 Unity Structure

4. Model Target: It empowers to understand and track specific objects practically based on the object shape. 3D CAD model or a 3D scan of the object can be acquired accordingly. The MTG (Model Target Generator) supports a range of file formats and model types. MTG offers several alternatives to set up your target for best recognition and tracing performance.



Fig 3 model designing

5. Vuforia Engine: Vuforia is a platform for AR/MR application development platform and supports Head Mounted Displays (HMD) etc. Unity's integration of Vuforia allows you to create vision apps and games for Android and iOS using a drag-and-drop authoring work flow. Vuforia Engine is a software development kit (SDK). Vuforia is used for creating AR applications. Computer vision functionality can be added easily to any required application, permitting it to understand objects & images for further interaction with real world examples.

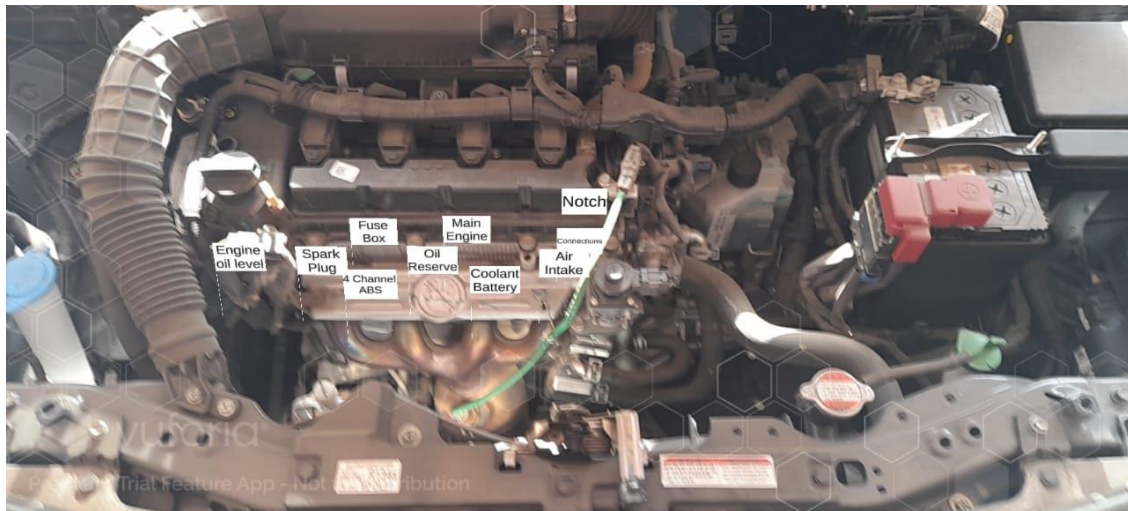


Fig 4 Vuforia Engine display

6. Results and Analysis:

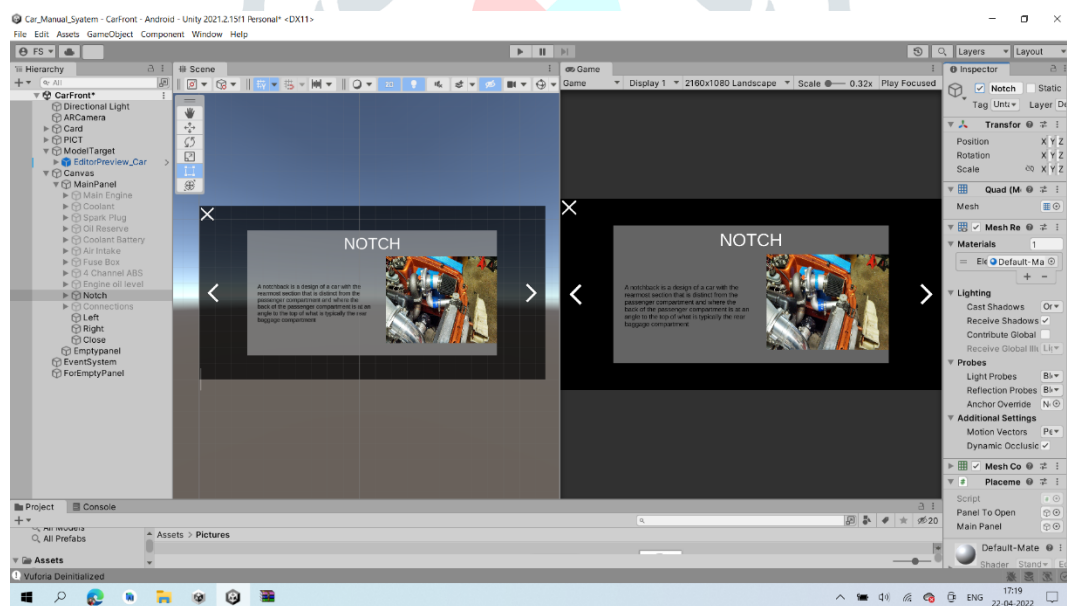


Fig 5 Screenshot of Information Description

Following figure shows the output of the application. It shows how the information will actually look after scanning we can select any option to see its description and then we can remember it for a longer time. We scan N number of times.

7. Result/Performance analysis: We can use this application in almost every car of our choice. It can be designed for any car we want and we can display the useful information as well as animations. It can be used a lot of time. The application gives you accurate results.

8. Conclusion: - AR is already available technology with smartphone, pc, etc...Many kinds of Application is published.AR has potential for use of learning - Medical Operation- Drawing Picture Creating AR content has become easy. The application was developed with the help of Unity Software. Augmented Reality is a vast technology and an emerging technology there will be a day where everything will be dependent on AR. The future of this technology is in almost every field. We have seen movies based on Augmented Reality.

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