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VEHICLE TUNING SIMULATION USING AUGMENTED REALITY

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Abstract: *People are having more and more ideas to customize their cars according to their wish and interest. Normal car users apart from who are using BMW, BENZ, VOLKS they cannot customize their cars virtually. Normally these features are available in the big showroom like BMW, BENZ, VOLKS. These cars can be customized in the showroom according to the users wish before they are buying. We can change the parts of the car virtually. Here we can customize all the brands of cars like (Maruti Suzuki, Hyundai, Tata Motors, Kia, Mahindra, Toyota, Renault, Honda.). BMW, Porsche, and Land Rover and all other cars that can be viewed in the roadway, use augmented fact era to assist car technicians accomplish complicated protection and restore obligations extra quickly. The technology that is used here is Vuforia and Unity Engine.*

Keywords: *Automobile, Augmented Reality, Virtualization, 2D to 3D, Vuforia, Unity*

1. INTRODUCTION

Utilizing modern technology gives companies a competitive edge over rivals in a variety of industries' highly competitive worldwide markets. It increases a business's capacity for innovation, can even lower production costs. Revenues. With the introduction of technological innovations, it has undergone major changes. Augmented reality (AR) has recently attracted a lot of automakers' attention, partly due to its accessibility and ability to generate innovative solutions. Virtual objects appear in augmented reality (AR). Normally, you have to go to a dealership when you first start looking into buying a new car. They frequently only have a few models on display and don't even have the color you want. Imagine an AR setting right now. You can modify any make or model inside of it just the way you're going to buy it. This technology can be introduced into any showroom as well as public android app store with the development and it doesn't have to be expensive either.

The biggest brands in the automotive industry have already made significant investments to keep up

with augmented reality software. By saving money, time, and human resources as well as avoiding legal problems with dangerous products, various AR applications assist car firms in streamlining all of their production processes. One of the most recent AR uses in the car sector is this. Before deciding to place an order, buyers can view how their vehicle will appear with several styles and customization options.

2. LITERATURE SURVEY

Fulu Sun, et.al The subjective assessment of chassis handling and comfort is discussed, and tuning activities and methods are discussed in this article. The need for chassis tuning and planning solutions for tuning testing are also discussed. In addition, we discuss the main factors that affect chassis handling and comfort. Chassis tuning can be done through a combination of simulation and theoretical analysis. Autotuning is modifying a car to optimize it for different performance needs than it was originally designed for. The most common are increased engine power and dynamic driving characteristics [1]. Anton Pashkevich, et.al., have discussed about the Improvement of technological processes management is one of the directions for production systems optimization. A practical methodology for improvement of production process of automotive components is presented herein. The methodology is based upon decision support system that permits for management of technological transport while changing the production and logistics system's parameters. The proposed simulation model is a tool for intellectualization of the decision-making process. To test the adequacy of the proposed solution, the example of using the developed model for the enterprises that produce automotive components is given. Highly competitive environment of automotive components manufacturers (ACM) forced the companied to look for ways to improve processes and increase product quality [2]. Ma Zhimin, et.al, have discussed this paper which describes a self-tuning control strategy and algorithms for vehicle suspension design. The controller design, using generalized minimum variance control theory, is adapted

to the changes of road input and the variations of vehicle parameters, in order to provide optimal control in different conditions. The results of simulations showed the feasibility and effectiveness of the approaches. The main purpose of this paper is to design a self-tuning control algorithm for an adaptive cruise control (ACC) system that can adapt its behavior variations of vehicle dynamics and uncertain road grade [3].

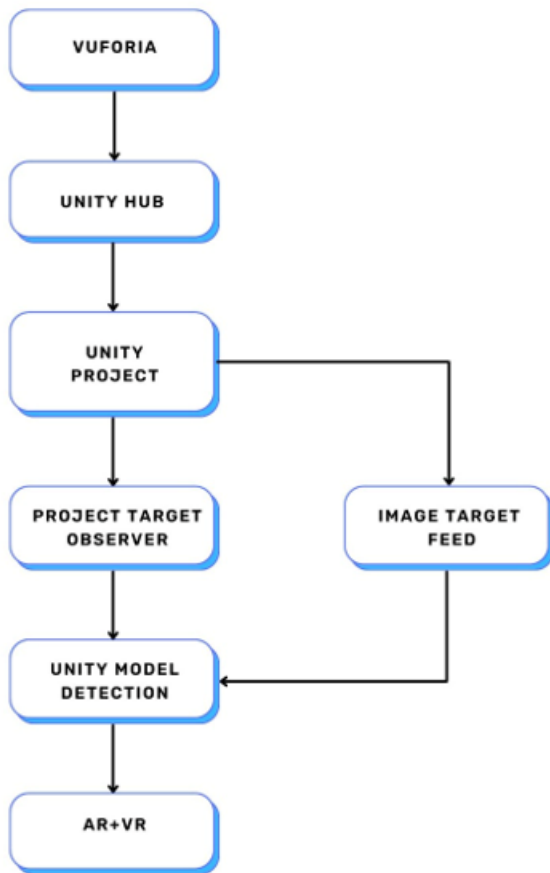


Fig 1.1 Software Architecture Diagram

3. PROPOSED DIAGRAM

3.1 SOFTWARE ARCHITECTURE DIAGRAM

In Fig 1.1, We understand that the software architecture data flow explains the software development phases of this software.

Vuforia:

Vuforia is a cross-platform Augmented Reality (AR) and Mixed Reality (MR) application development platform, with robust tracking and performance on a variety of hardware (including mobile devices and mixed

reality Head Mounted Displays (HMD) such as the Microsoft HoloLens). Unity’s integration of Vuforia allows you to create vision apps and games for Android and iOS using a drag-and-drop authoring workflow. A Vuforia AR+VR samples package is available on the Unity Asset Store, with several useful examples demonstrating the most important features of the platform. Vuforia supports many third-party devices (such as AR/MR glasses), and VR devices with back-facing cameras (such as the Gear VR). You can use any device with a camera to test AR/MR games and applications built in Unity with Vuforia.

AR Technology:

Augmented Reality (AR) technology is a technology that combines virtual information with the real world. The technical means it uses include Multimedia, 3D-Modelling, Real-time Tracking and Registration, Intelligent Interaction, Sensing and more. Its principle is to apply computer-generated virtual information, such as text, images, 3D models, music, video, etc., to the real world after simulation. The two kinds of information complement each other, thus achieving the enhancement of the real world. In recent years, more and more internationally renowned research institutions, universities and enterprises have invested in the research of AR. These results demonstrate the feasibility and innovation of AR as human-computer interaction technology. With the improvement of computing power of computer software and hardware, AR has gradually shifted from the theoretical research stage of the laboratory to the stage of mass and industry application, and as a bridge between the digital world and the real world, it provides people with a new way to recognize and experience the things around. In addition, it has been listed as one of the top ten most promising technologies in the future by authoritative organizations such as the American Times Weekly.

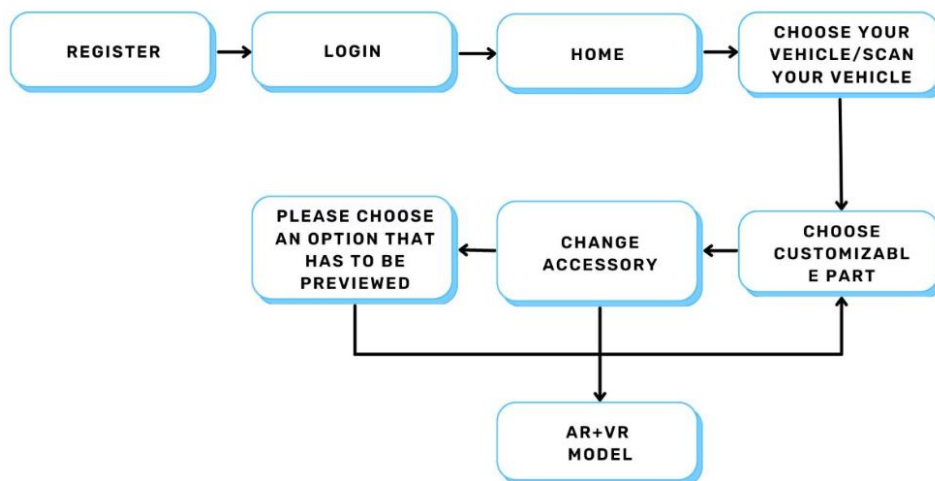
3.2 MODULES LIST

- Register
- Login
- Vuforia Real World Target
- Car Custom Details
- Vuforia Target Details
- AR Model
- Real World + AR Out - Turn

In this application, it involves several modules to access. Some of the modules that are major used are

Register page, Login page, Vuforia Real World Target, Car Custom Details, Vuforia Target Model, AR Model, Real World + AR Out-Turn these are the few modules that are major used modules to create these applications.

submitted by Customer to Zygote for development of the Product to permit imaging, animation or reproduction of the Target Image as a Licensed Animation/Video. Each part is swapped with the Real-World objects to Virtual Objects in the application.



3.2.4 AR MODEL

Autoregressive (AR) models predict future behavior based on past behavior. that is time series values and values before and after them. Combining all the parts Subject to user selection and modification. Autoregressive (AR) model Predict future behavior based on past behavior. Used for forecasting when there is some correlation between values in the time series and the values before and after them.

3.2.1 REGISTER PAGE

The login page (registration page) allows users and organizations. You can register independently and access the system. It's common to have multiple login pages for different types of people. Organization you want to register. The login page allows a user to gain access to an application by entering their username and password or by authenticating using the credentials of registering.

3.2.2 VUFORIA REAL WORLD TARGET

Model targets allow apps built on Vuforia Engine to perceive and be aware. especially the truck real world object based on the shape of the object. A wide variety of objects can be used as model targets, from consumer electronics and toys to vehicles, large factories, and even buildings. The model target generator takes as input a 3D model representing the object to be tracked, checks for suitability, and can be configured for optimal tracking using guidance and advanced views.

3.2.5 AR MODEL, REAL WORLD + AR OUT-TURN

The output (Virtual Customized Car) can be viewed on the actual working entity. Augmented reality technology (real world + virtual objects). augmented reality (AR) Superimposing visual, auditory, and other sensory information on reality A world to enhance your experience. Retailers and other businesses use augmented reality to promote their products, Services, launch novel marketing campaigns and collect unique user data.

3.2.3 VUFORIA TARGET MODEL

Target Image means any picture, diagram, drawing, tangible item or copyrightable subject matter

3.2.6 TARGET IMAGE IN GREYSCALE

Vuforia Engine uses a grayscale version of the target image to Can be used for detection and tracking. You can use your grayscale histogram. An image for evaluating suitability as a target image. Grayscale histograms can be edited using image editing applications such as: B. Created GIMP or Photoshop. Low overall image contrast, narrow image histogram, Prickly, it's probably not a good target image. These factors make the photo Doesn't offer many usable features

4. FUTURE IMPLEMENTATION

In the future, we will apply our approach in other similar applications and evaluate its performance by using other datasets. Thus, upgrading includes devise a marketing mechanism for other internal vehicle part datasets to increase the success rate of better reliability. In conclusion, improving the automatic generation of machine-generated reviews is a valuable next direction to provide more precise recommendations and personalized explanations for each and every product.

5. RESEARCH CHALLENGES

In the Automobile industry, there are some challenges to implement the features. List of some challenges are:

- Fewer Storage Capabilities
- Technology and Skills Gaps Security & Privacy Issues
- Hardware, and curriculums

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