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AR (Augmented Reality) Lens

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Abstract

The term "Augmented Reality" (AR) refers to an interactive environment in which computer-generated perceptual data is used to enhance the appearance of real-worlditems. A system that combines real and virtual worlds, real-time interaction is known as Augmented Reality (AR), which helps people byproviding them with virtual aids. Because it was built for an android, the software runs well. Our initiative is a next-generation learning platform that allows users to engage with the virtual environment. If we point our camera at an imageof medical equipment, the camera will recognize it and offer us the best results, including the device's name, description, tutorial video, and another ideal image. Our primary goal into advance the teaching strategy or platform theproject will improve the learning experience. When the Augmented Reality lens' functionality was tested, it performed successfully. The goalof the project is to have a camera recognize real-world images or items using a raspberry pi that includes the Vuforia search engine, which employs Image Segmentation to find things and provide a description of the current image.

Keywords: Unity; Vuforia; Augmented reality; Lens

1. Introduction

The term "augmented reality" (AR) refers to an interactive environment in which computer- generated perceptual data is used to enhance the appearance of real-world items. A system that combines real and virtual worlds, real-time interaction is known as augmented reality (AR), which helps people by providing them with virtual aids. The above response outlines the steps involved in creating an augmented reality (AR) maintenance checker using Vuforia and Unity for medical machine maintenance checking, AR technology allows for digital information to be overlaid onto the real-world environment, providing a valuable tool for technicians to access maintenance procedures and improve their efficiency and accuracy.

2. Problem statement

Biomedical engineers find it difficult to learn newly launched medical equipments. They are unaware of the working and hardware architecture of the equipments. They need assistance to learn to operate these medical equipments. Itrequires a lot of time and human energy.

3. System overview

3.1. Augmented reality

Technology supporting augmented reality overlay computer graphics visuals on the real environment. This makes it possible to visualize data in-place, allowing, for instance, medical data visualizations to show where they belong in a

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live being. The viewpoint of the observer must be precisely known in order to create this blending of actual and virtual pictures and the positions and forms of the items in the immediate environment must also be saved in the controlling computer. With this knowledge, drawing 3D visuals that are layered on the real- world photographs is a simple application of conventional computer graphics techniques. The difficult aspects are establishing out how to determine the exact the observer's eye movements, which is required for perfect registration, and how to create portable, lightweight, undistorted optical systems.

Figure 1 Augmented Reality Lens

4. Operation unit

4.1. Unity

At the Apple Worldwide Developers Conference in June 2005, Unity Technologies initially revealed and published the cross- platform game engine as a MacOS X game engine. Since then, support for a range of desktop, mobile, console, and virtual reality platforms has been gradually added to the engine. It is particularly well-liked for creating mobile games for iOS and Android, is thought to be simple to use for new creators, and is well- liked for creating independent games.

Figure 2 Unity

Users of Unity may develop 2D and 3D games and experiences, and the engine provides drag- and-drop capabilities in addition to a primary scripting API in C# utilizing Mono for both the Unity editor and games itself. The engine previously supported Boo, which was eliminated with the release of Unity, and a Boo-based JavaScript implementation called Unity Script, which was deprecated in August 2017 following the release of Unity 2017.1 in favors of C#..

4.2. Vuforia

Images, objects, and environments are among the various things and areas that can be tracked using the Vuforia Engine. Utilize this overview to start using the Vuforia features and solution that best meet your needs. The edge- detection method is used by Vuforia. If the high- contrast image has more lines or vertices.

A number of 2D and 3D target types, such as "marker less" Image Targets, 3D Model Targets, and an addressable Fiducially Marker known as a VuMark, are supported by the Vuforia SDK. Through an addition to the Unity game engine, Vuforia offers Application Programming Interfaces (API) in the C++, Java, Objective- C++, and.NET languages. In this

approach, the SDK enables the creation of AR applications in Unity that are quickly portable to both iOS and Android platforms as well as native development for iOS, Android, and UWP

Figure 3 Vuforia Engine

5. Operation unit

5.1. Image segmentation

Image segmentation is the division of a digital image into several image segments, often referred to as image regions or image objects, in digital image processing and computer vision (sets of pixels). The purpose of segmentation is to reduce complexity and/or transform an image's representation into something more relevant and understandable. Image segmentation is frequently used to identify objects and boundaries in images (such as lines, curves, etc.).

A set of segments that together encompass the full image, or a set of contours taken from the image, are the products of image segmentation (see edge detection). Regarding a characteristic or computed property like color, intensity, or texture, every pixel in a region is comparable. The hue of adjacent sections with relation to the same attribute differs dramatically .The contours that are produced following picture segmentation can be utilized to produce 3D reconstructions with the aid of interpolation methods like marching cubes when applied to a stack of images, which is usual in medical imaging.

Figure 4 Image Segmentation

6. Block diagram

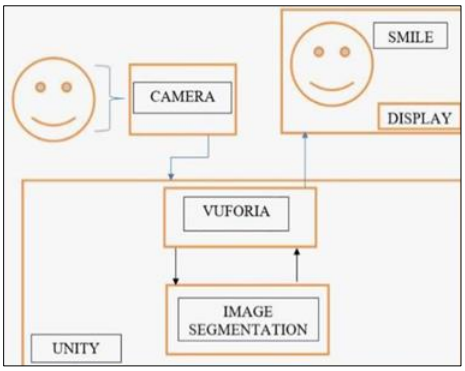

Figure 5 Block Diagram of output

Figure 6 Combination of Vuforia and unity

Limitations

There are still certain obstacles for augmented reality to overcome. People might prefer not to rely on their cell phones, which frequently have tiny screens on which to overlay information. Wearable technology, such as glasses and contact lenses with augmented reality capabilities, will give people more convenient, wider views of their surroundings. Screen real estate won't be a problem anymore. Real-time strategy games may soon be playable on computers, or you may be able to invite a friend over, put on your augmented reality (AR) glasses, and play on the tabletop in front of you.. Too much knowledge is a real possibility. An excessive reliance on augmented reality could result in individuals missing out on what's right in front of them, much as Smartphone and internet addictions are worries. While a tour guide may be able to provide a degree of connection, experience, and personal touch unmatched by a computer programmer, some consumers may prefer to use their augmented reality iPhone applications rather than a seasoned guide. Additionally, there are instances in which a physical plaque on a structure is preferable to a virtual one, which would be available to users of specific technology only.

7. Conclusion

In order to better prepare students for the future, augmented reality (AR) in education includes elements that improve the development of skills like problem-solving, teamwork, and invention. It is also beneficial for conventional schooling that emphasizes technical expertise and knowledge.

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interest among the authors.

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