Books4Geeks

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Abstract

Augmented Reality (AR) is a technology used to add a virtual image or an object onto a real image. It is done with the help of a camera or glasses specially designed for AR.

Keywords- Image Tracking, Marker Recognition, Augmented Reality, Virtual Image Superimposition, Novel, Vuforia, Text Recognition

I. INTRODUCTION

Augmented reality (AR) is a technology by which a virtual image(s) or object(s) is superimposed onto images of real-life objects captured live (in other words, in real time) by a tracking device like the camera installed in mobile phones. The device can also be an optical head mounted display which resembles a pair of eyeglasses. The virtual image that is being superimposed can also be in the form of sound, video or GPS data.

In this project, the author was tasked with exploring the domain of Augmented Reality. The pre-existing knowledge was used to create an interactive novel review system based on AR technology. This project aimed to implement Augmented Reality on novels by recognizing novel's cover as marker and adding the novel's review on top of the cover in the device upon recognition. This way, a person interested in buying or reading a novel could have an authentic review about the novel, and then decide whether to buy it or not. The person will be able to read about the Author, the rating, the publishing date, and the preface of the novel.

II. PROBLEM IDENTIFICATION

Fig. 1 represents the working diagram of a basic Augmented Reality based project.

In this era of digitalization, people prefer reading e-books rather than the traditional system of paper novels. The e-books are considered more interesting as compared to novels. But e-books have some problems too. Firstly, there is constant straining of eyes due to the prolonged use of digital devices like tablets or mobile phones. Secondly, since the e-books are easily available online free of cost, it is demoralising for the author whose main source of income is either the paper-based novel or the paid version of the e-book.

The project aims to motivate the children to inculcate the practice of reading the traditional static paper-based novels. It will give the person a review about the novel and the author and make it easier for the person to decide whether to buy the novel or not.

The purpose of the project was to change the boring story reading practice into an interactive and an attractive experience with the help of the Augmented Reality technology.





III. RELATED WORK

Integrating Augmented Reality into a system is a challenging task since it's a relatively new technology. The following work was studied:

A. A Novel Augmented Reality Navigation System for Endoscopic Sinus and Skull Base Surgery.

To verify the reliability and clinical feasibility of a self-developed navigation system based on an augmented reality technique for endoscopic sinus and skull base surgery. [1]

B. A Novel Augmented Reality System for Displaying Inferior Alveolar Nerve Bundles in Maxillofacial Surgery.

This study aimed to develop a novel registration and tracking technique to establish a navigation system based on augmented reality for maxillofacial surgery. [2]

C. Towards a Novel Augmented-Reality Tool to Visualize Dynamic 3-D Anatomy.

Using augmented reality (AR) to teach dynamic 3-D anatomy may impart better understanding of bone dynamics during body movement. [3]

IV. System requirement

The following hardware and software specifications are required for the project to work.

A. Hardware

The hardware requirements can be classified into two main types: - (1) Android Handset (2) Digital Eyewear

1) Android Handset

The project is currently available only in the form of Android Package Kit (APK). Hence, it's functional only on handset with Android as Operating System. The handset needs to have the following features:

- 1) Functioning camera with 'Autofocus' or 'Touch to focus' option.
- 2) Version of Android Operating System has to be 2.2 or more.



Fig. 2: Android Handset

2) Digital Eyewear

Also known as Optical Head-Mounted Display. An optical head-mounted display (OHMD) is a wearable device that has the capability of reflecting projected images as well as allowing the user to see through it that is augmented reality. [4]



Fig. 3: An Optical Head-Mounted Display

B. Software

The software requirements are the following:

1) Unity 5.3.5

Unity is a cross-platform game engine developed by Unity Technologies and used to develop video games for PC, consoles, mobile devices and websites. First announced only for OS X, at Apple's Worldwide Developers Conference in 2005, it has since been extended to target 21 platforms. [5]

2) Vuforia

Vuforia is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications. It uses Computer Vision technology to recognize and track planar images (Image Targets) and simple 3D objects, such as boxes, in real-time. [6]

V. TEXT RECOGNITION

Text Recognition uses two basic filters:

- 1) Black-List Filters It is used to exclude certain words from being recognized or detected.
- 2) White-List Filters It is used to include or allow certain words from being recognized or detected.



Fig. 4: Steps involved in Text Recognition

VI. WORKING

- 1) The android application is started.
- 2) The application automatically opens with the camera mode on.
- 3) The handset is brought over the novel with the camera pointing towards the cover of the novel.
- 4) The application uses the camera to track the marker which in this case is the cover of the novel (figure 5).
- 5) As soon as the marker is recognized, two buttons appear on the novel. On pressing one of the buttons, the preface of the novel is augmented as shown in figure 7.a and on pressing the other button, the information about the author is augmented as shown in figure 7.b.



Fig. 5: Novels cover as a marker

One boy. One dragon. A world of adventure.

When Eragon finds a polished blue stone in the forest, he thinks it is the lucky discovery of a poor farm boy; perhaps it will buy his family meat for the winter. But when the stone brings a dragon hatchling, Eragon realizes he has stumbled upon a legacy nearly as old as the Empire itself.

Fig. 6 (a): Review to be augmented

Christopher James Paolini (born November 17, 1983, Los Angeles, California) is an American author. He is best known as the author of the Inheritance Cycle, which consists of the books Eragon, Eldest, Brisingr and Inheritance. He currently lives in Paradise Valley, Montana, where he wrote his first book.

Fig. 6 (b): Review to be augmented



Fig. 7 (a): Review augmented on the novel



Fig. 7 (b): Review augmented on the novel

VII. CONCLUSIONS

By analysing the project, the author has come to the conclusion that this project should prove quite beneficial in the real world as it will make novels more interactive and attractive to students. It shall be used in schools, college's libraries and in book selling stores. This project will make it easier for people to decide which novels to read and which to skip, since they would have an authentic review to judge the book. The project has been tested. The time response found was satisfactory.

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