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ABSTRACT

Augmented Reality (AR) is a growing area in virtual reality research. The world environment around us provides a wealth of information that is difficult to duplicate in a computer. An augmented reality system generates a composite view for the user. In this project, we were tasked with exploring present innovations and industry practices in the area of Augmented Reality. This knowledge was used to create an interactive literature analyzer using an AR application. This study aimed to implement Augmented Reality on literature like novels, magazines, children's books by recognizing novel's cover as a marker and to add the novel's details on top of the cover in the device upon recognition. This way, a person interested in buying or reading a novel can have an authentic review of the book 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 book. Also, a Farm Animals children's book is made in which farm animals image is used as a marker and their 3D view is shown. This project should prove quite beneficial in the real world as it will make books more interactive and attractive to students. It will be used in schools, college's libraries and in bookselling stores. This project will make it easier for people to decide which books to read and which to skip since they would have an authentic review to judge the book. Also, the AR 3D models book can make learning fun for children. Today augmented reality has spread its wings not just into gaming but also into our day to day life. From retail business to the health sector. Augmented reality has shown its capabilities and showcased its future scopes to all of us. The future of augmented reality seems really bright. Like any other evolving technology, AR also faces some obstacles regarding technical issues, to social and ethical problems to financial problem. Where none of the issues seems overwhelming. With time, all the technical issues will be resolved and AR will definitely showcase something that would fill the gaps between social and ethical issues too.

Keywords: *Augmented reality, Unity, Vuforia, Mobile application, C#.*

1. INTRODUCTION

Augmented reality (AR) is an imaging technology[1] by which virtual objects are overlaid onto images of real objects captured in real time by a tracking camera. Augmented reality (AR) is a live, direct or indirect, view of a physical, real-world environment whose elements are augmented by computer-generated sensory input such as sound, video, graphics or GPS[2] data.

It is a technology that can enhance visual perception through rendered information generated by a computer. Various applications using AR have rapidly developed in many scientific and commercial fields in recent decades. By overlaying computer-generated virtual objects on the captured images of real objects, AR systems can intuitively provide users a wealth of useful information.

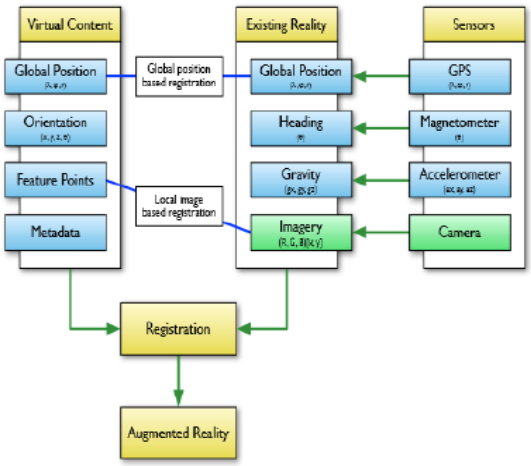

Figure 1: An overview of a typical augmented reality system, where virtual content and existing reality are combined

2. HOW IS IT USED?

Augmented reality is hidden content, most commonly hidden behind marker images, that can be included in printed and film media, as long as the marker is displayed for a suitable length of time, in a steady position for an application to identify and analyze it. Depending on the content, the marker may have to remain visible.
It is used more recently by advertisers where it popular to create a 3D render of a product, such as a car, or football boot, and trigger this as an overlay to a marker. This allows the consumer to see a 360degree image (more or less, sometimes the base of the item can be tricky to view) of the product. Depending on the quality of the augmentation, this can go as far as indicating the approximate size of the item, and allow the consumer to 'wear' the item, as viewed through their phone.

Alternative setups include printing out a marker and holding it before a webcam attached to a computer. The image of the marker and the background as seen by the webcam is shown on screen, enabling the consumer to place the marker on places such as the forehead (to create a mask) or move the marker to control a character in a game.

3. HOW DOES IT WORK?

Using a mobile application, a mobile phone's camera identifies and interprets a marker, often a black and white barcode image. The software analyses the marker and creates a virtual image overlay on the mobile phone's screen, tied to the position of the camera. This means the app works with the camera to interpret the angles and distance the mobile phone is away from the marker.

Due to the number of calculations a phone must do to render the image or model over the marker, often only smart phones are capable of supporting augmented reality with any success. Phones need a camera, and if the data for the AR is not stored within the app, a good 3G Internet connection.

4. WHAT MAKES AR WORK?

The main components that make an AR system works are,

1) Display

This corresponds to head mounted devices[3] where images are formed. Many objects that do not exist in the real world can be put into this environment and users can view and exam on these objects. The properties such as complexity, physical properties etc. are just parameters in simulation.

2) Tracking

Getting the right information at the right time and the right place is the key to all these applications. Personal digital assistants such as the Palm and the Pocket PC can provide timely information using wireless networking and Global Positioning System (GPS) receivers that constantly track the handheld devices.

3) Environment Sensing

It is the process of viewing or sensing the real world scenes or even physical environment which can be done either by using an optical combiner, a video combiner or simply retinal view.

4) Visualization and Rendering

Some emerging trends in the recent development of human-computer interaction (HCI)[4] can be observed. The trends are augmented reality, computer supported cooperative work, ubiquitous computing, and heterogeneous user interface. AR is a method for visual improvement or enrichment of the surrounding environment by overlaying spatially aligned computer-generated information onto a human's view (eyes).

5. PURPOSE OF THE PROJECT

The main objective of this project is to explore present innovations and industry practices in the area of Augmented Reality. This knowledge would be used to create an interactive analyzer using an AR application[5]. Augmented reality (AR) is a live, direct or indirect, view of a physical, real-world environment whose elements are augmented by computer-generated sensory input such as sound, video, graphics or GPS data.

6. ROLE OF SMART PHONES AND OTHER DEVICES

- Smartphones are general purpose devices
- Becoming more accessible and inseparable part of life.
- Kids tend to be attracted to smartphones due to dynamic nature of these devices.
- Smartphones capabilities like camera, better hardware and accessibility can be leveraged to impact children.

7. WHAT WAS ACHIEVED?

- Identification of target animal pictures and rendering 3D animal models over it.
- Displaying informational videos using AR over target animal images.

- Adding virtual buttons[6] in the system for swapping between AR models and videos.
- Building Android platform compatible application.

8. AUGMENTING ON AN IMAGE

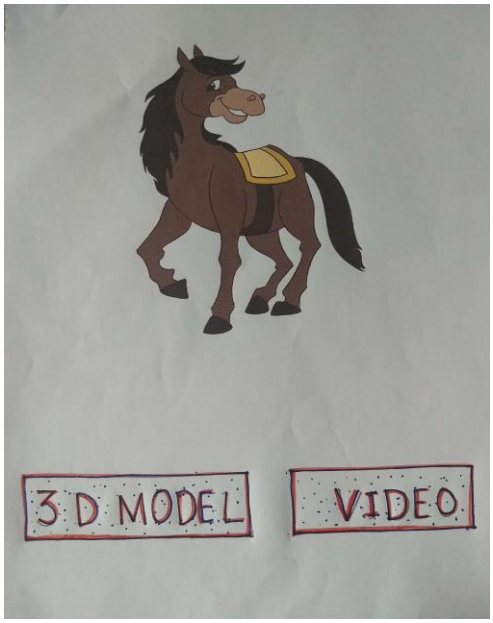

Figure 2: Image as a marker

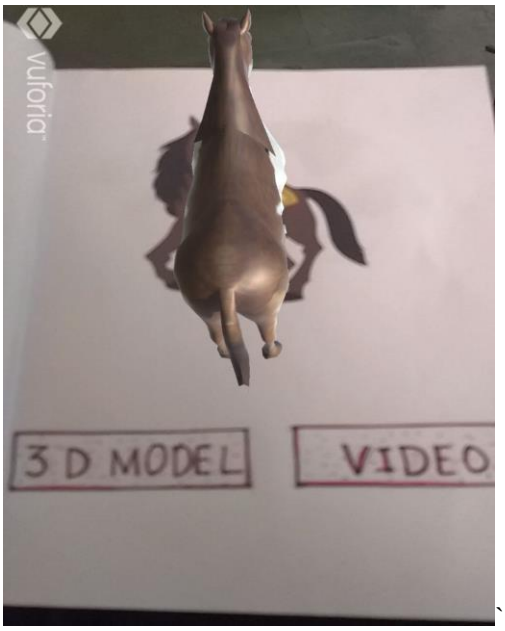

Figure 3: 3D Model augmented on image

Figure 4: Video augmented on image

9. HARDWARE AND SOFTWARE SPECIFICATIONS

- Hardware Requirements: Android 5.0 or above, autofocus camera-enabled smartphone, 60MB+ storage.
- Software Development Requirements: Windows 7 or above, Unity3D[7] editor, vuforia[8] AR engine[9], C# scripting[10].

10. CONCLUSION

By analyzing the project, we have come to the conclusion that this project should prove quite beneficial in the real world as it will make books more interactive and attractive to students. It will be used in schools, college's libraries and in book selling stores. This project will make it easier for people to decide which books to read and which to skip since they would have an authentic review to judge the book. Also, the AR 3D models book can make learning fun for children.

11. REFERENCES

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