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Abstract/Introduction

Augmented reality (AR) is a technology that allows the enhancement of the real world with a computer generated virtual world. This virtual world can be simple or complex, and can contain sounds, images and even interactive virtual objects that appear to be real. Augmented reality allows to enhance our senses and natural perceptions beyond their normal limitations and grant them new abilities. This is a vision of augmented reality which uses a computer to augment and enhance our senses and perceptions of reality. AR would enable us to hear and see things that we could not otherwise, to see and create virtual objects that seem to be real, and access relevant and useful information at the flick of an eye. A lot of classes of potential AR applications can be specified.

Virtual reality can recreate sensory experiences, which include virtual taste, sight, smell, sound, and touch. People gain 70 percent of information by vision, resulting in systems like HMDs that provide the visual component of immersion have been widely used to develop virtual environments. VR provides one of the best tools for accident reconstruction, training and hazard identification by immersing the trainee in an environment that is as real as possible. The use of high quality three-dimensional graphics, sound and dynamic simulation combine to form a uniquely engaging experience.

Methodology

Programming Language Used -> PYTHON 3.7.2
Libraries Used -> i) OpenCV
                 ii) OpenGL

First of all, 2 webcams were fitted on the VR headset to perceive the surrounding environment. They were fitted in such a way that the person wearing the headset gets the right perception of his surrounding.

The input taken was processed through a bunch of codes using Python as the programming language. OpenCV library was used in it. This library was used to put date and current dynamic time on the 3D world viewed through the headset.

Further 3D objects were also added to the real world using OpenGL library. ArUco markers are synthetic square markers composed of a black and white border and an inner binary matrix. They were used to provide a platform to help in rendering these 3D objects to the real world.

Lastly Speech Recognition Module was added to the VR headset . Its purpose was to provide subtitles to the user. The motive of this module was to provide the viewer a way to communicate with the main server while experiencing the augmented world.
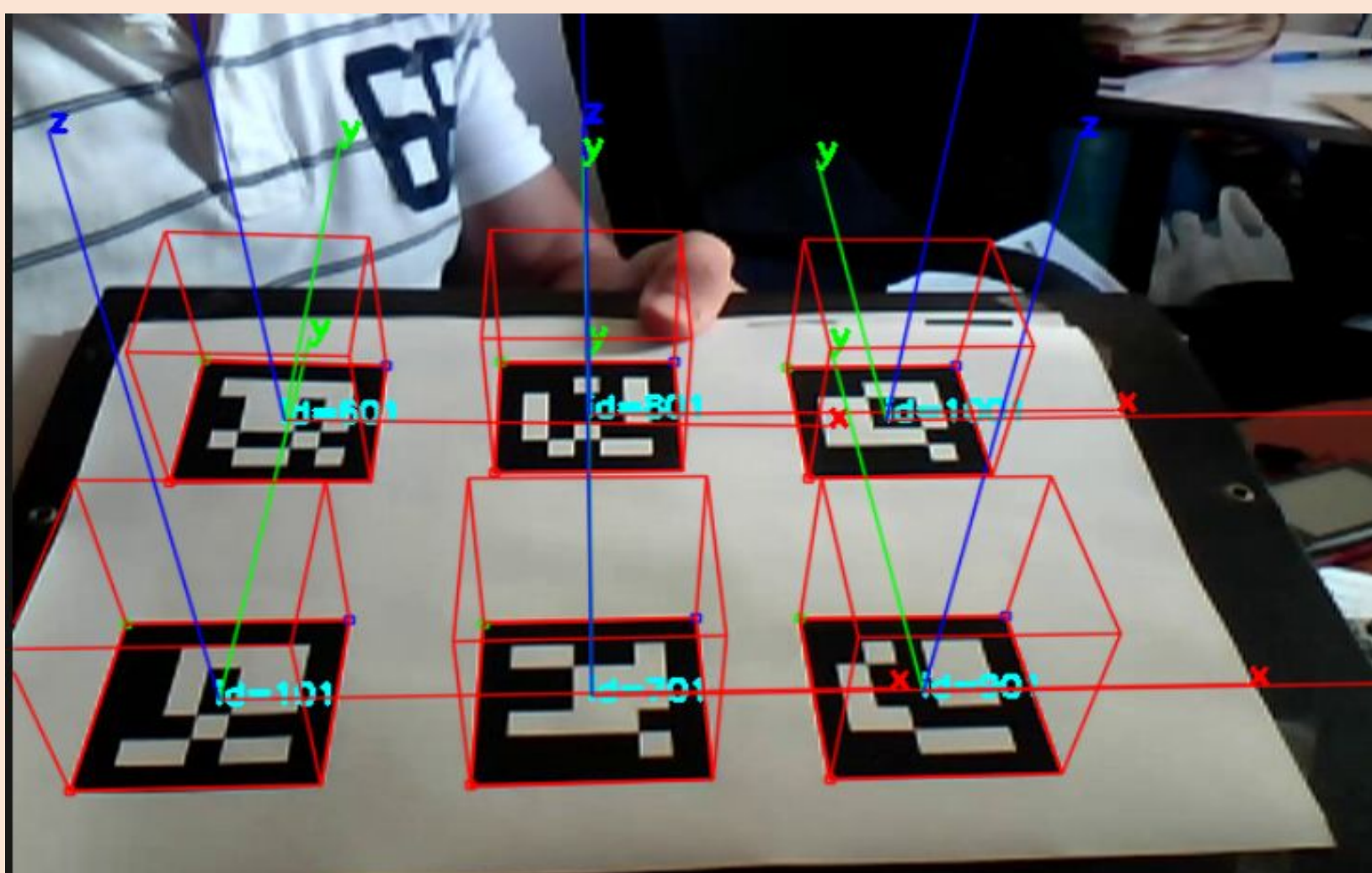
Fig. 3D object creation via ArUco Markers

Results

As a result, we achieved a combination of real world with virtual world thus so called the Augmented Reality.
The 3D objects were detected via ArUco Markers and Speech Recognition Module helped in getting the subtitles displayed.

Fig. Accessing Google Street View inside VR headset

Fig. 3D Animal created on the ArUco Markers

Conclusion

In this paper, we described how to create a basic prototype of Augmented World that could be used to experience our world along with interacting virtual objects in the real time. Augmented Reality is a relatively new field where most of the research have occurred in academic and industrial research laboratories.

Overall, we found that VR headsets are indeed very beneficial - allowing the users to immerse into a near-actual environment. The users were able to interact, identify, and gain an in-depth experience pertaining to construction safety and jobsite management. The application of textures, materials and site development were found to create a life-like feeling. Each participant became physically involved in his exploration, exhibiting natural movements outside of the VR environment. This observation confirms the immersive viability of the VR environment, creating a lifelike reality. There are unrealized benefits of Virtual Reality scenarios, tailored to specific tasks or trades for training purposes. Not only for safety, but the life-like experience of performing tasks in a risk-free environment.

We see prospects for AR in many aspects of our everyday lives and we do hope that someday AR will be integral part of our everyday life.Future work will pursue confirmation of AR benefits for enhance perception of users.

References

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