SCHOOL: SCOPE

COURSE: Computer Graphics and Multimedia.

Course Code: CSE3016

SLOT: C2

PROJECT REVIEW 3

By

Amough Mittal

17BCE0210

TOPIC

AUGMENTED REALITY GAME

(BALL IN A MAZE)

ABSTRACT

We will use UNITY 3D Engine to develop a motion game in AR(Augmented Reality).

The name of the game is Ball in a Maze and in the beginning of the game the ball is placed inside the ball we have to move the ball through Augmented Maze without letting it fall . If the ball falls it respawns from the initial position and we have to start over .

LITERATURE SURVEY

The Literature survey was based upon the articles and journals collected from Various sources.

1. An analysis of each paper has been carefully done with regard to the project, and useful information has been extracted.

2. References for future survey have been saved and studied.

3. Various other fields have been looked into, to broaden the field of research.

4. An interpretation of what is actually the scope of the project, and implementation of Augmented Reality has been studied in-depth.

5. Any scope for improvement has always been kept open.

The Following Journals, abstracts and Research papers have been analysed for the Literature Survey:

1.A Physics-Based Augmented Reality Jenga Stacking Game

Abstract:

In this paper, we present a cross-platform environment in which handheld and desktop-computer users can collaborate with each other in a shared scene to accomplish physically realistic experiences during the course of interaction. In realizing the system, we: 1) exploit client/server architecture to connect user devices, where the server is responsible for maintaining and managing the virtual objects shared by users, 2) build the distributed scene graph structure according to X3D specification for presenting 3D computer graphics, To demonstrate the effectiveness of the system, we developed Jeng AR, a simulation of the well-known tower building game.

2. A dice game in third person augmented reality

Abstract:

We describe a prototype entertainment application of the augmented-reality toolkit based on a fantasy dice game. Two players roll dice bearing glyphs that are interpreted by a computer, which provides graphical and auditory feedback. Our prototype uses entirely consumer-grade equipment: a USB Webcam, a projector, and a 2 GHz desktop with 5.1 surround speakers. Unlike many AR-Toolkit applications, our players are not encumbered by head-mounted displays. Face-to-face gameplay, integrated with the physicality of a traditional dice game, display results on a shared projection screen from a third-person point-of-view. This combination of elements provides a unique application of AR-Toolkit for merging the spectacle of modern video games with a tangible interface.

3. Gaming and Augmented Reality Come to Location-Based Services

Abstract:

Recently released mobile phone services include Foursquare and Gowalla, location-based social networking services with a gaming element, and Metro Paris Subway, Yelp, and Urbanspoon, which add augmented-reality features to local-search applications.

4. Case Studies on the Development of Games Using Augmented Reality

Abstract:

Games have fascinated people in activities related to entertainment, education, health care, etc. The augmented reality technology, using computational support, brings the game from the computer to the user space, making the interaction friendlier. This paper introduces augmented reality and makes considerations on the ARToolKit software, pointing out its interactive processes. The use of augmented reality in the development of games is illustrated by five case studies of games implemented with ARToolKit. The main characteristics of each game and the exploration of the augmented reality resources are discussed.

5. Butterfly effect: an augmented reality puzzle game

Abstract:

Butterfly effect is a 3D puzzle game using augmented reality. The key motivation was to create a game that leverages the structure of the physical world during gameplay without requiring the computer to have a detailed model of the space. The butterflies are virtual, but the space the player navigates is physical. The player travels her environment, collecting the butterflies. For butterflies that are out of reach, the player can rotate the virtual world in 90 degree chunks about an arbitrary axis to bring them to an accessible location.

6. Augmented reality RPG card-based game

Abstract:

Role Playing Games allow users to impersonate characters whose skills are managed through rules and game mechanics. Some popular games use cards where the user summons creatures, spells and other resources for winning the match. An important factor in these scenarios is the player's imagination and the commitment to the role is playing, however, the game's set up require a physical space containing a table for drawing the cards and space for the players. With the spreading of gaming hand-held and mobile devices, the development of RPG card-based video games have been gaining momentum as a complimentary mean for mobile experience the games against the computer or others around the world. Another alternative for increasing immersion can be found in augmented reality where the game cards can be enhanced with compute graphics to boost user engagement and interaction. This project develops an augmented reality RPG game where the cards are the markers, this approach differs from others where black and white markers are used for both the board and summoned cards. From the validation, players found this approach helpful as it provide information related to the creatures and spells for better strategy planning.

7. Research on Augmented Reality Interactive Games

Abstract:

Augmented Reality (Augmented Reality, referred to as AR for short) is one of the research hotspots of many renowned foreign universities and research institutions in recent years. AR technology has a wide range of applications not only in similar application fields to VR technology, such as research and development on sophisticated weaponry and aircraft, visualization of data model, virtual training, entertainment and arts and other fields, but also in medical research and anatomy training, manufacturing and maintenance of precision equipment, navigation of military aircraft, engineering design and remote control on robot and other areas. Besides, because of its characteristic enhancing the display output of real environment, it has more pronounced advantages than VR technology in those latter areas. Interactive games based on AR technology are games of developmental direction in the future. It can unite virtual and reality, which can bring sense of deeper immersion to the players, thus greatly increasing the interest and attraction of game. Such games used in the field of education, compared to the traditional gaming species, will greatly enhance the player's memory, which can better achieve the entertaining and educational effect.

8. Learning through augmented reality mobile game application
Abstract:

In the recent years, mobile technology has been in a growing trend and industry started to look into how mobile applications can assist in promoting education and improves business. School of Interactive and Digital Media (SIDM), Nanyang Polytechnic, as a school decided to look into mobile game development three years ago and added Android and IOS development into the curriculum for the Diplomas. Students are tasked with Client-based Mobile applications for their Final Year Projects and most projects are in periods of 3-6 months duration. The school see potential on projects for edutainment while the technology of Augmented Reality (AR) became a research topic to enhance the user experiment on using the mobile application. The mobile application created

is targeted at young users from ages 7-12 and aims to educate young kids and teenagers how to be responsible pet owners. Through interactive 3D animated characters and games, tips of pet care are presented to the users.

9. Illumination rendering in Game and Augmented Reality

Abstract:

Summary form only given. One of the most challenging task in developing Game and Augmented Reality (AR) applications is to make the virtual environment as realistic as real world. In AR, virtual objects should mixed harmoniously with the real scene. Realistic virtual environment in game and AR systems require sophisticated effects such as shadows, daylight and interactions between sky colours. In this keynote speech, state-of-the-art of illumination rendering in game and AR will be presented. This including trends, challenges and research gap of the future development. Samples will be drawn from research that being conducted at MaGICX and other popular research lab globally. Research and development work in game and augmented reality conducted by our team will be highlighted.

10. Enhancing Traditional Games with Augmented Reality Technologies

Abstract:

Digital technologies are useful to enhance existing traditional games to increase their pleasure. In many games, digital technologies can add special effects to excite a player emotionally. However, the technologies are also useful to help a player to learn complex rules in the games. Especially, traditional games like a poker are not easy to learn for beginners so many recent young people lose interests to play the games. In this paper, we present AR-Hold'em that is an enhanced Texas Hold'em poker game with augmented reality technologies. We also present some user studies showing the effectiveness of our approach.

11. Augmented reality techniques in games

Abstract:

As a consequence of technical difficulties such as unreliable tracking, many AR applications get stuck in the "how to implement" phase rather than progressing to the "what to show" phase driven by information visualization needs rather than basic technology. In contrast, most of today's computer games are set in a fairly realistic 3D environment, and unlike many AR applications, game interfaces undergo extensive usability testing. This creates the interesting situation that games can be perfect simulators of AR applications, because they are able to show perfectly registered "simulated AR" overlays on top of a real-time environment. This work examines how some visualization and interaction techniques used in games can be useful for real AR applications.

12. Augmented reality for board games

Abstract:

We introduce a new type of Augmented Reality games: By using a simple webcam and Computer Vision techniques, we turn a standard real game board pawns into an AR game. We use these objects as a tangible interface, and augment them with visual effects. The game logic can be performed automatically by the computer. This results in a better immersion compared to the original board game alone and provides a different experience than a video game. We demonstrate our approach on Monopoly™, but it is very generic and could easily be adapted to any other board game.

Proposed Methodology:

Import the Vuforia plugin and your image database into Unity.

In the Vuforia folder, click and drag the ARCamera prefab into the hierarchy.

Find the imageTarget prefab in the same folder and drag it into the hierarchy as well.

In the scene, move the imageTarget prefab away from the camera by a few units.

Drag it onto the ARCamera prefab (making it a child).

Using cubes create a 3D copy of the maze on top of the image target.

Make a small sphere and create a new material.

Drag the new material onto the sphere and make it a bright color.

Create a cube and place it above the maze (this is going to be the spawn point for the sphere).

Remove the mesh renderer and collider of the sphere.

Add a C# script to the sphere, call it "ballScript" and paste this code:

```
using UnityEngine;
using System.Collections;


public class ballScript : MonoBehaviour {


        public GameObject plane;


        public GameObject spawnPoint;
```

```
        // Use this for initialization

        void Start () {


        }



        // Update is called once per frame

        void Update () {


                if (transform.position.y < plane.transform.position.y - 10) {


                        transform.position = spawnPoint.transform.position;


                }

        }

}
```
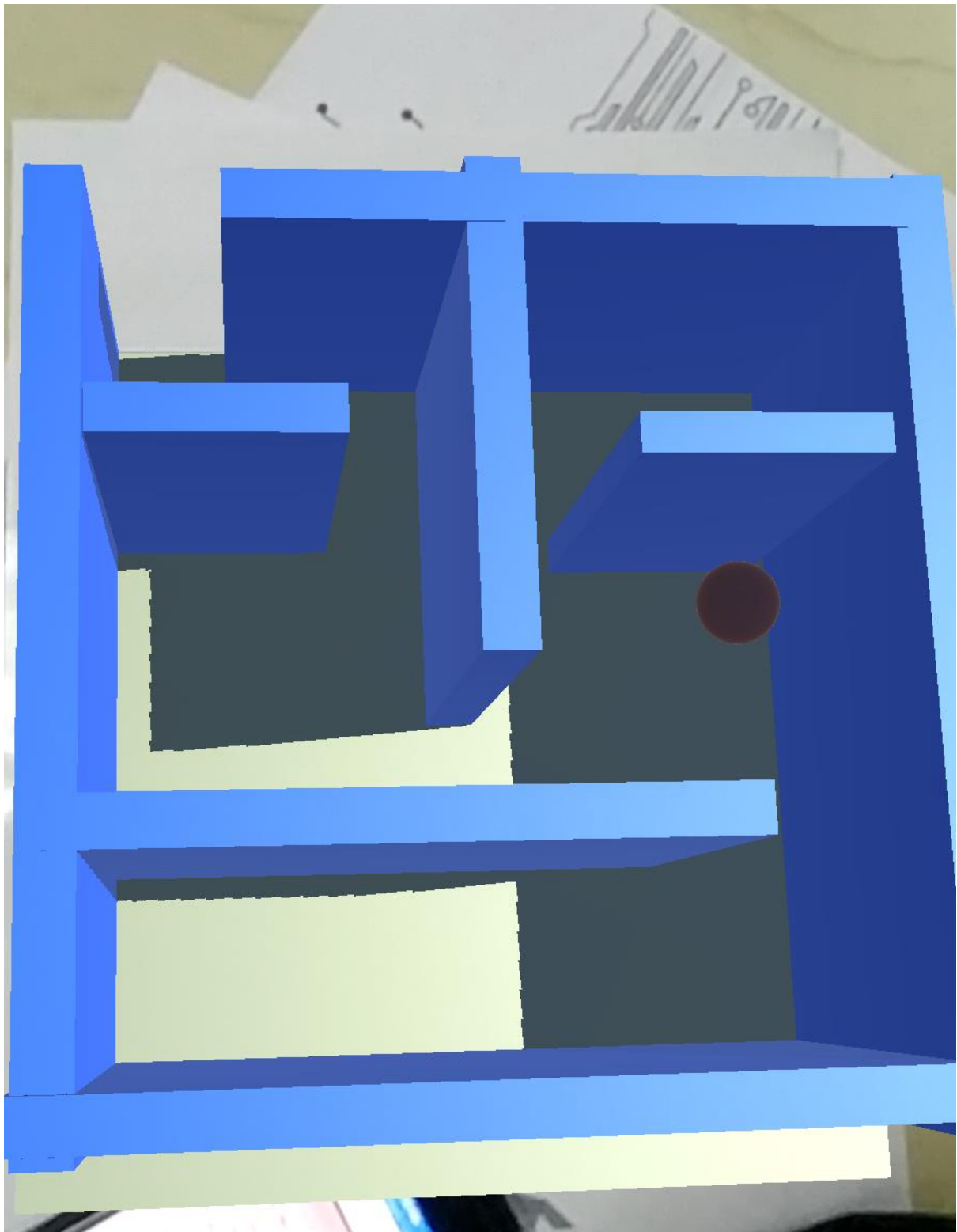
In the scene view, click the sphere, and on the ball script, drag the plane and the cube into their respective places.

In the hierarchy, drag the plane, the sphere, and the cube on top of the image target to make them children.

Click play and all should be well.

RESULT:

RESULT ANALYSIS:

We get a very fun and interesting Augmented Reality Game : Maze In a Ball.

CONCLUSION:

After analysing the above-mentioned papers, we found many merits and demerits for us to use.

MERITS

There were many different algorithms which we found and had to understand to get develop a deeper understanding of our topic.

The main benefit (or merit) which was common to almost all of the papers was that they all started at the most basic and then went to the advanced level.

Apart from all of these merits, there were quite some major demerits in the papers also.

DEMERITS

A very negligible amount of the papers focuses solely on our topic, so we had to read through the a vast number of them to understand our topic better.

Another demerit we faced was the way different papers used different algorithms, and both declaring theirs efficient than others while being published in the same year.

Despite all of the demerits, reading through research papers provided us with a lot of knowledge essential for the successful completion of our project.

REFRENCES:

https://ndl.iitkgp.ac.in/result?q={%22t%22:%22search%22,%22k%22:%22augmented%20reality%20games%22,%22s%22:[],%22b%22:{%22filters%22:[]}}