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Posiball

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Abstract *– Android games nowadays are widely popular for purpose of entertainment. These applications can be also considered as a stress reliever to some users. Nevertheless, some of these Android games are also capable of enhancing human senses such as hand – eye coordination. The proponents developed an Android game called "Posiball", which is an endless game that aims the speed of the user's reaction time through their hand – eye coordination that will enhance their dexterity. Timing and strategy will be enhanced here as well. The game is all about a ball rolling inside an endless pipe and as the ball (player's character) runs, there will be obstacles along to dodge it by tilting your mobile phone up if you want your character to move right and tilt down to move left. Tilting aside, there is also another way to control the character using a thumb stick that can be found in the bottom left corner of your android phone. The character need to maintain its positive score by taking the positive balls, and dodging the negatives. There are also called "red walls" that if the character hits, the game will be over.*

Keywords – *Accelerometer, Android Games, Endless Game*

INTRODUCTION

Computer games nowadays are widely popular for the entertainment they give to the end users. For the past years after the first invention of the first computer games, many more games are created and became popular. Not only just these games provide entertainment, but because games give a big shot to the business industry. And because being a game developer is also a profession where they create games to earn for a living wherein the games they create are being sold in the market.

Computer games require such technology to play. From the first machines that have been invented for the first 8-bit games, where these machines' size are big enough to occupy your room, and through the evolution of technology, the games you play, and the size of the machines/device where you can play these computer games have been transformed.

While the evolution of technology is still on its' peak, from computer games up until mobile phones were created, mobile games have also been one point to consider. The purpose of the creation of these devices is to reduce human efforts and as well as for business purposes. In the present time, not just the popular mobile phone are available in the market where you can play mobile game entertainment, now there are also the x-box, laptops (gaming laptops), but of course the early invention of VR Box or Virtual Reality Box (Ray, 2015).

Of course games aren't just invented for self – satisfaction. They also have benefits to give us. In the recent study of Life Hacks, playing video games is well-known to provide certain health benefits-from reducing depression, to relieving stress and even creating a general good feeling. While this might sound like an outrageous claim, there is lots of available evidence to support it. This has led many to incorporate video games into their regular lives.

Allocating a bit of time to playing games can improve your mental health in a lot of amazing ways. In playing games, one of the benefits is that they improve your mood. There are few better ways to boost one's mood than the feeling of victory that comes with knowing you have finally figured out a difficult mobile video game level and completed the game successfully. This usually comes with games that involve users trying to find their ways around demolishing the enemy's Crown Towers, like in Clash Royale Games, where users have an excellent visual approach and are equipped with great mechanics. In addition, playing mobile games can help to keep anxiety at bay and promote relaxation (Sharif, 2017).

What more can this game apps can do is that they could improve hand-eye coordination. Hand eye coordination is essential, not only for martial arts experts, Katniss Everdeen, or participant of sports in which balls are thrown (which is an awful lot) but for people who wish to carry out everyday tasks from

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writing their names to tying their shoes. Hand-eye coordination is the visual systems ability to recognize and manipulate objects. Video games have been studied for nearly thirty years for their ability to improve hand-eye coordination, and Smartphone apps represent a new generation of hand-eye coordination improvement tools (Dangerfield, 2013).

In this research, the proponents developed an Android game that exhibits the hand – eye coordination sense wherein this game is basically controlled by titling the mobile device to create the left – and – right movement of the object at a constant speed. The objective of this game is to avoid all obstacles while the moving object is travelling at an endless course.

OBJECTIVES OF THE STUDY

The aim of the study is to develop an Android Mobile Game that is named "Posiball", specifically, the study of the following objectives: (1) To create the game's algorithm for the character's control, (2) to Spawn and compute the score for Positive ball and negative balls, and (3) to create an endless road for the game.

MATERIALS AND METHODS

In this study, the developers systematically studied designing, developing and evaluating the algorithms that met the measurement of the acceptability. In order for the developers and researchers to develop a game, the researchers used the Scrum lifecycle as the developmental model

Scrum is a frame work used by teams to manage their work. Scrum implements the principles of Agile as a concrete set of artifacts, practices, and roles. Scrum is iterative. The entire life cycle is completed in fixed-period called a Sprint. A Sprint is typically 2 – 4 weeks long (Boer, 2017).

The researchers read books, unpublished studies, thesis works from the library which are related to the game "Posiball" to gather appropriate information. Researchers also consult their advisers about the game's features. Other information was obtained from related studies and some tutorials in the internet on how to use the unreal engine 4 which was the developers used in developing the game. Most information for the use of game development came from www.unrealengine.com.

The game is single player and has no multiplayer mode so it is not capable for 2 or more people to join in 1 game. The game is endless and offline which means you can play the game without needing the internet. The game can only be installed in android mobile phones with at least 1gb of Ram and an android version 7.0 nougat or higher.

RESULTS AND DISCUSSION

As the researchers work for the game, they have developed the algorithm for the control movement of the character, generation of its' endless route, and the spawning of positive and negative balls as well as their values for scoring. As the player continues to run, there will be obstacles along the route that should be avoided. And there will be score points that will spawn. To have a score and avoid getting hit by the obstacles, the player must avoid those obstacles by controlling right if the player wants to turn to the right side and left otherwise.

As for the character's control, we decided to make use of a thumb stick. The character ball can dodge 45 or -45 degrees while running in a fix speed along the route of the pipe. By taking the movement input, branching it that if it is true, then the condition will execute and that the condition is we would set a desired rotation of the character, and call the **combineRotators** function, and make its rotation in z by our desired degrees for dodging.

The character's rolling area is limited in the height of the pipe where it can move and rolling in the tube is 180 degrees in radius where it can no longer move higher than the half of the pipe. we also set our controller's degrees for if the character can run upside down the route and can turn in a no limit direction, then it is possible that our character can turn backwards or can move 90 degrees or higher and continue to run in a wrong direction that would make the game complicated (see Figure 1).

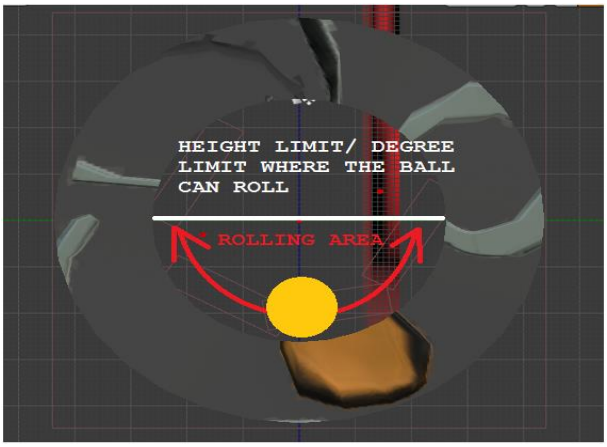

Fig. 1. The Ball's rolling limit area.

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In creating the endless route for the game using unreal engine 4, the proponents first need to consider what kind of shape we need to spawn as our road. In this case, the pipe shape or the cylinder hollow would be a fitting choice. To start with, the proponents created a blueprint class of an actor and that can be named as "Pipetile" and add a scene component. At the same time, we are also going to add a static mesh component and that component will be our road. After adding a static mesh, choose a static mesh of a pipe shape and then we'll proceed. Take note that if we created a pipe shaped mesh, it is on vertical position so we need to rotate it by 90° (degrees) as shown in the Figure below.

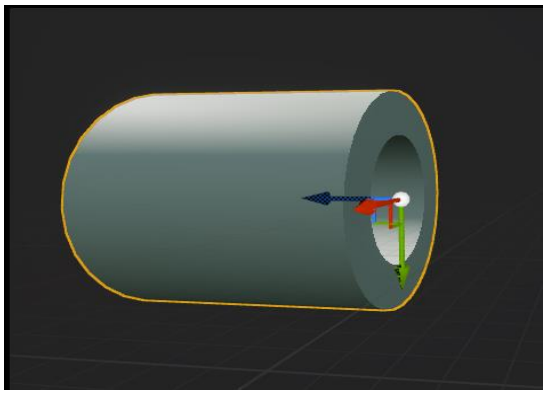

Fig. 2. Actual shape of the course route using unreal engine 4.

Now that the rolling course has been designed, it needs to be spawned endlessly. And to do that, it is needed to add another component to the mesh which is end trigger. Just like the arrow, its location will be placed and the tip of the pipe then the scale and its height and width is placed and set its collision to overlap only pawn. And then create a begin overlap event for this component. In the "On Component begin overlap", it is needed to cast it to run character (which is in this case, the "Ball") and then call the "AddPipe" function and then it is going to have a delay for spawning about 1 second before spawning another pipe and then destroy the first pipetile to avoid game crash since program in the game doesn't want infinite loops. Target must be itself the "pipetile" so that while the character or the player is rolling forward, there will be 10 pipes that will spawn as its ground and then while the player is running forward, the pipe will spawn another pipe every 1 second and that is destroy itself at the other end of the pipe.

Finally, for the scoring, there will be a point that will be added to your score if you hit the positive balls while your score will be subtracted if you hit the negative balls.

CONCLUSION AND RECOMMENDATION

The researchers were able to develop this application by the use of the Unreal Engine 4. The application was developed following the Scrum Methodology which includes the Product Owner, Scrum Master, Scrum Team which includes Product Backlog, Sprint Planning and Sprint Backlog, Sprint Execution and Daily Scrum, The Task Board, Sprint Burn Down, Sprint Review and Sprint Retrospective.

In order to make PosiBall game more possible to create and convincing to play, the researchers added features such as making it an endless game, 3D playing environment, and how the score adds and subtracts during run time.

As a result of the developer's evaluation in designing and developing the Posiball game: (1) The software used in creating the Posiball game is Unreal Engine 4 where it is a complete suite of development tools made for anyone working with real-time technology. Unreal Engine is capable from enterprise applications and cinematic experiences to high-quality games across PC, console, mobile, VR and AR.

(2) In order to implement the controller mode of the game, the researchers decided to use two types of controller where with the use of rotating gesture for tilting to move right and left of the character movement and creating a thumb stick as a substitute controller where the player could choose on what controller are they going to use.

(3) The concept where a pipe will be spawned and another pipe will add into the front and keeps on adding another pipe per second while the other side of the pipe will be removed while the character is moving forward the developers have created an endless route.

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