Original Article

Third Person Shooter Game

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Abstract

Game designing is the art of applying designs, imagination and aesthetics to create games for joy entertainment, education, practice, and experimentation purposes. In game designing, elements and principles are rapidly being applied to many other interactions in the form of gaming evolution. Games have inspired groundbreaking research in artificial intelligence, probability, optimization theory and economics. Applying game designs to ourselves is the present research topic of Meta design. There are many concepts on which game can be developed like Strategic decision making, Develop rules with learning tools, single or multiplayer, storyline and plot, luck and strategy, these can be further developed on a first and third person or 2D basis.

With the increasing global competition in game production, the importance of the ability to generate new ideas for computer game development has become widely recognized. In this context, the ability to actually utilize well-known creative techniques or their adaptations to support innovation in this field is a promising challenge in the field of amusement games. The main goal is to build innovative games that are not identified using the usual methods used to analyze game proposals. We present a case study of developing a basic game that meets the most basic requirements of a third-person shooter.

Keywords- Shooter, TPS, Niagara, VFX, Animation.

Introduction

Video games take us to a mysterious reality that is very different from ours. They allow us to perform skills and fight enemies we never dreamed of. The beauty of the game is that with countless options across many genres, there is always something for everyone. Third-person shooters are one of the most popular genres, and there are many games that are considered consistently good. The shooter is very popular overall, but there is one big difference between the first person view and his third person view. It's visual. In first-person shooters, the camera appears to be the actual character, and in third-person shooters, the camera appears to hover slightly behind the character's shoulders. The third-person genre has been an integral part of video game history, but it has seen significant improvement. Seen through the eyes of a character, first-person games can feel exciting and immersive, but the third-person perspective has something more game-like about it. Seeing and controlling your avatar from above can be an exciting experience, especially in third-person shooters. In the third-person shooter genre, the camera is pulled back so that the player can say, "I'm this person," and see and control that person doing great things. Sometimes you don't want to step away from the action and be in character. Instead of looking directly through the eyes of a video game protagonist, you interact with an on-screen avatar. It's the difference between playing a hero in disguise and fighting with an action figure. The development of game is quite a challenge itself because it contains a lot of things int it. A simple game you find quite a boring contains a lot of work of developers in making it. Like here are some things that should a developer consider while making a game. The game should be platform independent and can run on pc without any other software perquisite. The Third person game can be distinguished from other games as the camera is placed behind the player so that player can see through the environment clearly as well as player avatar. The game consists of different levels and the environment consists of many objects and assets. Assets contains 3D models which make our environment looks realistic and interactive. To increase the difficulty there are a bunch of opposition party or non-playable character acts as enemies that attack our player. As the level rises the difficulty level increases and the damage dealt with enemy bullets also increases. A game menu system is also there which contains to play

the game, and settings menu, in which we have audio and video manage options. To turn on the audio and how much resolution we use to play the game in low resolution. And this is not the end. The game requires hundreds of hours of work and effort and a team is required of large number of peoples who are professional in their work. The professional coders code hundreds of thousands of lines of code. As the technology is advancing very fast the technology which were limited to only games is now used by many industries like film industry, animation, VFX etc. Some games consist of Augmented Reality, Virtual Reality, Mixed Reality by which a player can feel the world of gaming. Third person games focus on mainly puzzles in the game, Role Playing where a person has a avatar and its characteristics, storyline or storytelling with cinematics and cutscenes, and action like we have many examples of games like Tomb Raider trilogy series, Uncharted etc. Online Games also comes in third person genre. But most of them are of only battle royale and esports competitions [1][2][3].

Related Work

Today's gaming market is filled with first and third person shooters such as Crysis, Gears of War and Resident Evil. All these games have a common feature. It tends to have no UI on the main screen, creates different interior and exterior landscapes for realism, and has higher quality graphics.

Sam Hauser is a British video game producer. He is the co-founder and president of Rockstar Games and one of the creative minds behind the great 'Grand Theft Auto' franchise. Grand Theft Auto is a third-person open-world shooter action role playing game with a large city map [4][5]

Sandy Petersen studied zoology at the University of California, and after sometime became interested in video games development. Working on his games, which were primarily first-person shooters, in 1997 he joined Ensemble Studios, where he worked as the chief designer on many famous games like The Conquerors and Age Of Empires [6][7].

Markus Persson is a video game developer from Sweden. He also founded the 'Mojang' a gaming company in 2010. He left the company when Microsoft acquires Mojang in September 2014,. He is the developer of a popular game 'Minecraft', which gained popularity after its launch in 2009 [8].

Ed Boon is a famous programmer who has been developing video games for fifteen years. He is currently working for Warner Bros, Ed is the creator of a very popular game series the Mortal Combat. He was recognized by Guinness World Records as the longest video game voice actor in 2008. He also directed the Mortal Combat X and its next game, Batman game series [9].

Present Vice President of Konami Digital Entertainment and Director of Kojima Productions. He says his Super Mario Bros. game motivated him to become a game developer. His most popular games includes Metal Gear, Snatcher, Zone of the Enders and Lords of Shadow [10].

Gabe Logan Newell, also known as Gaben, is a businessman and president of 'Valve' a video game company. He is also the developer of hugely popular game Half-Life. Additionally, Valve has developed the extremely popular online game Counter Strike [11].

The number of game developers is not limited to only these, there are a lot of people who follow the same idea of game development, but using different storyline, character, player, mod, features and interactivity with the user. The Core concept of the game development is same [12].

Proposed Methodology

Our task is to develop the third-person shooter game which perform the basic movement functions, and held with a weapon which shoots when player fire. A number of enemies will attack on our player [13].

The methodology is as follows as we start with our character, we download a 3D model character which contains bones and a human shape figure. Here we downloaded a waith character which is from the canceled unreal game Paragon. Now we provide our character movement feature. The movement feature allows our player/character to move in the environment freely [14].

We create our environment from megascans. Megascans is a website as well as an application which provides us high quality of 3d assets like leaves, trees, grass, sand, stones etc. It also provide a variety of household assets and 3d textures. Now a days megascans is used in almost all HD games to create realistic environments. For environment we can also download some 3d vfx assets from unreal engine marketplace which provide us a variety of paid and free 3d particle effects assets for developer purpose [15].

Then we move to next part which is to provide the movement animation to our character. With this our character will move with correct foot movement as forward, backward, jumping, and also most importantly the gun aim always point in direction of our aim and front of our player face.

After the animation part is done we move to other part which is shooting mechanism of our weapon. Here we also provide the unreal particle system Niagara. The shooting vfx particle effect when we shot from weapon. Same goes for enemy players.

Now we provide our player a health system. Each time enemy fires at our player Our player health decreases. When it moves to zero our player dies and we lose [16].

Now we already created our own player so its time to create enemy ai. The enemy has its own radius in which when our player enters it starts following our player and attack on our player. This can be done using unreal ai mechanism. Unreal engine provide a lot of features in ai and also in multiplayer.

Now finally we provide our game a win lose condition. When we eliminate all the enemies in the level we display a win message and after five seconds the level will restart. If our player health reaches zero without eliminating all enemies we display lose message and the same level will restart since we do not add any other level. We can make many levels and add them but It also increases the size of game in lots of Mbs and Gbs as the assets size and quality.

Proposed Model

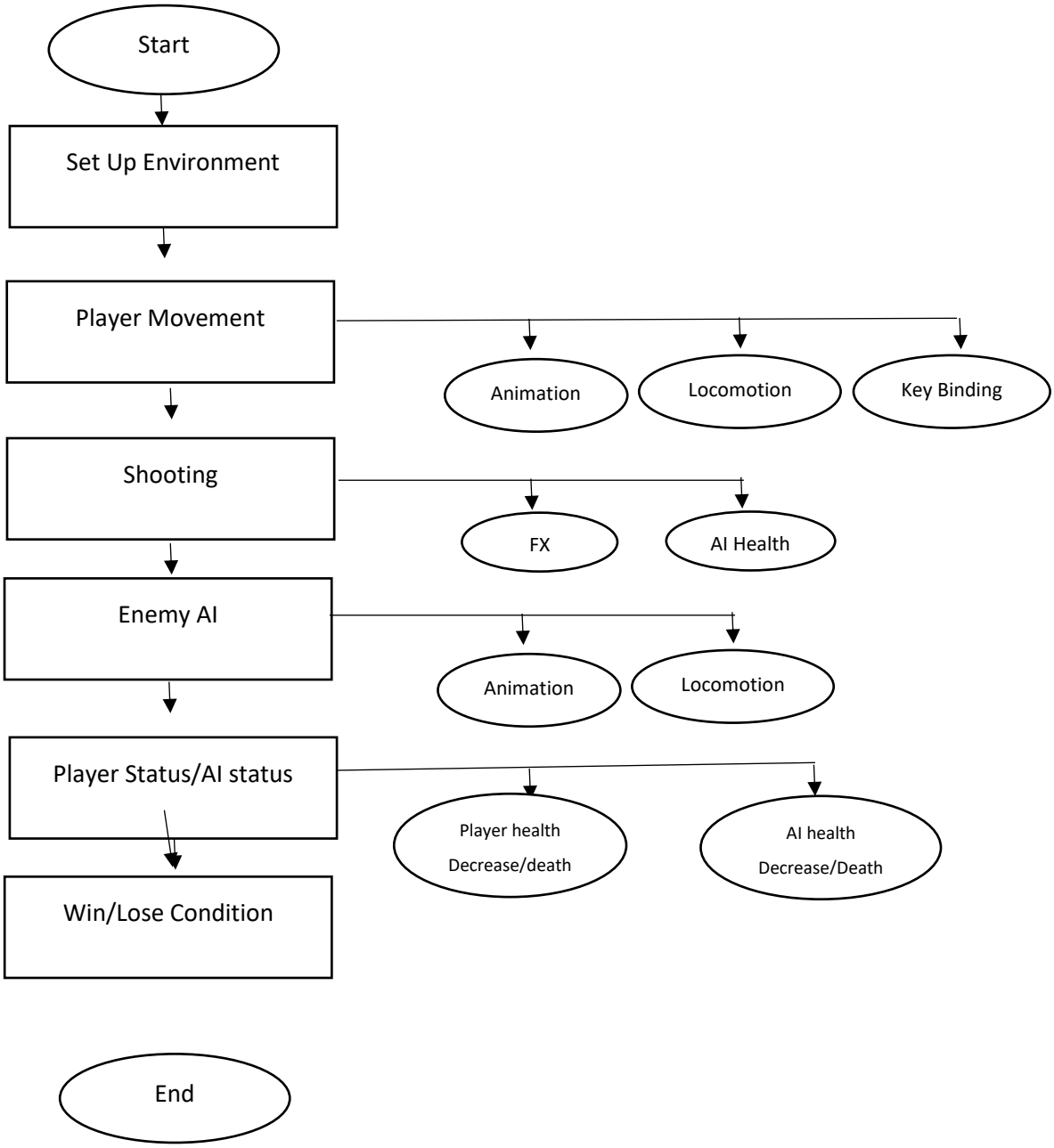

Fig: Major steps in development

Setting up the environment: The first step of the game is to set up the environment. The environment is the first thing a player notices. Its graphics catches the eyes of every person who looks at it. The environment can be made from the scratch or there are free environment available to use on unreal marketplace. In this game the environment is used from the marketplace. Import the environment then open it in unreal editor. It will start rendering shaders and textures.

Player Movement: The unreal engine provides us a default mannequin when we choose a third person template. Now we download the character from the unreal marketplace or we can make our own 3d skeletal model in different software. Here we use free character provided in unreal marketplace. We import the character and then the first thing is we bind the keys. The unreal provides the function PlayerInputComponent which is used to bind the functionality to our input. When we done with this we set up our animation files which comes with our

character by creating our own animation class. Here we set up our animation blending.

Shooting: In shooting we use tracer. Tracer creates an invisible straight line which is used to detect collision. The simple logic here is whenever we click with our mouse. The smoke and spark vfx is shown at the front of weapon, and at the end of the tracer anything there collides with it generates another smoke vfx. If AI is there decrease its health.

Enemy AI: It is similar to our character. But we are not the one who posses it. Its functionality is similar to our character but here we use a fixed distance at which enemy can detect our player and starts chasing us and shoots at our character.

Player/AI status: here we provide functionality when our character gets hit with enemy ai health decreases vice versa.

Win/Lose: We use widget to create a win/ lose pop up screen when our player defeat all enemy or when player dies.

Output screens: These output screens show the final working project output screens. In which we can see the health bar which decrease when our player gets by enemy. The vfx particles of shooting and the winter snow and frozen ice in environment. Other than that our player can navigate through the environment and enemy will attack. There is only one level in which there are two conditions. One when our health bar drops to zero then our player dies and You lose will appear and level will restart after five seconds, the second condition is win condition in which we have to eliminate all enemies in the level then you win message appears and the same level will restart after 5 seconds.

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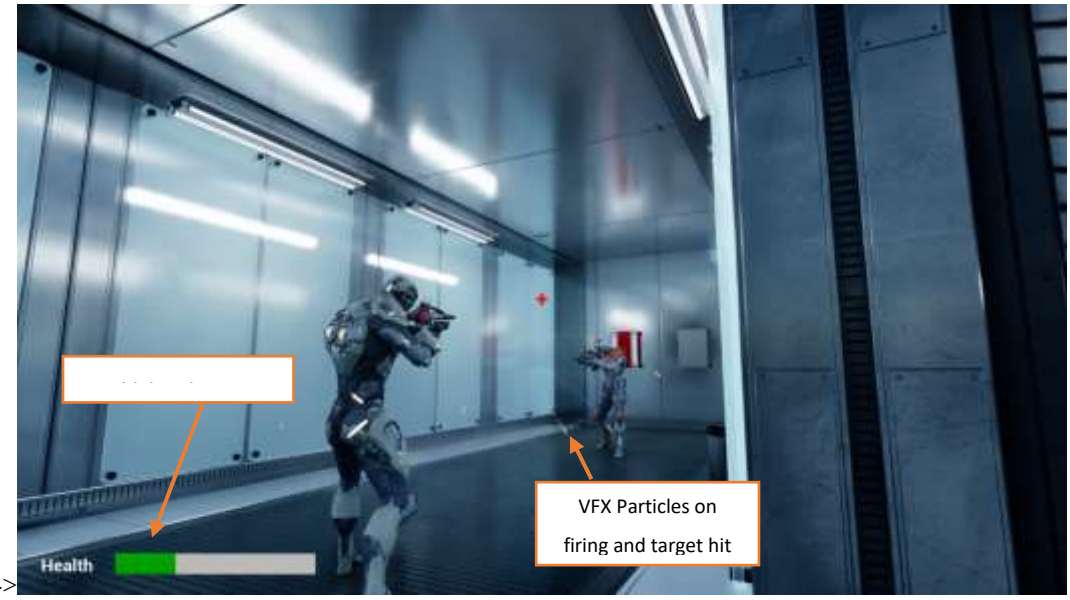

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Experimental Result Discussion

The implementation of a third-person camera can be more complex from a game design perspective than the implementation of a first-person camera. Since you don't see the main character of the first-person camera, but only the hands and weapons, you also need less character animations. The third person camera, on the other hand, requires a complete animation of the character, e.g. for running, crawling, jumping, etc.

The performance criteria of a game can be measured by many ways. Like playing it on the different platforms, disk size requirement, its memory requirements, frame rate etc. Here are the performance criteria of this game.

System Configuration: Windows x64

(The system for which game is developed)

Frame Rate: 44fps

(Frame Rate is typically the frequency at which consecutive images are captured or displayed. The more fps the better is the performance)

Memory Usage: 420mb

(Memory Usage is the amount of RAM used by the Programme)

Hard Disk Size: 1.42GB

(The amount of hard disk size needed for the game to install, it is the size consumed by the files)

Language: English(US)

File Version: 4.27.2

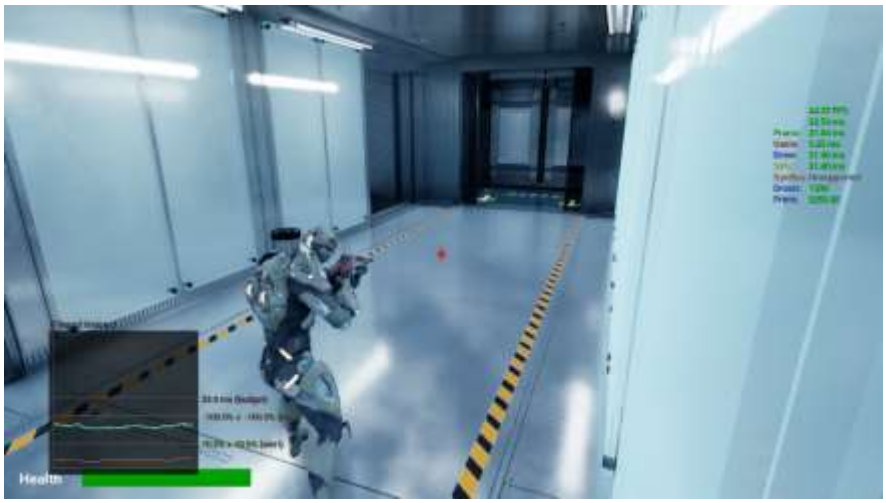
(The file version is same as the unreal engine version on which it is developed which is 4.27.2)

Type: Application

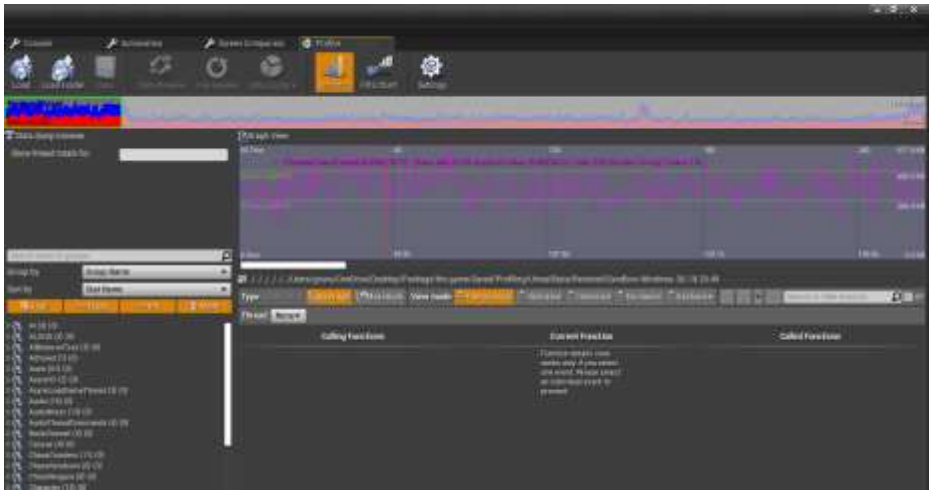
GPU Usage: 1.2GB

(The graphics processing unit(GPU) in device helps handle graphics-related work. The game is tested on Nvidia 4GB 1650 Graphic Card)

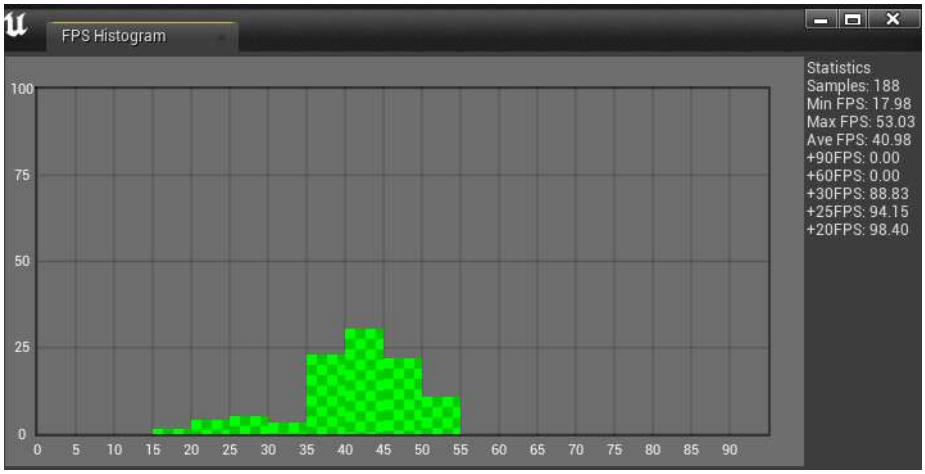
Game Stats:



Live Statistics Graph:



FPS Histogram:



Performance Optimization:

The Performance of the game mainly depends upon the system on which it is played. If the system does not meet the criteria of the game then this creates the problem in loading files and rendering images. The AAA game makers provides all kind of customizable system configuration settings for a low end system to a completely high class gaming system.

This game is tested on Windows 11 x64 with 16GB RAM, 4GB Nvidia 1650 Graphic Card, 60fps display screen, 3ghz frequency, 512GB SSD. The result was the game runs smoothly. While on the other hand when it is tested on System Windows 11 x64 8GB RAM, 2ghz cpu frequency, 1TB HDD. It is found that the game lag when it run.

With this data we can easily say that things which played most part in optimization of the game is the:

Hard Disk: The SSD is faster than HDD.

Graphic Card: The graphic card helps in rendering the high quality textures and images of the game.

CPU Frequency: It represents the speed of the processor. High frequency means fast processor.

Conclusion

As we look into the old records the game development is now is dramatically grown from low level games to high graphics intense and competitive games not only in first person view but also in third person gaming and

others. The improved and better gaming engine provide the ability to develop games easily. There was a time when in developing a game it took a long time of many years, but now it is completely changed we can not only develop games in a short period of time but also the graphic of games is tremendously increased. Not only unreal engine there are many more gaming engine which provides different features. Plus there is a Magascans community which provide realistic texture and environmental assets which makes one's game development journey very easy like drag and dropping. This project reflects the result that a student can also develop a gaming software application for pc. Using just a computer language like C++, Unreal engine and megascans assets library. This game is a simple third person shooter where you have to kill all enemies to win the game.

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