BEARD GAME

05.05.2016

—

TEAM YEN
Navneeth Nagaraj
Yuanqi Huang
Evan White

Background Research and Motivation

When the instructions was given that we need to develop an application considering the demand of the Business, we came up with many ideas such as wanting to develop an application that can be used to make Advertisements, a Fashion application where the users can dress a model to see how it looks that help them in making the decisions on dressing, a Horror game which is very famous now a days in gaming industry, a Puzzle game that helps people suffering from OCD, a Beard game that has the properties of beard in it and many more.

On analyzing the above ideas, we came to know that there are not many beard games in the market and most of the games that are out there are either a 2D game which makes the beard grow by eating some food or is just a beard styling game which is not much of fun. Considering this, we came up with an idea that we want to develop a Beard game where it will have life in it and will have the qualities of the beard.

Then, we started to build ideas on how to develop a beard game that is different and wanted to make it more fun. We then started searching for the qualities of the beard which includes that the beard grows on drinking beer, shampooing it periodically, keeping it hygiene. We also came across that different countries have different type of beards which is famous in that country.

We wanted to develop beards which are famous and looks funny. We then made a list of beards which we wanted to add in our game. Further to it, we wanted to develop a beard game which was more like a horror game since all the members in our team are interested in horror genre. Later, we thought of adding scissors as weapons in the game since the scissors are the most commonly used item to cut the beard.

We also wanted to make changes to the beard for which we decided to set up a barber shop in the game, where the player can change the look of the beard by having more experience points.

We wanted to design a gameplay that will suit for all the users of different age. So the gameplay is more like a beard goes to a far place and stays in a mansion, where after dark he will have a sleep during which he is found in a land where he has to survive other beards and boss. When the beard wakes up, his room will be filled with all the beards he has encountered. The prologue of the game can be seen here: https://www.youtube.com/watch?v=01m4EQBrkPg

While there are so many platforms available to develop a game, we wanted to choose the best one and the one that is easy for us to use, since we are developing a 3D that includes lot of modeling and programming, hence we chose of using unreal engine because it uses the recent graphic options and shader programs along with available abstract of codes. The gameplay consists of day and night variations that similar to that of Dead Island game. The effects in the game were designed by considering the gameplay of Doom, Silent Hill, Dead Island, Dead Space and Quake. Further to the look and feel of the character, we chose to use blender for animation design because unreal engine supports the models exported from blender and we were more familiar with blender. Further, we wanted to add sounds to the movements and other characters for which we have used audacity. We wanted to add the explosion and other effects like impact and birds to the scene for which we have used real time physics particle system concept. The unreal engine provides an in-built particle system which can be modified according to the desired effect.

The game was built from start to end by following the SCRUM technique, which helped us to finish off the game by following the sprints and keeping track of the progress and finishing the intended task of the sprint within the time that we had scheduled. Previously we had not used this technique to develop an application, so we did a background research on the technique to get all the basic principles of the technique. We found that the technique is flexible because of which we were able to self-organize. Its key principle that is “Can change the minds about what we want and need” helped us to finish the project even though we were short of a team mate.

Further, we wanted to incorporate all the concepts that we have studied till now to the game and we planned on how we can achieve this. For example, considering real time physics, where we have studied the soft bodies, rigid bodies, particle system and Collison detection and response.

Technical Details

As discussed above, we wanted to link and develop all the concepts that we have studied and add it to the game. The whole game is programmed in C++ using unreal engine. For the detailed explanation of the code, refer the following site: https://github.com/NavneethRaj/AI-Development

1) Real Time Physics

- **Particle System:** We have added particle system in terms of explosion and impact of the weapon. The birds in the scene is also a part of particle system. The following diagram shows the small and big explosion.

- **Rigid Bodies and Soft Bodies:** We have created meshes for beards and made it Rigid bodies, on the other hand the barriers in the game are soft bodies which can be moved by the rigid body members.

- **Collision Detection and Response:** When the player shoots at the enemy there will be a particle system indicating the shot and this is detected in the blueprint which is coded to reduce the life of the target. On the other hand, the player when attacked by the enemy will have his life value reduced.

2) Real Time Animation

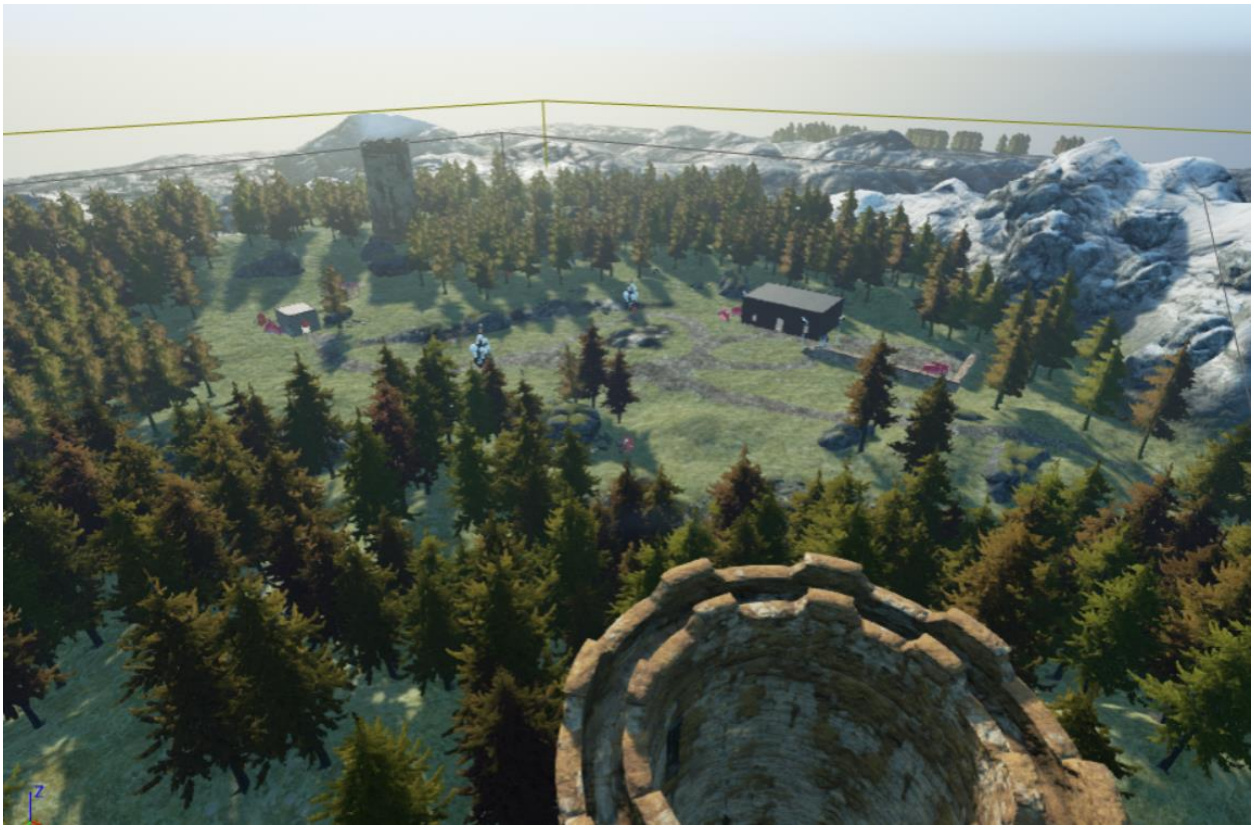
- ❖ Design: Talking about design of this game, few things needs to mention. With help of Blender, 9 different beards have been designed and introduced into the game. All of them are colored and applied materials if needed. The appearance is designed based on image of beards of different countries. Some of the models are rigged and basic animations have been applied on them. All of design are done in the Blender and imported into Unreal engine.
- ❖ For compatibility reason, few efforts had been tried. Coordinate system of models between developing software's require modifications. Still, some animations from blender doesn't work in Unreal. In one word, one should be careful when working with different developing tools.

3) Artificial Intelligence

- The Agents in the game have different behavior such as the boss have higher level of sensing, hearing and attacking power. Few of the bots have sensing level more few have hearing level more. The bots are designed by considering the zombie behavior. The detail explanation of the code and the principles followed are explain in (Section 5 of https://github.com/NavneethRaj/AI-Development)

4) Real Time Rendering

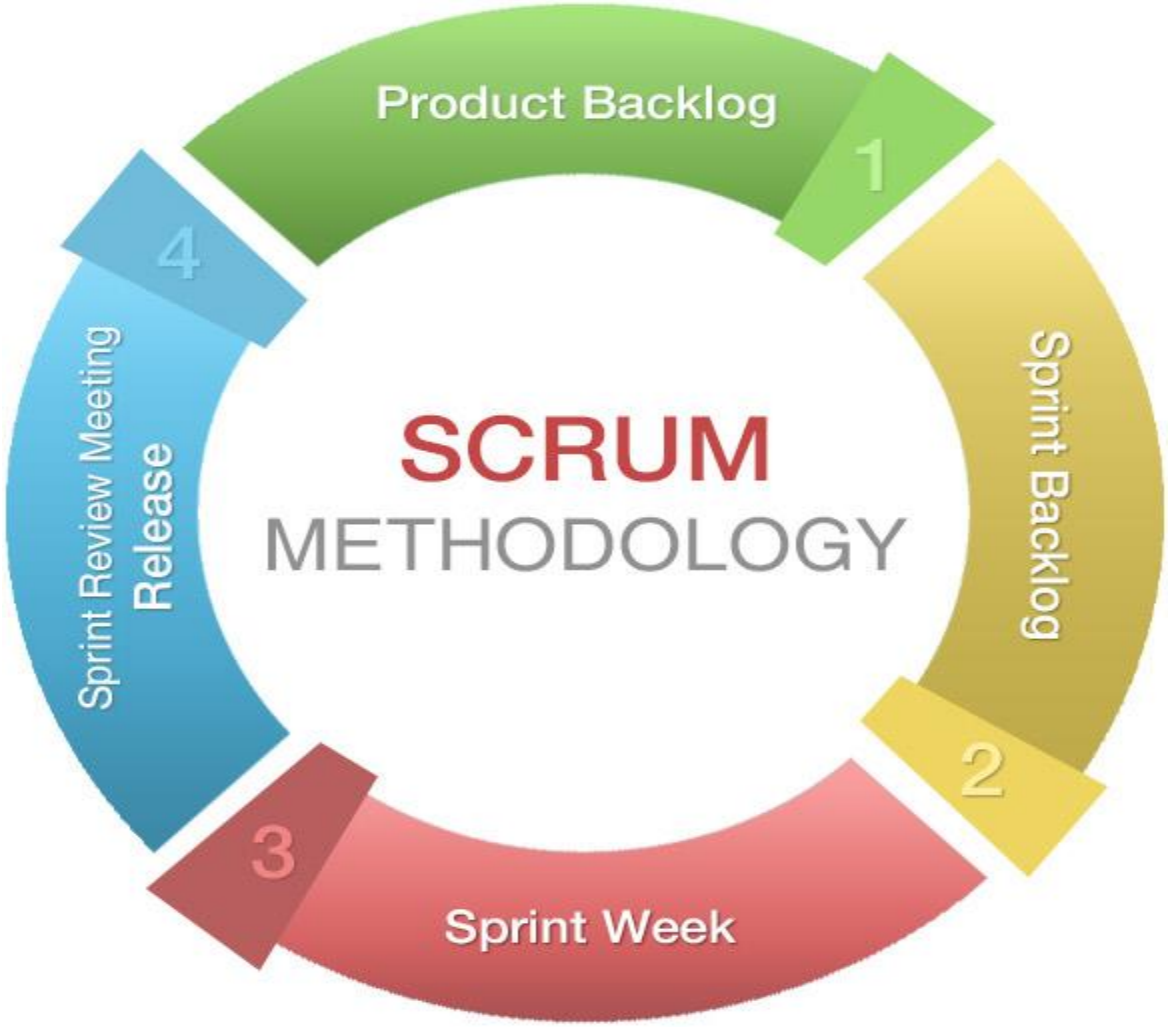
- Shaders: The day and night along with the texture of the terrain with the pixel effects in the game were designed using shaders available in unreal engine.
- Terrain: The terrain was built with the assets and tools available in unreal engine



Overview of SCRUM process

Scrum is an iterative framework that is far more simple and easy to manage change in a software development. Scrum methodology sounds quite confusing but the fact is that it makes change management more organized with less effort. Scrum has a strategy in which a team works in collaboration to meet challenges and fulfill the goals, which helped us to complete even though we were short of a team member. It focuses on physical co-location and close coordination of team members working over a development project.

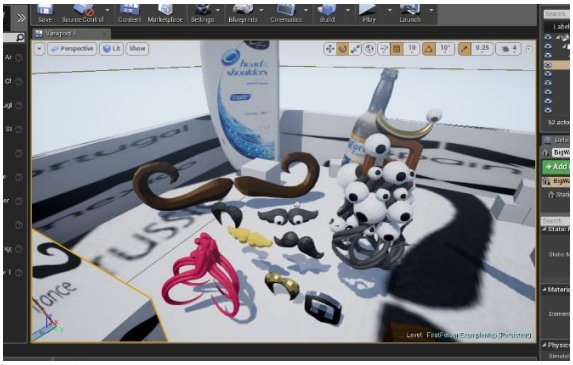
We had planned what tasks are to be completed in every sprint and we were keeping track of the progress of individual by daily 5min talk. The problems that we faced were discussed and used to come up with possible solutions. The changes to be made to the game were easily tackled using scrum process. With the help of Carol's periodic check and guidance on the priority of the work, we were able to complete the project successfully.



Overview of each Team Member's Responsibility and Achievements

Yuanqi Huang's Responsibility: Beards Character Design, Model, Animation, Mesh Structure.

Achievements: 9 beard player characters, Boss character. Character Animation. Object Materials.



Navneeth Nagaraj's Responsibility: Terrain Design, AI development, Character Movements, Character Transformation, Sound Effects, Inventory Options, Menu, Trailer, Shader Changes, Gameplay effects, Environmental Changes.

Achievements: Terrain was designed with high quality assets that is no less than recent games, AI movements of the agents were programmed using advanced principle (Inverse Reinforcement Learning), Character movement is smooth and has good collision impact and response, Character transformation which is import aspect work very well, The Sound Effects which plays a major role in Horror games were well designed and synchronized, Inventory and Menu options were designed to suit the game, Shader changes for fine scale detail were programmed using unreal engine which gave the game more realistic look. Environment Scene has a good graphics quality which has night and day effects.