Bilkent University

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Department of Computer Engineering

Senior Design Project

Project short-name: Planetarium

Project Specifications Report

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1.   Introduction

Global Games Market Report released by Newzoo shows that 2.2 billion gamers across the globe are expected to generate $108.9 billion in game revenues in 2017. This represents an increase of $7.8 billion, or 7.8%, from the year before. Mobile is the most lucrative segment, with smartphone and tablet gaming growing 19% year over year. [1]

The opportunity to reach millions of people through the video game industry has been increasing dramatically in recent years. Our aim is to take a part in this fast-developing industry. In order to catch up the recent trends and new ideas, we have chosen space as our theme.

Since the humanity has always been curious about space and space-related topics since the beginning of the civilization, space is not a theme that can easily lose its popularity. Mankind are programmed to discover and conquer. The domination of planet earth is just the beginning and the era of expansion to the space and beyond is now. This provides a foundation to many discoveries about space to be made so our imagination is the limit to our project.

2.   Description

The game starts with the user picking out a username and a planet type which is based on the type of mine in majorly includes. Then a tutorial which explains the basic functionality of the game can be played but this is optional. After that user's planet will be auto generated and will be constructed with default workers and a default base. The first main objective is to explore the planet, use its resources and develop the base through time. The base will include three quadrants:

-Warfare

-Constructional

-Research & Development (R & D)

Players will be able to advance their current structures and weaponry with the resources they have gathered from the planet. The resources will be gathered by the default workers that were assigned at the beginning and the base will be developed around the default base that was also assigned at the beginning. The resource gathering process will be time dependent and if a worker is designated to gather resources, the worker cannot be later changed to do another task(e.g. worker 1 sent to gather resources, remaining time 1.5 hours, cannot use worker 1 until 1.5 hours is completed)

The structures, weaponry and workers have levels. For structures and workers, leveling up will increase the health of the unit and decrease the time needed to complete a task. For weaponry, leveling up will increase the damage done.

The type of mines are distinct and each has various benefits to different types of weapons, buildings etc. For example weapon "Z" can be only built with the mine "X" and mine "Y" is needed to level up R & D unit from level 19 to 20. This makes gathering mine resources an essential part of the game.

Players will also be able to interact with other players. This interaction can be both beneficial or harmful to each other. Players can share and trade their resources with others in exchange with other resources. Players can even share/exchange advanced equipment like weaponry.

Players can also engage in warfare with each other. If a player decides to engage a battle, he arrives at the enemy planet, the enemy gets a notification

that he is being attacked and if he decides to join the battle he will pilot his mobile weaponry and also be accompanied with the current defense systems that were already built on his planet which will attack automatically. The attacker will also pilot a desired battleship of his own while having a fleet of his own which will also battle with the defense systems of the enemy planet automatically. The players will use the gyroscope of their smartphone to pilot their guns which will create a sense of a space battle.

3.   Constraints

3.1. Economic Constraints

- For Android™ platform , a fee of 25$ needs to be paid so that our application can be published on Google Play™. This payment will be done only once.
- For iOS, a fee of 100$ is going to be paid. This payment has to be done every year so our application can remain on App Store®.
- There will be a need for upgraded versions of engines and tools.
- There will be in-app purchases. App will be free to download.
- A server is required to contain necessary data of the user.

3.2. Social Constraints

- There will be age limit since the game includes violence.
- The application will not have any sort of mechanism that enables negativism while user communication.

3.3. Ethical Constraints

- We will abide by the Code of Ethics[8].
- The application will not distribute any personal user information to the third parties.
- The user will only be able to access their information after a successful authentication.
- User data on our servers will be encrypted.

3.4. Sustainability Constraints

- The application will receive user feedback from AppStore and PlayStore. The team will consider the comments from these source to be very valuable.

3.5. Implementation Constraints

- Our team will use Gitlab for codes sharing due to privacy and use GitHub for documentation.
- Object Oriented Programming paradigm will be used while in development.
- iOS and Android will be main targeted platform.
- The game will use Unity 2017 as the game engine.
- MakeHuman for creating characters and Blender 3D for graphics will be used.
- Firebase will be used to manipulate database, notifications and authorization.

4.   Professional and Ethical Issues

Our game is based on industrialisations, reconstruction of the environment and both physical and psychological warfare. All of these concepts have been controversial for centuries and this may harm the playful image of the game. To overcome this, the civilizations in the game won't include humanity. This doesn't also mean that any type of assail to any type of living organisms is manifested. To make sure our content doesn't create any discomfort for several users, an age restriction of 12+ is needed. For the information privacy issues, all necessary and private information of users are kept confidential with Firebase, so the developers won't be able to gather any of these information.

Additionally, our application will be using login API's of Google and Facebook. In this way, we will be able to manage user information easier and safer, but if user does not want to login by their Google or Facebook accounts, our application will allow users to register using an email and password. For those users, as a future work, a two way authentication system can be implemented.

On top of that, the codes included in the application will either be our development or free source. If the application includes free source code, this will be indicated. Any additional source relevant to the application development will be properly referenced.

5. Requirements

5.1. Functional Requirements

5.1.1. Data Resources

- The application will take games datas from users, city information from a user, fight and trade information from users.

5.2. User Specific Requirements

- The user should be able to choose different planets based on their needs and wishes.
- The users will be able to fight and trade with other users.
- According to their budget, the user will be recommended with different places to visit.
- The user will be seeing the comments made by other users for recommended places and leave comments themselves.
- The users will see the descriptions for reaching their target either on VR view, or on panoramic view of Google Street screen.
- Integrated small games for VR view, like Brick Breaker, will be provided for especially children who will use the application.
- The users will be provided with information on approximate living expenses, and may be able to calculate their own spending during their stay.
- In the future, depending on the contracts between airline companies, users may be able to unlock achievements as they travel more.

5.3. Non-Functional Requirements

5.3.1. Usability

- The game will be easy to use for all types of users and provide a user-friendly and a simple-enough interface.
- The game will provide necessary information on how to use it.

5.3.2. Accessibility

- Accessibility is not a problem for the game because the target audience is smartphone users where number of smartphone users is 2.53 billion.[2]

5.3.3. Extensibility

- The game should be able to include new features with ease, so it would be developed in a way that makes it easy to update.

5.3.4. Portability

- The game should be able to run on different hardware and software platforms, in our case on both Android and iOS devices.

5.3.1. Efficiency

- The application should respond to user and gather travel information quickly while using the least possible amount of system resources and internet bandwidth as possible.

6.   References

[1]https://newzoo.com/insights/articles/the-global-games-market-will-reach-108-9-billion-in-2017-with-mobile-taking-42/

[2]https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/