Run N Jump

CE301 Capstone Project Final Report

By Bartosz Markiewicz

Supervised by Dr. Doctor, Faiyaz

1704256

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Abstract

The Arcade has been called the grandfather of modern video-gaming. The influence of arcade games can be seen even on modern games. The video-game market has been growing rapidly and is projected to continue growing. This had encouraged me to recreate the classic side-scrolling Super Mario Bros experience with my own twist on the formula.

My project goals have been to create a Mario game with light RPG-elements such as friendly NPCs, a text-based story narrative and a basic inventory system. My focus has been on having a working game with collisions, enemy AI agents and other dynamic world features such as unlockable doors. I aim to have it be playable on Windows and Android platforms. For Android I intend to have the game published on the Android Google app store in the future. To create this game, I had utilised mainly the LibGDX Java game development framework based on OpenGL using the Android Studio IDE. I had used TMX tiled maps for the creation of my game levels. Furthermore, I intend to add an online SQL based high-score system for the game to allow the players to compare their score to others. Additionally, I had added a wide range of animations and SFX into the game to give the game a more professional feel to it.

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Literature Survey

Context

The video game industry is the fastest growing software industry segment. [3. p25] Arcade games are not just used for fun. The development of games has often been used by new software engineers as a way to teach themselves computer science principles they can use in all spheres of software development. But it is not just the process of creation of a video game that can have an educational benefit.

Playing a video game can be very educational and useful, most arcade games can be in some way adapted for an educational purpose. Even a simple game like Tetris can solve an educational purpose, at MIT researchers created a web based vocabulary-drill version of Tetris. It works through the use of voice recognition in the form of Web Accessible Multimodal Interface software [4. p4]. The game begins like classic Tetris with a piece appearing at the top of the game board. The twist is that also an image appears every time, if its the first time, the image appears with the corresponding word. If the image is appearing for a subsequent time it appears without the word and this is when the player has to say the word associated with the image out loud to unlock block rotation. [4. p3] Through this the player learns new words and their meaning.

There are limitations to the ability of games to teach, and certainly adding learning to a game can often lead to lesser overall enjoyment of the game. [4. p5] This necessitates the developer to often choose between either high learning effectiveness or fun when choosing how to implement features.

Games with a ‘higher’ purpose besides entertainment are often called serious games. This can be a game with an educational/learning aspect or a game promoting health/therapy. Currently the biggest challenge in developing serious games is the difficulty in assessing weather the game possesses actual learning value/benefit, which is why there is a lot of research going into game related learning analytics. [5. p23]

Design

When designing the product, I had conducted research into game design and have learnt that games are meant to arouse meaningful immersive experiences, furthermore a game consists of various elements such as mechanics, story, aesthetics and technology - these are equally important. Each player’s experience is totally unique. [1. p1] There is a subset of serious games which can be educational, educational games have to be designed properly to incorporate engagement that integrates with educational effectiveness - the challenge for the game designer is in finding a balance between game-play and learning objectives. The goal of a designer is to balance the five elements - flow, immersion, presence, arousal and engagement. [1. p2] If a designer wants to teach something, the learning should impose a cognitive load. If the learning objectives are disconnected from the gameplay the game may fail to produce educationally effective experiences. [1. p4] Additionally the difficulty of the game should be increased when the player is bored. [1. p7] Simply put player engagement is important, the experience of the player needs to be rewarding, non-player characters need to resemble real players as much as possible - since gameplay alongside real player had much higher user engagement. Lastly the game should give feedback to the user to show how he is performing, especially if the game has a learning component. [1]

Games can be fun and educational due to tapping into the motivational drivers of human behaviour - positive/negative reinforcement and emotions. The principles central to gamification and games in general are the MDE framework - mechanics, dynamics and emotions. The types of people involved are - players, designers, spectators and observers. Mechanics are the decisions that designers make to specify the goals and the boundaries of the situation to be gamified. There are three different types of mechanics, setup, rule and progression mechanics. Which are tremendously important for games, setup mechanics shape the environment of the experience. Rule mechanics shape the concept or the goal of the experience to be pursued. Whereas progression mechanics dictate the reinforcements present in the experience - this increases the likelihood that certain behaviours will be repeated in the future. [2]

Summary of Technical Documentation

(link to gitlab detailed technical documentation)

Project Planning

Conclusion

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