

Souls of the Wrath: The VR Game

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Abstract : Educational VR game is designed for Vocabulary building and is implemented to cultivate student's language skills. The proposed framework consist of video game play which is traditionally associated with sedentary activity and is also ubiquitous game play paradigm that encourages users to engage in Vocabulary building using First Player Shooting (FPS). Use of education in VR technology will promote development in VR industry, also provides educational resources and also supports students autonomy learning which rises the idea of smart learning. The feature of providing education in form of VR game will be a key point as application of VR technology in the field of education.

Keywords – A*, pathfinding, serious games, Unity 3D, word prediction.

I. Introduction

The framework will improvise language skills of users and offers a unique structure to complement traditional teaching strategies as well as infuse teaching with energy, spork innovative thinking, also provide diversity in teaching methods. Here, first player will collect different letters by shooting the zombies. The player predicts word using those letters, only the correct word will give bonus item drop to the player, with which players can buy new weapons and move to next level. If the player does not predict word then it has to continue with the same weapon and the level will become more difficult comparatively. Learning concepts become more palatable for students and also supply learners with a platform to improvise language skills through the use of games. This will act as learning trigger including lively learning concept among students.

II. Literature Survey

According to our survey, for pathfinding A* algorithm is a provably optimal solution. A* is a best first search algorithm, it solves problems by examining all possible paths to the solution (goal) for the one that has smallest distance travelled, shortest time and among all these paths it first consider the path that leads most quickly to the solution. The path that minimizes $f(n)=g(n)+h(n)$ is selected, where n represents last node on the path, $g(n)$ represents the cost of the path from the start node to n , $h(n)$ is a heuristic that estimated cost from n to the goal [1].

Unity 3D is a multimedia engine, with following built-in features- materials and shaders, rendering, physics, advanced animations, lighting, audio support, video support, it also contains powerful UI- development tools. Unity 3D has advantage of C# programming language, which may already be familiar to some extent to many new comers. Another feature on Unity 3D is that it supports over 20 platforms that can be from workstations, mobile devices, game consoles, to web applications. It also supports advance graphics which optimizes and utilizes modern hardware to fullest extent [2].

When we apply games and simulations technology to non-entertainment domains it results in serious games. The development includes all application domains : healthcare, public policy, strategic communication, defense, training and education. It also works on human performance engineering as well as game evaluation [10].

III. Methodology

The following concept explains about the AI Agent and Gameplay Metrics.

1.1. AI Agent: How to shoot, shooting angle, how to move, moving direction, distance, power of projectile are easily determined by AI agent. Following flowchart shows the process of determining shooting angle.

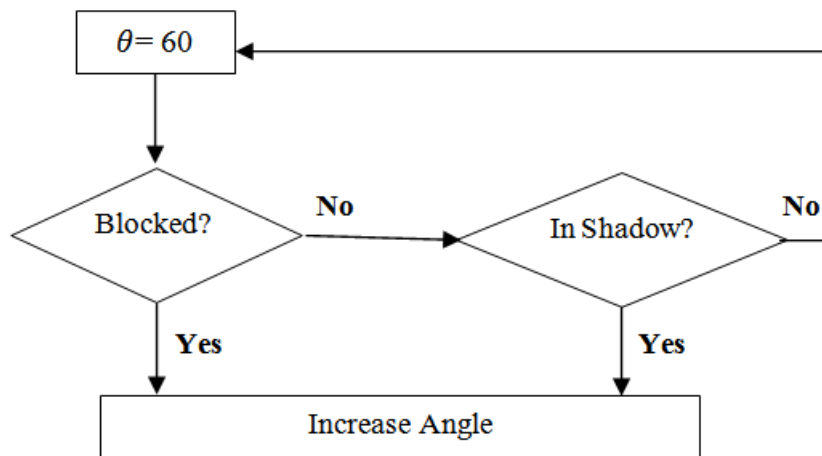


Figure 3.1.a Shooting Angle

Here we set the shooting angle (θ) to 60 degree as default setting. If the Projectile is blocked by the terrain in the raising section, increase θ until the projectile will no be blocked; if it is blocked in the falling section and it may hit the enemy if there is no tiles between hit tile and the tile the enemy lies on.

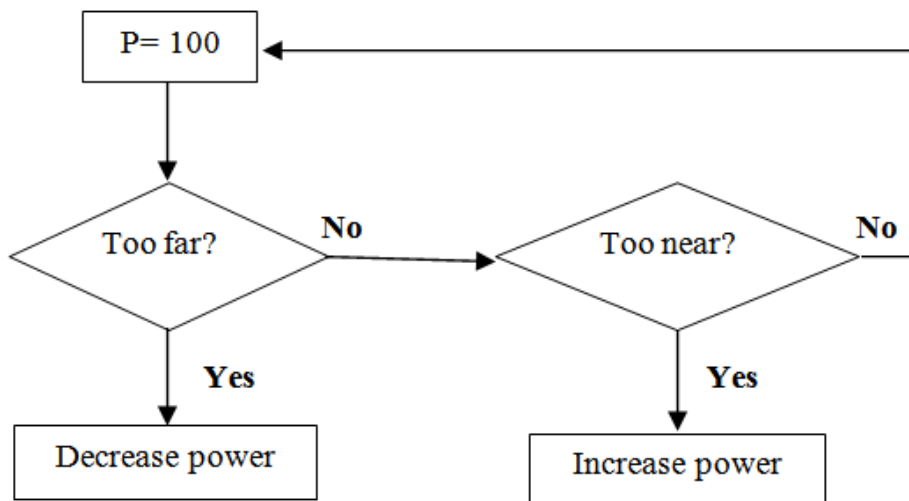


Figure 3.1.b Shooting Power

We set the power of Projectile $P=100$ as default. Decrease P by 1, if projectile flies too far than the enemy and increase P by 1, if it is too near than the enemy.

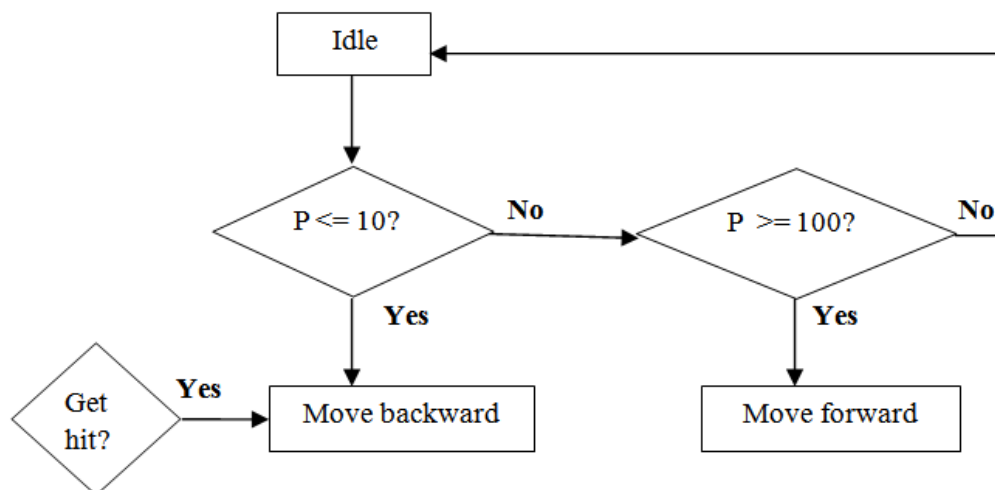


Figure 3.1.c Movement

1.2. Gameplay Metrics: Player experiences are built from gameplay data. The metrics of gameplay in our approach is -the player goes through 5 difficult levels, where the player shoots the zombies and receives drops. From the collected drops the player has to predict the suitable word, which will grant him bonus weapon drops that is required for the survival in the next level. Players receive bonus weapons only when they have predicted the correct word. As the difficulty of each level increases the player is caught in the mist of English words and hence game over. Weapon's hit points are upgraded and the hit point level increases according to the level of zombies. Zombies are AI agent against which players needs to survive as it is motion based VR game, it is available on Google cardboard and Day dream hardware.

IV. Conclusion

We represented a framework that adds user context with serious games in the field of education. We successfully demonstrated that it is possible to design such a framework by leveraging different technologies together and also while having fun through this game we get to learn new words that increases players vocabulary skills. This framework is helpful to any age group and it also utilizes time in a productive manner. VR makes it more interesting and lively classroom type where player will predict words and not just play game.

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References

- [1]. "A*-based Pathfinding in Modern Computer Games" Xiao cui,Hao Shi ; IJCSNS International Journal of Computer Science and Network Security, Vol.11 No.1 ,January 2011.
- [2]. "A Unity 3D Framework for Algorithm Animation" Nicholas Harshfield,Dar-jen Chang,Rammohan ; The 20th International Conference on Computer Games , IEEE 2015.
- [3]. "Gameplay- driven Terrain Generation in Scorched Earth" Quan Yu ,Roger Crawfis ; The 20th International Conference on Computer Games , IEEE 2015.
- [4]. "Designing Serious Games for Safety Education: "Learn to Brace" vs. Traditional Pictorials for Aircraft Passengers" Luca Chittaro; IEEE Transactions on Visualization and Computer Graphics, 2015.
- [5]. "Virtual Reality Game for Safety Education" Ge Jin, Shoji Nakayama; Vol.14, ICALIP2014.
- [6]. "A Pathfinding Algorithm in Real-time Strategy Game based on Unity3D" Jie Hu, Wang gen Wan, Xiaoqing Yu; Vol.12, ICALIP2012.
- [7]. "How to Develop Serious Games for Social and Cognitive Competence of Children with Learning Difficulties" 8th IEEE International Conference on Cognitive Infocommunications (CogInfoCom 2017) , September 11-14, 2017 Debrecen, Hungary.
- [8]. "Intelligent Serious Games System for Children with Learning Disabilities" Ghada A. El Khayat , Tamer F. Mabrouk , Adel S. Elmaghraby; The 17th International Conference on Computer Games, CGAMES 2012.
- [9]. Game/AI, "Fixing pathfinding once and for all", <http://www.ai-blog.net/archives/000152.html>, accessed September 23, 2010.
- [10]. "From Visual Simulation to Virtual Reality to Games" Michael Zyda USC Information Sciences Institute, 0018-9162/05/ 2005 IEEE.