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An Ingenious Game-Based Learning System for Awareness and Prevention of Viruses – "Alive-3D"

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ABSTRACT

As everyone is facing the biggest challenge due to Covid-19, which has affected thousands of lives. Inspired by that, we decided to develop a game based on this where users are civilians and fight against the virus they wish to. There will be options on viruses as the user starts the game by selecting the viruses. While selecting the virus, information related to viruses will be displayed where the user can attain related knowledge to it. As they play, this will also assist the players with information about the viruses that affected people's lives in real-time and create awareness and help save themselves from these viruses. There will be various levels in this game. ALIVE 3D will provide information about viruses and plague without compromising with the aspect of adventure and entertainment.

Keywords : Alive-3D, Covid-19, viruses, epidemic, 3D, game-based learning.

I. INTRODUCTION

Game-based learning has a vital role in today's pedagogy. Irrespective of the domain, learning becomes very easy and understands ability and learns ability in game-based learning. This was the primary motivation to provide information about viruses, their effects, prevention measures, and cure. Game-based learning uses the idea of playing the game and gain specific knowledge and skills along the way and teaches the process of repetition, failure, and accomplishment of the goals which must be achieved. While playing this game, the players become aware of the viruses affecting people and how it is essential to know about them and take prevention measures.

In the current situation, the whole world faces a change in learning paradigm due to pandemic Covid-19, also known as corona virus, which is still affecting thousands of people's lives day by day. Preventive measures should be taken as soon as possible to avoid the worsening of the situation. More awareness should be created and given by all means to make this pandemic come to an end. As online platforms are overgrowing and the game is one of the platforms which can be used effectively to spread more awareness about the virus. Henceforth, project ALIVE was born, which makes use of this platform for spreading information about viruses. It also provides enjoyment, thrill, score, liveliness, and user-friendliness, which motivates the users to play this game, have fun and learn together.

ALIVE a game-based learning system that provides the users a clear idea of various viruses, which is a must. In addition to this, it also provides a basic idea on how viruses are spreading and the ways it has to be treated. The overall perspective is that the learning

happens as the user tries to reach a designated location without getting infected by the viruses. The user has to cross three learning stages. Therefore, creating awareness is attained in all three stages game is not only for entertainment but also it creates awareness.

II. METHODS AND MATERIAL

System design in the game helps to break them down into different modules. The work on each module is executed, and towards the end they are combined. System design assisted in planning on how to do game development and implement it altogether. Based on the selection, the player is taken to a particular screen to continue the game. The system architecture is a conceptual model that illustrates the structure and understandings of the system and helps understand overall system components and how the implementation goes on. In this game system architecture, two-level tier architecture is implemented, as shown in figure 1.

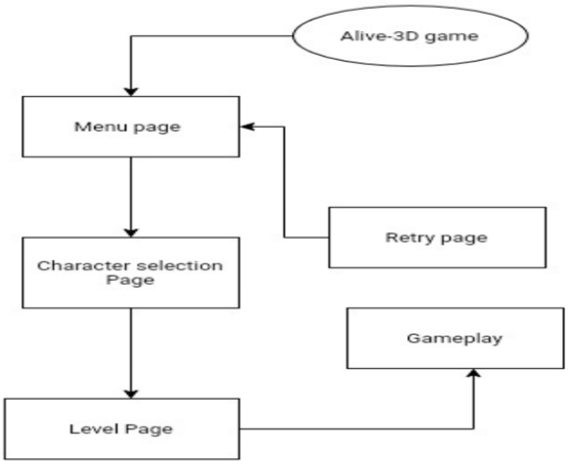

Fig.1 System model of the ALIVE project

The above figure shows that the system model is first based on the menu selection, then it further takes to the selection of character, virus, and level. Based on the selection, the player further navigates to a particular screen for continuing the game.

User interface

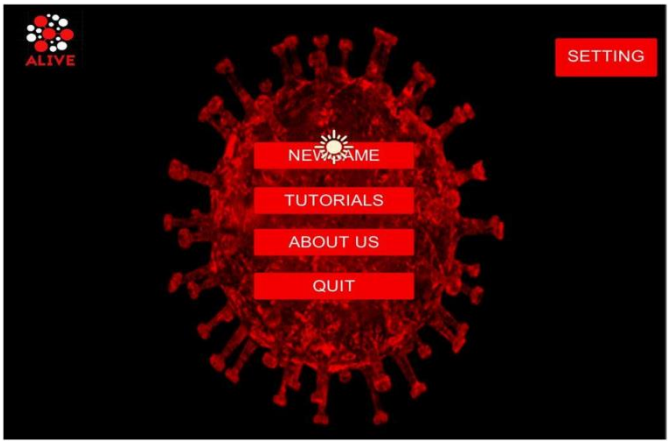

Fig.2 Menupage

It is the main page for navigation between the game play and external factors .

Fig.3 Character Selection Page

It is a page where a user has an option to select the character for the game ,the character can be a boy or a girl

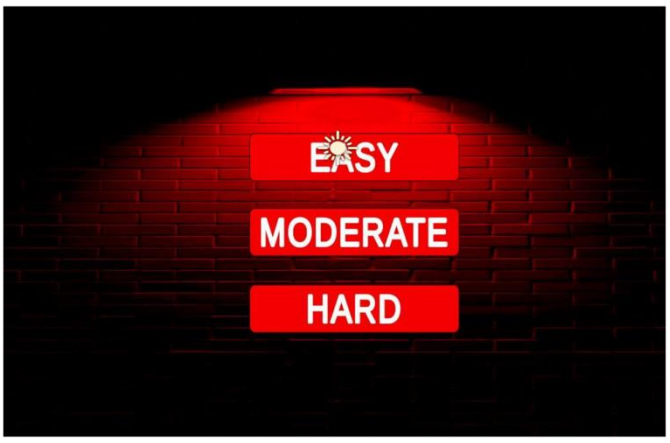

Fig.4 LevelPage

Alive-3D game has three levels easy, moderate and hard.

Fig.5 Gameplay

This screenshot shows the gameplay of Alive-3D game.

Fig.6 Scoreboard

Alive-3D game has scoreboard consisting of damage taken , time taken to complete the game , life left after the gameplay got over and the result outcome of the game.

Fig.7 Virus Selection Page

Virus selection page is a interactive page where the player can select the virus of 3 types .

III. RESULTS AND DISCUSSION

Functional testing in the ALIVE game identifies bugs or errors in the game that the user may experience. This testing was done to determine whether the application is working according to the specifications. The user interface and aesthetics were also examined, as well as game mechanics and stability issues. The ALIVE project also underwent user interface testing to guarantee that the game is user-friendly.

Performance Testing was also done to ensures the software performs properly under its expected workload. It was done to see how well the system performed under different workloads in terms of speed, dependability, and stability. The game's overall performance was examined. The game's speed was optimised through performance optimization.

TEST CASES

SL.No	Module Name	Test Case No.	Test Case Description	Expected Results
1	Checkpoints	TC1	To check the working of checkpoints and correlation ship with each other.	Only after passing first checkpoint the next checkpoint should be visible and should be given message that they crossed particular checkpoint.

2	Checkpoints	TC2	To check the game response when character is moving away from the checkpoint.	The distance bar value should be increased and user should be given a message that they are going away from the checkpoint.
3	Health Bar and Life Bar	TC3	To check the visibility of health and life bar working in user interface screen.	In the user interface, the health bar and life bar should be visible and working based on player and virus interaction
4	Health Bar and Life Bar	TC4	To check if the user is given any caution message when health and life decreases.	The user will be given messages when their health and life decreases.
5	Scoreboard	TC5	To check whether the scoreboard displays accurate results.	The accurate results will be displayed in the scoreboard.

Test Reports:

Sl.No	Test Case No.	Test Status	Test Report
1	TC1	Successful	Fig 8
2	TC2	Successful	Fig 8
3	TC3	Successful	Fig 8
4	TC4	Successful	Fig 8
5	TC5	Successful	Fig 9

Fig.8 TC1 ,TC2,TC3 and TC4

Above figure shows the four test cases mentioned in the table.

Fig.9 TC5

Above figure shows the fifth test case from the table,

IV. CONCLUSION

Alive 3D Game is a 3-dimensional game made with Unity engine. Considering the pandemic situation, to develop a 3D game not just provides entertainment and gives knowledge to the users who play the game was the need of the hour. When the game starts the user while be given a menu page which consists of new game, about us, tutorials option where individual button redirects to its respective pages. A character selection page is followed by virus selection, which has the information about the different viruses. A level selection page with three levels that further lead to the gameplay is based on the selected virus and characters. The gameplay is set is such a way as to reach the final checkpoints without making any sort of contact with the viruses and without getting infected as well. Towards the end, the performance of the player is displayed in the form of a scoreboard. The option to restart the game directly is an added advantage in the game.

Some of the limitations of the Alive-3D game are it does not have a progress tracking option and retrieval of last progress. Apart from that, it is currently limited to PC and did not support the android application. Also, the memory usage is a bit more. Not just that it has the limited number of characters and virus models[11][10], the major limitation is that it is a single-player game, lacks a multiplayer option and has limited stages of each level. Along with all the limitations mentioned above in future ALIVE 2.0, advancement is developed to develop higher stages in each level and increase character and virus selection options, thus allowing players to keep track of progress.

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