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Docile – Game Development Using Spark AR

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Abstract – *Gaming is a key component of the rapidly growing entertainment industry and the need for new stories, new modes of storytelling and game mechanics is increasing drastically. The project game development using SPARK AR focuses on implementing new game mechanics (touchless system) that makes use of the users/player's facial gestures and head movements to control the character or to interact with the environment that the game design provides. The new game mechanics can be implemented in any games that need to make use of the touchless system we had developed, in their game. A game named Docile will be developed which makes use of the new advanced game mechanics. The game would make use of the users front camera for capturing the player's facial gestures and eye movements to interact with the game. The project will be useful for any new developers who want to stand out in the gaming industry as our projects stand out from the traditional gaming mechanics. A well polished and adaptable game mechanics can stand out in the gaming industry and this project can have a positive impact on the gaming industry.*

***Key Words*: Spark AR, Game Mechanics, Facial Gestures,**

1.INTRODUCTION

The recent development in the gaming industry shows that the industry is looking for a new mode of gaming experiences. The recent increase in the users of AR/VR based games is the best example of the pursuit of new modes of gaming experiences by gamers. The game mechanics this project brings forward would be a new addition to the gaming industry and the game we develop as a mode to showcase the game mechanics would challenge, entertain and would provide a new experience to the user. The title of the game is Docile and it is an adventurous puzzle game that makes use of head movement and eye gestures to control the protagonist of the game named Neo. The game starts in a dungeon like environment and as the game progresses the levels will be set in various environments. The game follows environmental-based storytelling, so the player has to observe and deduce what the level and actions of the game are trying to convey to him/her. The challenges of playing the game are quite high as it requires quick reaction and deduction.

2. PROJECT PURPOSE

The project aims to showcase new game mechanics that would be implemented in a story-based game called Docile which is used to showcase the game mechanics. The development will be done in software called Spark AR and the character design and animation will be done using various tools like Photoshop, Aseprite etc. Various Open source components will also be used for the completion of the project. The game mechanics and the Docile game would provide the user with a new experience and challenges.

3. OBJECTIVE AND SCOPE

The principal objective is to create a novel way of accessible gaming, fit enough to put back other conventional alternatives of gaming using 'New Game Mechanics'.The name of the game 'DOCILE' elucidates the ability to accept control and instruction from an external source. But, it's passable to provide the end-user with an astounding virtual experience. The genre of the game is an adventure. This reassures a different perspective for gaming with an experience of freestanding gaming. Facial simulations and eye movement can be used for controlling the central character. The central character of this game is 'Neo'.The entire game encompasses around an interesting plot with 'Neo' as the central character. There is a wide range of possibilities of augmented reality, by this implementation, such a key to this vast opportunity can be found. By making use of Facebook's augmented reality studio 'Spark AR', something exceptional can be pulled off.

4. STORYLINE

The story is set in the mind of a sleeping kid. The kid starts to dream during his sleep and he begins to dream of the scary movies he had seen. As the kid dreams about a particular movie (example: the first level is based on a movie called "The Shining") he keeps on adding other scary movies/scary thoughts which increases his panic and tempts him to scream and be a slave to fear. A psychological concept called associative activation is what makes the kid think about other scary movies when a dream about shining first catches him. Each scary movie may be individually placed or intermixed and that is what makes the level. Hints regarding which movie he is currently dreaming of can be deduced by observing the environment. The player needs to navigate the consciousness of the kid without catching the fear by finishing the game. If the player fails to navigate the consciousness, the kid will scream of fear and will become a slave to fear. The game can also be considered as a casual runner game like temple runner, subway surfer etc.

5. EXISTING SOLUTIONS

5.1 Ingress Prime

It is an augmented reality (AR) mobile game developed and published by Niantic for Android and iOS devices. Ingress uses the mobile device GPS to locate and interact with "portals" which are in proximity to the player's real-world location.

5.2 Temple Run

It is a 3D endless running video game that has many objectives and stores. The level design of this particular game is done in such a way it continues in a loop. It's also a game whose genre is an adventure. The entire gaming atmosphere makes the player explore it anxiously.

5.3 Pokemon Go

It is an augmented reality (AR) mobile game developed and published by Niantic in collaboration with Nintendo and The Pokémon Company for iOS and Android devices. In simple terms, Pokémon Go is a game that uses your phone's GPS and clock to detect where and when you are in the game and make Pokémon "appear" around you (on your phone screen) so you can go and catch them. ... The idea is to encourage you to travel around the real world to catch Pokémon in the game.

5.4 Fast Like A Fox

Fast Like a Fox is a game that lets players control the speed of its protagonist by tapping the back of their phones. It uses your device's internal sensors to detect movement. ... Learn the tapping technique to have the best precision. The treasures of the Golden Fox tribe have been stolen by mysterious minions. You are chosen to return them to their rightful owners.

5.5 Scream Go Hero

Use your voice to move and jump between platforms. The more you shout, the higher you jump. Watch out for pitfalls. It's also different from the conventional mode of gaming as it uses the voice of the player for the play control.

6. MODULES

Project-based on 2D game development using spark AR. The main target is to replace the conventional mode of gaming by composing 'New Game Mechanics'. Individual players can control the game by employing facial gestures, namely eye blink and head movement. There are certain defined modules that are indispensable in this accomplishment.

- Head Gesture
- Blink Gesture
- Timer
- Level and Character Design
- Audio

6.1 Head Gesture

The primary movement of Neo is possible through this module. To make this viable the face tracker patch which recognises the player's face is bridged with the head movement patch. To make the character proceed ahead, the player needs to move his head towards the right. And, to move rearwards, the player needs to proceed the head towards the left. Likewise, the hitch and hike motion can be done flourishingly. Even so, the thing to be perceived is the player's attentiveness while making the movement, a small miscalculation can lead the way to a collision and thence the game may end. So, it utterly pivots on the individual player. This extrapolates the demanding nature of DOCILE.

6.2 Blink Gesture

This is an additional character motion control module. This module deals with jump control that is the upward and downward gesticulation of the character. This motion is controlled through the eye blink of the player playing the game. To make this conceivable the face tracker patch is bridged with the eye blink patch to expose the eye movement of the player. Consequently, when a stumbling block arrives, the player can triumphantly bounce the collision by making use of this blink module. By the same token, with full-on attentiveness, each level can be traversed. If it's close though with the mechanics the challenging nature is not something inaccessible.

6.3 Timer

This module has an unswerving interdependence with the blink module. The timer constitutes a milliseconds timer that kicks off indubitably as the player starts playing the game. Starts from zero and continues till the character hits an obstacle on its way. When a collision is detected the timer is then rebooted to zero and it stipulates the end of the game. The screen tap mechanism is used to start off the entire mechanism either to begin the game or to reboot it once a collision is detected. The head module, blink module and timer module in one piece make all this attainable.

6.4 Level and Character Design

Level and the character design are done in such a way as to cope up with the engrossing game plot. The character 'Neo' is a random one, unescorted by the storyline. As the story recommend acting in accordance with this. Also, each level design is divergent from the other. The entire gaming environment offers the player a puzzling impression. It

creates an unthought terrain, which prompts the player to make headway.

6.5 Audio

The audio is incorporated by the addition of audio playback controllers into the patches. The three audio controllers are background sound, jump audio and the audio while a collision comes off. This specific module is also analogous to the screen tap operation. There's a looping complexion for the audio playback controllers. Subsequently, all the modules put together layout a delightful involvement of the game player.

7. SYSTEM IMPLEMENTATION

7.1 Spark AR

Spark AR Studio is an augmented reality platform for Mac & Windows that allows you to somewhat easily create AR effects for mobile cameras. It is a tool developed by Facebook which allows the user to create the AR effects for mobile which uses the front camera. This studio is fit for both Mac and Windows. It is a platform that creates custom AR effects for the social media generation. It is a good tool for professional creators as well as for personal users. This software enables you to make anything like a face mask, filters, interactive AR games and social media gives it a wide range of audiences.

7.2 Adobe Photoshop/Blender

Adobe Photoshop is software that is extensively used for raster image editing, graphic design and digital art. It makes use of layering to allow for depth and flexibility in the design and editing process, as well as provide powerful editing tools, that when combined, are capable of just about anything.

7.3 Instagram

For the game deployment, Instagram is used here. With the generated link from the Spark AR studio, the game can be accessed using the player's Instagram login credentials. It will direct to the filter zone, where the game can be played.

7.4 Facebook

For the game deployment, Facebook can also be used. With the generated link from the Spark AR studio, the game can be accessed using the player's Facebook login credentials. It will direct to the filter zone, where the game can be played.

7.5 JavaScript

The scripting language used here is Java Script. It is the world's most popular programming language.Java Script is the programming language of the Web and it is easy to learn.

7.6 Ardour

Ardour is a hard disk recorder and digital audio workstation application that runs on Linux, macOS, FreeBSD and Microsoft Windows. Its primary author is Paul Davis, who was also responsible for the JACK Audio Connection Kit. Ardour is intended to be a digital audio workstation software suitable for professional use.

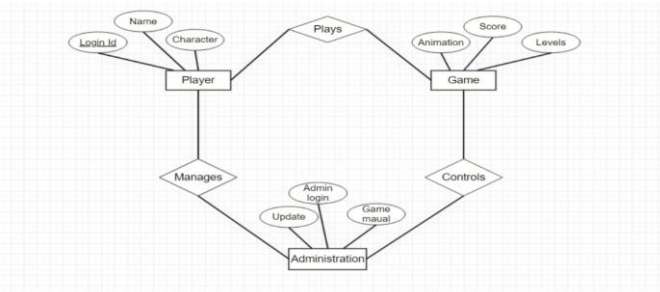
7.7 Audacity

Audacity is an easy-to-use, multi-track audio editor and recorder for Windows, Mac OS, GNU/Linux and other operating systems. Developed by a group of volunteers as open source.

8. SYSTEM DESIGN

8.1 ER Diagram

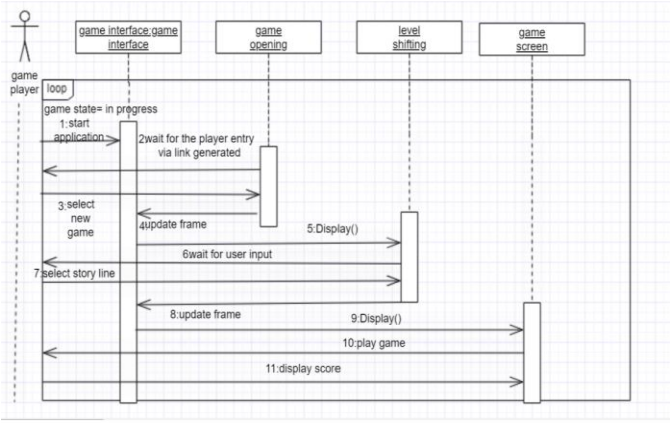
The entity-relationship diagram depicts the basic structure of the database we use in our system. The ER diagram for our proposed system is given in the figure, which shows the relationship between the entities of our system. We have three entities in our system which are player, game and admin. Basic information like name, login id which is a unique key, name and the main character in the game are the attributes of the player. Similarly, in the case of the game we have the levels in the game, the score obtained and the animation. The admin contains the admin login the updations regarding the game as well as the game manual.



8.2 Sequence Diagram

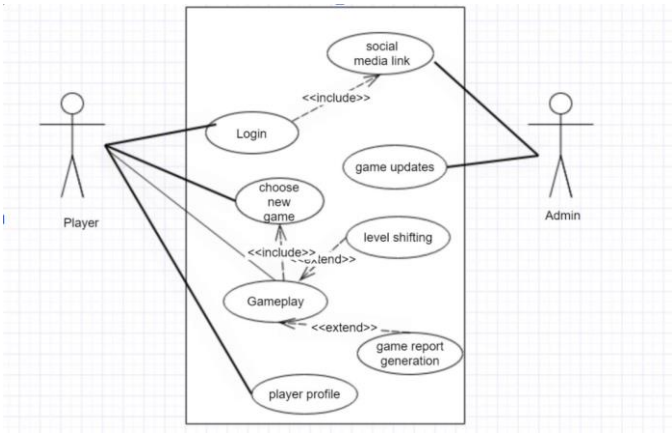
The sequence diagram represents the sequential flow of the game we are developing. The Sequential diagram of our proposed game is shown in the following figure. The entire system is within a loop box. When the player wants to play the game he enters this loop. Once he fails he will be again redirected to the start point and make a new start. First comes the game interface, where verification and login are

performed. After successful verification and selection, the game screen is displayed. Once the game is started the level shifting is done through the level shifting module. The final score will be displayed on the screen.



8.3 Use Case Diagram

The use case diagram given in the figure, for our proposed gaming system is described as follows: There are two actors player and the admin. A player plays the game and the admin has an interactive functionality with the player. Authentication of player details by the admin is the initial step. After which if it's valid, the user or the player can choose a new game and start playing. Game report generation and level shifting are all performed on the admin side.



9. RESULTS

9.1 Head Movement and Eye Blinking

The patches for the head movement is connected with the game character and is successfully moving with respect to the movement of the head (left to right) also, the blinking will help to move the character up and down. When the character will collide with the obstacles and return to the first level.

9.2 Score and Timer

The JavaScript is used to update the score when the character passes each obstacle successfully. The script is also used to build a timer to know the time played. Both the score and timer have worked successfully.

10. CONCLUSION

Implementing the game mechanics that can be integrated into any future game that wants to make use of the game mechanics implemented in Docile. Develop a Dungeon crawler game that is similar to games like Sekiro and Hotline Miami.

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