

Intelligent Gameplay for Improved Retro Games

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Abstract—In the wake of increasing nostalgia and the success of retro-compilations in the sixth and seventh generations of consoles, ‘retro gaming’ has become a motive in modern games, as well. The goal of this project is to remake and improve a classic puzzle game with intelligence gameplay element and better graphics for Android users namely “Coins Wipeout”. The development of the gameplay intelligence will involve the use of a game engine – where three *game mode* are introduced; “Qualifier”, “Knockout” and “Wipeout”. The success of the project will surely contribute in success of retro games industry.

Index Terms—Retro Gaming; Intelligent Gameplay; Android.

I. INTRODUCTION

“Coins Wipeout” is a standard puzzle game inspired from an addictive game back in the 90’s; “Lose Your Marbles” by Sega Soft Inc. or SEGA (1995). The game concept is user play versus the computer or a friend, and the objective of the game is user have to keep the board clear of coins while their opponent tries to do the same. When a game is started, coins of 5 different colors are already placed on the board. User must align coins of the same color in the middle row (called the Wipeout Line), either in groups of three, four, or five, for them to disappear. As the coins are cleared, user will receive bonuses that effect their opponents by adding coins to their board, and vice versa. There are three skill levels to choose from. In each level, user move on from one difficulty level to another, while facing more challenges.

However, there are few major drawbacks in this classic game. Firstly, the graphics quality is not very satisfying, the welcome screen is quite dull and the game menu screen is not user friendly. This is a problem nowadays since users prefer more attractive and interactive game menu screen. The gameplay is also not very challenging, thus users will get bored after playing few times. In addition, the original game has been discontinued by the developer. Thus, the proposed game is to be built to overcome all the drawbacks and provide user a game full of entertainment. The proposed solution involves use of a game engine, Unity3D to assist in building the game with better graphics and improve the overall quality of the project. Imagine playing a classic game (retro game), where we like the concept of the game however the graphics are not very satisfying. For example, the user interface is not very attractive; game menu screen color is very dull. In addition, the difficulty level of the game is not too challenging, making us lose interest in the game after playing a while. Furthermore, the game is only for personal computer (PC) use and not available in mobile mode, thus we are not able to play it anywhere else but on our PC. The

classic game has also been discontinued by the original developer (SEGA) thus it is not accessible to users now. Hence, this project is proposed to overcome the problems mentioned above. The remake of the classic game is expected to provide a better gaming environment to the retro games and also provide a new type of gaming sensation to the current generation.

This project is driven by three main motivations; 1) to provide mobile (Android) users a pulse-pounding excitement and strategic challenge while improvising their problem solving skills, 2) to dedicate efforts to bring back an addictive game back in the 90’s with improvised graphics and gameplay and 3) the discontinuation of sales and support of the original game “Lose Your Marbles” by the original producers (SEGA). These motivations lead to the objectives of this projects – 1) to provide a mobile game for android users with more consistent and user-friendly user interface, 2) to improvise gameplay by providing/inserting artificial intelligence elements through varying intelligent gameplay modes and proposing reward method for users based on user scores and time, and 3) to provide online multiplayer mode. The proposed solutions are focus on 3 major issues; 1) artificial intelligence elements in the gameplay – features bonus rounds to improve the gameplay and provide user different types of rewards that can be claimed from time to time, 2) graphics – the use of modern art to provide user new, fancy graphical user interface (GUI), and 3) online multiplayer – enable user play online with friends. The majority of work in this project will be to produce an enjoyable game for the mobile users. Besides that, the retro gamers can also enjoy the game since it is a remake of a famous classis game back in the 90’s. Should this end be achieved the project will be considered a success. The use of game engine surely provides a huge advantage to the remaking of this game. With a successfully completed game, the strengths and weaknesses of the different aspects of classic games remakes which are explored will be examined from the perspective of mobile game development and deployment.

II. BACKGROUND AND RELATED WORK

“Lose Your Marbles”, is a discontinued, fast-playing puzzle game from Sega Soft Inc. (SEGA) created back in the 90’s (1995). It offers hours of habit-forming, shameless fun for any PC user looking for a break. Not only user can play against the computer, the game also offers user to face off against a live opponent at the same keyboard. Even the game supports LAN play but it lacks Internet competition. An even bigger fault is that it makes you start at level one with each new game; there's no way to restart at higher levels once you've reached them.

System requirements for “Lose Your Marbles” include an IBM PC or compatible with 60 MHz processor, CD-ROM, Windows(r) 95, 1 mg video card, 8 mg RAM and DirectX 3.0. Sega Soft Inc., was a joint venture by Sega and CSK, created to develop and publish single-player and multiplayer games for the PC and Sega Saturn and was founded in 1995 and lasted until 2000. It develops interactive software and content for PC's and the Internet.

A. Current technologies in game industries

There are a lot of match-three puzzle games available in gaming industry in current times. For example Cookie Jam, Disco Ducks, Forest Mania, Fruit Land and many more. However, there are two games that are famous and largely in demand even until now; namely “Candy Crush Saga” developed by King (2012) and “Bejeweled Blitz” by Pop Cap Games (2010). The state of the art technologies used by current game industries can be divided into three categories which are graphics development (Table 1), artificial intelligence (Table 2) and online multiuser mode (Table 3). This two match-three puzzle games are compared in this project according to the three categories mentioned above to determine which current technologies suit the proposed mobile games the best.

Table 1
Differences in graphics development between “Candy Crush Saga” and “Bejeweled Blitz”

| Properties | Candy Crash Saga | Bejeweled Blitz |
|------------------------|---|--|
| Interface | Consistent theme, color and fonts. Story narration. | Consistent theme, colour and fonts. No story narration. |
| Graphics and animation | Intuitive, colorful. Uses curvy shapes. | Modern, dark colors. Uses sharp shapes. |
| User types | Children. | Adult. |
| Game interaction | Motivate user by showing their friends positions and scores on game map. | Motivate user by showing their friends position and scores on scoreboard. |
| Target Score | Provides user information on target scores during game. | No target points during game, accumulation of points only. |
| Feedback Mechanism | Candies light up, has a circle around it before it is swiped. No hints provided. Voice over and sound effects for user actions. | Red square highlights the selected jewel before it is swiped. Hints provided. |

Table 2.
Differences in artificial intelligence between “Candy Crush Saga” and “Bejeweled Blitz”

| Properties | Candy Crash Saga | Bejeweled Blitz |
|-----------------------|---|---|
| Objectives | Varies each level. | Obtain highest score. |
| Continuation | Linking levels using map. | Linking levels by using badges collection. |
| Time Limitation | No time limitation. | User required clearing all jewels in given time. |
| Bonus/ Extra Features | Special candies, special shape of matching candies. | Unlocked by collecting and accumulating points from time to time. |

Table 3
Differences in multiplayer mode between “Candy Crush Saga” and “Bejeweled Blitz”

| Properties | Candy Crash Saga | Bejeweled Blitz |
|------------|--|--|
| Connection | Through Facebook. Users cooperate, help and compete against each other. | Through Facebook. Users compete against each other. |

B. Artificial intelligence (AI) elements in current game industry

In “Candy Crush Saga”, the objective in each level varied by limited number of moves, time limit, clearing “jellies” off the board and many more. However, “Bejeweled Blitz” uses jewels instead of candy and the only objective is to get the highest score. Casual games usually have lack of commitment but both “Candy Crush Saga” and “Bejeweled Blitz” is compelling to use because it allows a sense of continuation. “Candy Crush Saga” makes use of the idea of a journey by linking the levels together like a map, seeing where user stand and where their friends are at and who has the highest scores, making user want to continue to play to complete the levels, while “Bejeweled Blitz” makes user collect badges by collecting points up to a certain amount.

“Candy Crush Saga” has a true lose condition, whereby time is not a factor in the game, thus allowing users to think about each move which adds a sense of skill that other games do not possess. Meanwhile, “Bejeweled Blitz” offers up a randomized experience where the user is given a set amount of time to beat their friends on a scoreboard. A combination of the ‘lives’ system (which limits the number of attempts within a session) and the fact that there is a clear objective which can be failed means that a user ends their session wanting more and having a clear plan of action for the next time they open the application “Candy Crush Saga” add on layers of excitement to the match-three puzzle games whereby matching more number of candies in a row offers various types of bonus such as special candies that can clear a row of candies. Although “Candy Crush Saga” offers points as way to compare score with friends, points aren't the primary objective of the game. The game cleverly offers a nice variety of objectives without altering the game's rules. No matter the objective for a given level, users will always be matching candies in various combinations and trying to clear the board. In contrary, even though “Bejeweled Blitz” offers random placement of the gems on the game board each time, the goal is always to get the highest score possible within the time allowed which gets tiresome eventually.

III. PROPOSED SOLUTION METHODS

A. Intelligent gameplay

As challenging is relative to the player's ability, the AI ideally should be adaptive and increase in difficulty as the player's ability increases [1]. In “Coins Wipeout” three modes of game with different gameplay are introduced, namely; qualifier mode, knockout mode and wipeout mode (Table 4). Qualifier mode is a freeplay level for single user. User who achieved certain score will win. Beside obtain rewards offered, user is also qualified to continue the next level; knockout mode. Knockout mode offers competition gameplay between user and

the computer. User can continue to the next level; wipeout mode, if she or he win the game, otherwise will be *knocked out* the competition. While the final stage, wipeout mode, offers a free play game, multiplayer competition (i.e. user versus user). At this stage the winner will obtain rewards while loser will lose rewards she or he obtained in previous game(s).

Table 4
Differences between the three modes of the proposed intelligent gameplay

| Qualifier mode | Knockout mode | Wipeout mode |
|---|--|--|
| Number of players. User – Single | Number of players. User versus computer | Number of players. User versus user (multiplayer) |
| Gameplay. Free play | Gameplay. Competition | Gameplay. Free play |
| Win/Lose. User obtain rewards / No effects | Win/Lose. User obtain rewards, next level / <i>knocked out</i> of the competition | Win/Lose. User obtain rewards / Lose rewards |
| Rewards available. Special coins | Rewards available. Special coins, Bonus score, Time freeze, Extra life | Rewards available. Special coins. Bonus score, Time freeze |

B. Solution methods

C# as a Mobile Game Platform. The C# programming language is used to implement this mobile game. In recent years C# has been enhanced to enable the writing of mobile games. In addition, the development tools used to build the game uses the C# programming language as its main language.

Development Tools – Game Engine. Game engine is a software system designed for making video games. Game engine offers packages of visual development and reusable software elements that are typically offered in a built-in platform, enabling efficient, data-driven game development. The game engine is a framework which facilitates the kinds of tasks which need to be done when writing a game [2]. For example, displaying the images on the screen (in game terminology, an image which is displayed on the screen is called a sprite) and, drawing menus or text on the screen. Game engine used in this project is Unity3D. It is used in order to develop the game in its most efficient manner. Examples of games created using Unity3D as follow; “Silence” by Daedelic Games, “Nitro Nation Stories” by Creative Mobile, and “Dead Trigger” by Madfinger Games. Benefits of using the game engine as follows; 1) graphics - provide more complex features, help with animations and help organize the game and reduce the complexity of the code, 2) user interface - provide an easy mechanism to draw scores and create game menus, 3) physics - come with physics built in. Help define shapes and watch them respond like how real world shapes. 4) Sound - make sound effects very easy.

Mobile Operating System. There are two operating systems that currently dominate in terms of usage, namely Android OS and iOS. Android OS is chosen for this project based on the reasons stated in Table 5 [3].

Table 5
General comparison between Android OS and iOS based on five specifications

| Specifications | Android OS | iOS |
|-----------------------------|----------------------|-----------------------|
| <i>System</i> | Open source | Closed system |
| <i>Flexibility</i> | Easily customizable | Limited flexibility |
| <i>Media transfer</i> | Easy | Hard |
| <i>User base</i> | Massive (affordable) | Limited (Expensive) |
| <i>Ease of publications</i> | Simple processes | Complicated processes |

C. Technology deployed

Hardware and Their Specification. In order to find out the most appropriate hardware used to develop mobile games, a series of operating systems were compared and finally a decision was made to use the hardware with several requirements - Android phone with version 3.0 (Honeycomb) and above, minimum 2GB storage, dual-core 768MB random access memory (RAM) and above and graphic processor Mali-400MP and above.

Software Details. Android 4.0.3 (Ice-Cream Sandwich) and above is used with software Android Studio and Visual Studio 2015. Unity3D is chosen for the game engine development.

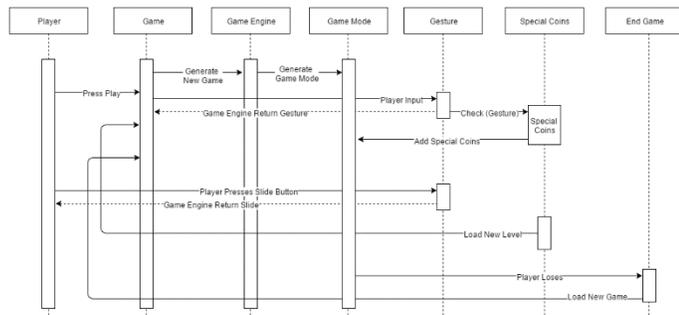
Language Used in Application Development (C# and Java). C# syntax is a highly expensive, and yet simple and easy to learn programming language. It is instantly recognizable to anyone familiar with C, C++ or Java. User able to begin to work productively in C# within a very short time. C# syntax simplifies many of the complexities of C++ and provides powerful features such as null value types, enumerations, delegates, lambda expressions and direct memory access, which are not found in Java [4]. Java is an object-oriented programming language expressly designed for use in the distributed environment of the Internet. Easier to learn compared to C++.

IV. CONCLUSION

Overall the project is expected to provide a satisfying mobile game for Android users and to be completed successfully without much trouble. Most of the system goals hopefully can be achieved by the end of the project. At most certainly the game fits the purpose it was developed. Intelligent gameplay modes and new gestures and interaction models are the two main uniqueness of this proposed solution in enhancing the retro game. The implementation methods and software that have been chosen will certainly help in developing the game properly. Customizability, portability and obtainability from Google Play are the key factors Android is chosen. This project proposes an interesting and refreshing mobile game for Android users. The mobile game consists of friendly user interface, challenging gameplay and wonderful gaming experience with improvised graphics. Therefore, the proposed mobile game “Coins Wipeout” is expected to satisfy Android users that miss the classic game “Lose Your Marbles”, and also those whom are looking for a good mobile gaming experience.

APPENDIX

System sequence diagram for “Coins Wipeout”:



Screen shots of newly developed intelligent retro game; “Coins Wipeout”:



Screen shots of “Lose Your Marble” (1997) by SEGA:



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