

Colt: The Code Series Game for Learning Program Logic through Real Time Implementation

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Abstract - *Unknowingly learning styles now-a-days have unavoidably become a limitation for improving the learning performance of a learner. Unfortunately, many times when a concept is taught to the learner he/she may not get a clear idea as it lacks the real-time implementation part. Therefore, this study proposes an alternative method for students or novice learners where they can implement their logic in a real-time environment. Colt: The Code Series Game is a web-based game for learning and practicing the programming language-related concepts for novice learners and students. The structure of the game, design concepts and model will be studied through this paper. Concept of Serious Gaming and Racing Games are combined in this game. The game consists of the hardware and the software part where the gaming concepts are made familiar to the learner first with the help of software. In addition to this the player has to apply logic and play a racing game which will utilize the hardware part of the game and real-time application of the logic used by the player will be seen.*

Key Words: Video Games, Serious Games, IoT, Programming, Arduino, Node MCU

1. INTRODUCTION

For every student, child and adult video games are just for fun entertainment. It's a way to take a break from work to relax and enjoy. But video games are more than that we know they provide a fun and social form of entertainment, more than that they encourage for work in a team and help to improve cooperation while playing with other players. They make children comfortable with technology and improve their self-confidence and self-esteem in dealing with technology as they improve more and more in games.

A parent, teacher focuses more attention on the potential danger of games than the potential importance and benefits of video games. If we look for it, video games are a powerful tool to help children develop their certain life skills not only by puzzle games but also with all other potentially beneficial games.

Colt: The Code Series is a game that is going to be a combination of Racing game and Coding game. This is going to be a platform for fun, entertainment and to enjoy coding. In this paper, we are discussing the process and information required for the graphical computer game "Colt: The code

Series" with a combined approach of Racing game and Serious game.

Games are the most ancient and time-honoured vehicles for education.[1] We have puzzles to learn the logic, mathematical games to enhance basic math skills, and even reading games to increase reading ability.[1] Also today lots of android applications are available in the market for children that provide education funnily and entertainingly through games.

While learning basic programming skills, students who are assigned to program in a games will develop the ability to formulate algorithms to solve particular problems, and will do so not only because they are having fun in creating these games, but also they are driven by the desire to solve the problems imposed to create something that they can be proud of creating and show to their friends and relatives.

2. LITERATURE REVIEW

The game is based on the learning mechanism used to learn and practice the programming language Python. There are lots of games like Racing games, Action, Arcade, Strategy games and also different sports games are available currently in the market. A new game genre that people are mostly not aware of is serious game.

A Serious Game which is also called applied games is a type of game designed for a primary purpose other than pure entertainment. These games are used by industries like Defense, Education, Scientific exploration, Health care, Emergency management, City planning, Engineering, and Politics. Mostly in the serious games simulations are created for the user practice, for example, medical students practice critical operations through these kinds of simulations, also in the military for the damage of the missiles these simulations are created. So, we can say that serious games are Electronic games whose main purpose is "Serious" and not to simply entertain. The primary purpose can be to teach or train in areas such as Education, Health care, Advertising, Politics, etc.

This same approach we are applying here for the Colt: The code series where the primary focus is given to the learning, practicing and training student for programming in Python along with focus on entertainment through racing. The players will compete against each other by completing levels as fast as possible.

3. WORKING

3.1 Problem Analysis

This project is the creation and implementation of a game using the hardware cars and game platform. There are lots of games developed for the Android system, desktop based application but in this scenario, the hardware system is used.

There are very few games based on programming language, Colt: The code series will be based on the questions on the python language for learning and practice. The points will be given on the player's performance. If the player gives a correct answer then the player will get points and the car will move forward. The opposite will be the process if the player fails to give the correct answer.

Project proposal for this game contains a plan for the development of racing games however as stated before this idea is more accessible and allows for greater enjoyment while still implementing several key racing concepts.

3.2 Units

Colt: The code series game is for learning programming code which will help the player to bridge the gap between his/her knowledge and the applications related to the concept of programming. The major goal is to facilitate the learning process and to make it more efficient and interesting along with gaming and actual interaction with the hardware cars. It provides more and more practice of code syntax through the code interface with real-life examples and fun of the racing games. The module of the game will include a coding platform for writing and learning a code & syntax understanding for the player.

Colt: The Code series Game is a desktop game for novice programmers for learning and improving programming skills, it has the coding platform for writing programming statements. The output will be the movement of the car for which a player has to write a programming statement to move a car from Start to endpoint. It will become more and more complicated as levels increases, points will be based on the movement of the car and the movement of the car will be based on the player's correct input. If the wrong answer is given by the game player the car will be moved to the reverse direction, which will delay the time needed to reach to the final goal.

The player will pass input as a code through coding platform, later this will be passed to Firebase database. Firebase database will be used to check the commands given by the game player and Node MCU will be used as a controller which has Wi-Fi access. The object i.e. Car will move based on the players input.

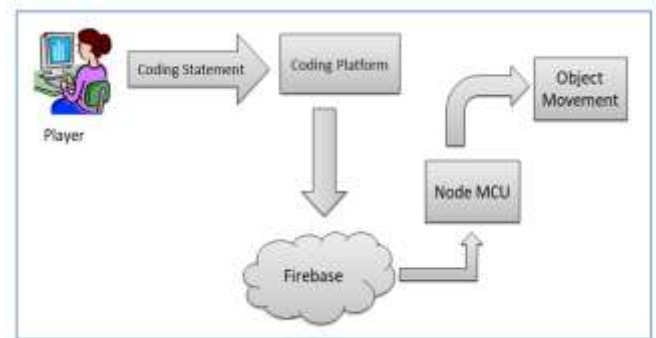


Fig -1: System Architecture of colt: the Code Series game

4. METHODOLOGY

The Project is divided into 3 main modules as follows-

4.1 User Interface Module:

User will communicate with the system using user interface module it will include all designed GUI or user interface. It will include the Front Page, Home Screen, Main Menu levels and Result of High score.

This module will take input from the player and will show the result of the level.

4.2 Game Processing Module

This module will generate python language-related random questions, accept the answer and check whether the answer is correct or not.

The System will check the answer given by the player. If the given answer is correct the player will get score points and if the player gives the wrong answer, point will be deducted. The result is sent to the hardware interface module.

4.3 Hardware Interface Module

This module is responsible to communicate with firebase and will read command or result provide by the game processing module and move car according to the command.

If the answer is true then give command will be to move the car forward for the particular delay and if the answer is false then given command will be to move the car in reverse for the particular delay.

For the Implementation of the Hardware cars use of Arduino IDE, Node MCU and ESP8266 is done.

5. CONCLUSIONS

An important aspect of any programming language is algorithm understanding and problem-solving. Without problem-solving, there is no computer science. Allowing students to learn through the games and practice the programming with the game will enhance the learning process and increase the student's interest. It will create a fun and engaging learning environment for the student who is eager to learn.

It's a visual way for students to get engaged in programming and at the same time they can enjoy the car racing game.

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