

Multiplayer Carrom Board Game with an Ai Opponent

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Abstract - Real Carrom is the way to go! With the realistic 3D simulation and intuited touch controls, you've sure to be hooked onto the actions for hours. If you've ever wanted to play a game of Carrom at the comform of fingertips, Carrom also known as Karrom or Carrom is a popular board game originally from South East Asia, with a concept similar to billiards, pool and suffle board where the players have to strike of their choice and the first one to do with the maximum number of Carrom (Cans) using a strike of their choice, and the first one to do so with the maximum number of Carrom wins use the finger to shoot the piece. Put your skills to test in the real time Carrom Game with AI opponent with VR Device to see the game in 3D environment. Other distinct type of virtual reality style technology includes augmented reality and mixed reality. Virtual reality growing day by day as it is gaining interest of gamers and also for game developers.

Key Words: Artificial Intelligence, First Person Vision, Blender Engine, Unity Engine, VR Box, Network Devices (Bluetooth, Wifi, LAN), Wired or Wireless Devices.

1. INTRODUCTION

Mobile gaming is becoming more and more trendy day by day because of it's enhancement in hardware and its large availability. Almost everyone in consumer having a mobile device as it has become necessary. And there is large amount of mobile users in the world. The developer is focused on mobile gaming platform [1]. In the research it is found that total half of the revenue comes from the mobile gaming industry. The discussion of this paper is based on the mobile game that we had developed (Virtual reality based Carrom game with AI opponent) for the android mobile specifically. Because of improvement in android mobile gaming it's now possible to use mobile devices as your very own virtual reality device. The game is designed so that user can experience 3D virtual environment with 360 degree view FPV (First Person Vision) or FPP (First Person Perspective) view along with AI opponent and controlling it via Bluetooth controller [4].

On the other side not only the hand core gamers are focused on playing games but also the normal people's who loves to play simple arcade and simple puzzle games and the revenue and users also increased. The enhancement in mobile hardware and software that led to deployment of graphics intensive games of mobile platforms [11].

The network has become more flexible because of 4G and 5G networking so now multiplayer's mobile games are not just fantasy [9]. The game engines like unity and unreal are providing better. Support for mobile platforms computer technology is to rise to a great extent now VR can be implemented in mobile devices and Android phones (devices).the content with your own material.

2. LITERATURE REVIEW

2.1 Virtual Reality

The virtual reality (VR) technology is used to create virtual environment that behaves like real world representation and user can interact with it [5] [2]. The technology is developed combing computer graphics, multimedia technology and stereo display, stereo sound, and Human computer interaction technology [3].

The technology is invented by Morgan Hooligan he introduced this technology with his device called sensor amaand considered earliest VR. So this technology came into existence with the hardware specifically designed for VR along with dedicated controller and software.

2.2. Artificial Intelligence

Artificial intelligence is technology in which machines are programmed to think and mimic Human actions. The term also associated with the machines that exhibit learning and problem solving traits as human beings.

The research in AI mainly associated with specific areas that include machine learning, expert system, pattern recognition, Natural language processing, robotics and game theory and artificial neural networks [8].

AI has become one of the important components of game industry. AI in game industry is now so advance that characters in the game exhibits independent behavior other players will interact with [11].

2.3 Mobile Hardware or Android

Mobile phones were just a handheld in early days this paradigm is shifted in 2002 with the first mobile gaming era.

In 2007 the phone came into market and is dominant player till now in mobile gaming industry. But it's still so expensive for everyone to use but with the emergence of android operating system and flexibility of mobile hardware the mobile industry became so large and a big portion of it is held by Android.

Now the android has been so improved that even geographically intensive game can be ported with thoughts. Android in the future will be the best platform for gaming and virtual reality because it has so many features built into tiny compact little devices features like gyroscope, light sensors, cameras and other wireless connectivity sensors necessary for VR.

2.4 First Person Vision

FPV refers to the situation where direct involvement of users with the environment is May possible. With FPV user get a sense of being available in the environment and it's best suited for VR games [6].

3. METHODOLOGY

We have developed a VR game to play with AI specifically designed for Android platform. The main concept is to use Mobile phone as a VR device. As all necessary hardware is built into android Smartphone it's easy to develop VR games for the platform. Different types of controller can be plugged into the android mobile phone [9].

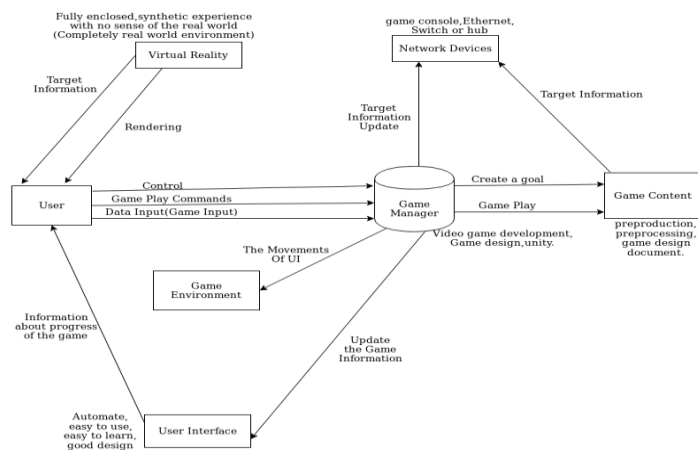


Fig-1: Multiplayer Carom Board Game Architecture

3.1 Supervised Decision Tree Algorithm

Machine learning is quite difficult. Some algorithms are very tricky to compute and Hard to impractical methods for supervised learning implement. A beginner should always start with the straighter forward in the field of Machine Learning or Data Science Decision Tree Analysis is a general predictive modeling tool that has applications spanning a number of different areas. In general practical methods for

supervised learning decision trees are constructed via an algorithmic approach that identifies ways to split a data set based on different conditions. The goal is to design a model that predicts and analysis and should take decision as per rule defined the value of a target variable by learning simple decision rules inferred from the data features [7].

In our Application we are going to consider a static machine learning method known as a Decision Tree. Decision Trees are categorized into supervised learning technique that predict and analysis of responses which learns decision rules derived from features. They can be used in both a classification and a retrogression context one of the primary been by construction, it produces interpretable if-then-else decision rule sets, which are taken to graphical flowcharts [10].

3.2 Mathematical Overview

Under function specification the model $f(x)$ of probabilistic adaptive basis is given by:

$$F(x) = E(ax) = m = 1Mwm \text{ (sum)}$$

Where, w_m is the mean response.

M_r , and u_m represents how each variable is split at a particular threshold value. These splits define how the feature space in Rap into M separate "hyper block" regions [10].

3.3 Decision Tree Classification

In this Application we have concentrated on almost exclusively on the regression case, but decision trees work equally well for only classification, hence the "C" in CART models.

We are going to represent the various techniques that all be implemented via direct implementation in any programming or scripting language. Due to their extremely general nature the problem with expressing complex behaviors through programs is that, programs can be difficult to understand and difficult to reason about.

While the mentioned before techniques are limited in their capabilities, they do provide game designers a clean, visually based structure in which to describe and reason about the behaviors they represent. In a number of ways decision trees can be implemented.

If the tree is not big (and it is a tree, as opposed to a directed-acyclic graph) you can translate the tree into an appropriate layered if-then-else statement in your favorite programming/scripting language. More generally, you can express the tree as a graph-based data structure, where internal nodes hold pointers to predicate function [10].

Table -1: Result

Probability	Value	Description
High	Probability of functionality	>95%
High	Probability of Performance	90-95%
High	Probability of working is	95%

Fig.Result



Fig -2: Working of Multiplayer Carrom Board Game

4. CONCLUSIONS AND FUTURE SCOPE

For testing their carrom skills and strategies based carrom provides less number of complexities to users. More stratagems can be added to enhance the control of gamers and aiming in carrom game. A full carrom board game can be provided to gamers for testing their skills by playing using VR with an Ai opponent. An artificial intelligence can be added to play game against the user or gamer. This game provides a good environment to users for applying their learnt skills and behavior. Our application is a more attractive, efficient and effective system for teaching Carrom skills and strategies.

According to the work presented above, we have explained how VR can be implemented for carrom board games. Playing board games in simulated environment by combining FPV. We have also developed an android application that uses built-in mobile sensors to detect 360 Degree.

Head movement of players like visualizing the virtual environment and aiming with the help of FPV method, as these characteristics of the application are the fundamental part of VR mobile gaming. We have planned to take surveys from several people in two different game scenarios and by their remarks and feedback we can add new features and

discovered that multiple enhancements can be done in the future to make our game more enjoyable. One is to enhance the graphics of the game to make it more user friendly and representable for the users.

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