

# A LITERATURE REVIEW OF THE CROSS PLATFORM AND MULTIPLAYER GAMES

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## Abstract

Today, the video game industry has become one of the biggest sources of entertainment for people. The gaming industry has surpassed many industries and has generated \$ 150 billion in revenue in 2020. This means a significant increase of 9.3% according to 2019 data.[1] Many game development companies want to keep their income level at the highest level by releasing their games with cross-platform and online features. Today, hundreds of games provide cross-platform support. [2] 56% of the players prefer to play games online. And they spend an average of 7 hours playing with others online – an hour more than playing in person.[3] In this review aims to inform multiplayer racing games, artificial intelligence in games, game engines and cross platform games.

### Keywords:

Computer and Mobile games,Car Racing Games,Cross Platform Games,Online Games,Multiplayer and Singleplayer Games,Game Engines,Artificial Intelligence,Networking

# Öz

Günümüzde video oyun sektörü insanlar için en büyük eğlence kaynaklarından biri haline geldi. Oyun endüstrisi birçok sektörü geride bıraktı ve 2020'de 150 milyar dolar gelir elde etti. Bu, 2019 verilerine göre % 9,3'lük önemli bir artış anlamına geliyor. [1] Pek çok oyun geliştirme şirketi, oyunlarını çapraz platform ve çevrimiçi özelliklerle yayınlayarak gelir düzeylerini en üst düzeyde tutmak istiyor. Bugün yüzlerce oyun çapraz platform desteği sağlıyor. [2] Oyuncuların% 56'sı çevrimiçi oyun oynamayı tercih ediyor. Ve başkalarıyla çevrimiçi oyun oynamak için ortalama 7 saat harcıyorlar - tek oyunculu oynamaktan bir saat daha fazla. [3] Bu inceleme, çok oyunculu yarış oyunlarını, oyunlarda yapay zekayı, oyun motorlarını ve çapraz platform oyunlarını bilgilendirmeyi amaçlamaktadır.

## Anahtar Kelimeler:

Bilgisayar Ve Mobil Oyunlar,Yarış Oyunları,Çapraz Platform Oyunlar,Çevrimiçi Oyunlar, Çok Oyunculu ve Tek Oyunculu Oyunlar,Oyun Motorları,Yapay Zeka,Ağ İletişimi

## 1. Introduction

The racing game is a type of video game in which players compete with land, air or sea vehicles. The history of racing games in the world dates back to the 1980s (such as Spy Hunter series (1983), Autoduel (1985)) and has always been the focus of attention. With the advent of computer technology, computer games have also gained an important place in our lives. It has even become an integral part of everyday life for many people. As computer languages, internet and visual effects developed over time, computer games were made realistic and more complex. These games, which started to be of higher quality, attracted the attention of wider audiences. A game that comes to mind when it comes to computer games and has the largest player mass in the world is racing games.

Among these games, the most popular and one of the oldest games is the car racing game.

The Turkish game market is developing slowly and opening up to the world. A few top selling companies have built their expertise on combat, RPG or action. However, there has not been much work done on racing games yet. By evaluating this gap, we want to bring an untouched genre to the sector and to create a fun competition environment among universities for domestic users.

This article explores the dynamics of racing games and important sub-issues that need to be developed to make a racing game. At the same time, the article highlights the reasons for choosing the right game engine and why cross platform games are preferred.

## 2. Cross Platform Development

When you build a native app you have to construct a separate one for Android and a separate one for Windows(PC) for this project, each using a unique language. For example if you want to code a program for Apple/iOS; programming language must be Objective C or Swift. For Android you have to use Java etc. For Windows Phone you have to use C# or XAML. As a result for each platform you have to use different languages and that might cause few problems in a one particular project. [4]

1.One of these problems is financial consumption. For each platform buying, creating and keeping it sustainable will cause a lot of expenses.

2.Another problem is programming native games requires at least 2-3 different programming languages.

3.Third, and lastly, another big problem is the ability to consistently maintain stability and uniformity. Since each platform has its own user interface, standardized components and features, applications will not be uniform from platform to platform and will create differences in user experience depending on the device.

Most people have more than one device type, so their experience will be different when they switch to an Android device using your app on iOS.

Gamers today have a wide variety of devices, from popular smartphones to high-end consoles. The best way to ensure your game reaches the widest possible audience is to create games that run on all major devices used.

## 3. Game Engines

Game engines are one of the most important tools for game developers. Developers use game engines to construct games for consoles, mobile devices, and personal computers. The core functionality typically provided by a game engine includes a rendering engine for 2D or 3D graphics, a physics engine or collision detection, sound, scripting, animation, artificial intelligence, networking, streaming, memory management, threading, localization support, scene graph, and may include video support for cinematics.[5]

### **The Most Popular Video Game Engines**

- Unreal Engine
- Unity
- GameMaker
- Godot
- AppGameKit
- CryEngine
- Amazon Lumberyard
- RPG Maker
- LibGDX
- Urho3D

### 3.1 Why Unity Game Engine ?

A convenience provided by Unity to game producers is that a game developed with Unity can be compiled for different platforms (PC, Mac, Web, iOS, Android, Windows Phone, Playstation, Xbox etc.) without the need for any infrastructure changes. In this way, a game prepared for PC can be run on Mac with one click. In addition, Unity offers advanced shader software, physics engine, animation editor, occlusion culling features offered by other extremely expensive advanced game engines to application and game developers for free. In addition to all these advantages of Unity, games written in Unity can be played easily on low and medium level computers (minimum 1.6 Ghz processor, 500 MB RAM).Unity as of 2018; It has been used by developers to create about half of the new mobile games on the market and 60 percent of the augmented reality and virtual reality content. [6]

## 4. Game Mechanics in Racing Games

Important part of racing game is of course driving the car. But diverse games offer you a different type of racing gameplay experience.

Need for speed: Underground (EA Games, 2003) incorporates a distinctive win condition. The player has got to end the race initially place solo so as to win the race, even there are over 2 players playing. This finish-first only mechanics deliberately augmented the challenge level within the game. Underground stress heavily on import competing scene and featured vehicles related to it. Cars may be custom to extend performance and visuals.[7]

Split Second (Disney, 2010) introduced devastating environment, that, once launched by player it creates obstacles for different players. As a player performs stunts like drafting, drifting or exactitude driving, the ‘powerplay’ meter builds up which permits the player to trigger special events like making obstacles, facultative shortcuts or fixing the race track entirely.

Playstation’s popular game Blur (Activision, 2010) incorporates world cars with arcade vogue handling and conveyance combat. It introduces a very new form

of gameplay to this car racing genre. However, it's brewed with the ability ups mechanics that has been employed in several games.

It additionally uses the ranking and perk system. The race starts while not a count-down timer that is presently popular; we are able to see such game mechanics in moment and wish for speed series.

One of the most important factors in racing games is speed. The more we increase the game speed, the greater the excitement, interest and difficulty for the player. In most racing games, beginner players are not given very fast cars. However, as the player gains certain achievements or levels up, they can use new features and cars. This makes the game more rewarding and increases interest.

Players generally prefer environments in which they can make their personal choices. The customization of the car is an important part of racing games. In addition, car models that have been transferred from real life to the game are another popular feature preferred by the players. In addition to these, the feature of ranking tables, comparison of scores and achievements brings more interest and competition.

Classic style speed racing isn't the number one factor in racing games. Some games provide stunt moves, car crashes, explosions other than racing in the game. For example, Burnout (Criterion Games, 2001) has many options besides competition, such as these features. Apart from making racing games just about racing, it also increases the fun level of the game. [8]

The product, which occurs not only in racing games but also in all games in general, is a combination of many factors and game mechanics. There is no formula for making the game with the highest sales numbers. But you have a chance to increase your chances of success by combining different types of gameplay.

## 5. Artificial Intelligence in Racing Games

The aim of artificial intelligence in racing games is not to beat the player, but to give the player a challenging and realistic experience.

Artificial intelligence uses a variety of techniques that can simulate the driving of cars to achieve this goal. Waypoint System, one of these techniques, is the simplest way to move the car on a certain road. These waypoints are stored in an ordered list and the car is moved between the positions of these waypoints. Another system is the trigger detection system. It supports detecting a specific game object when it is within the vicinity of another game object. And it can give commands such as turning or accelerating the car according to the detected objects.

## 6. Conclusion

In this literature, history of racing games, overview of cross platform games, encountered problems in cross platform games, game engines, game mechanics used in racing games and their examples are examined with details. Cross platform games continue to develop with high revenues and they must be able to be played via different platforms such as PS4, computer. One of the problems of cross platform games is platforms that have their own user interfaces. Game engines are important for users to develop games and have many properties. There are some techniques of artificial intelligence used in racing games. Racing games may have many game mechanics. If a racing game has many gameplay then the game is likely popular.

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