

Game mechanics in racing games



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The very first racing game built by KONAMI was Road Fighter (Konami, 1984). The goal of the game was to reach the finish line without running out of fuel. The interesting part was each time the player gets close to finish line without getting crashed; a superman flies by and the player gets extra 1000 points. If you haven't noticed before, the superman has 'K' marked on his dress, which probably stands for Konami. But, if you see from a developers' point of view, the superman bonus is the result of reward and feedback game mechanics. This point bonus encourages players to play better. It makes the game more interesting and players concentrate more in order to get the bonus "Superman" points.

Game mechanics is a huge subject. It has been used in many fields today, other than video games. Game mechanics have been used for growing the players' interest and involvement in gameplay, but as the area of game mechanics became largely successful, it started being used in other fields for other purposes.

With the research on game mechanics, I try to study and understand the vast game mechanics subject and its application in various fields. I have also tried to form up a definition and apply it to study gameplay in various games. At last, a thorough study of game mechanics in racing games is attempted, and I introduce a new mechanics for racing games.

Research Context

The example above explains the game mechanics at quite brief extent. Here, I present some definitions by various researchers as well as own thoughts, experience and some examples.

Game Mechanics Definitions

Different researchers provide different game mechanics definitions, most likely related to their research. Here are some of the definitions given by some authors.

Miguel Sicart defines game mechanics as: Methods invoked by agents for interacting with the game world. (Sicart, 2008) Here, Sicart offered a formal definition for game mechanics as he exercises this definition with a comparative analysis of *Shadow of Colossus* (Team Ico, 2005), *Rez* (United Game Artist, 2002) and *Every Extend Extra* (Q Entertainment, 2006) to research game context and user experience.

One of the game mechanics definitions that Sicart has mentioned in his research is by Lundgren and Björk (2003) as: “ any part of the rule system of a game that covers one, and only one, possible kind of interaction that takes place during the game, be it general or specific.” The definition given by Lundgren and Björk covers traditional board games and puzzle games, rather than video games. However, they mention that most of the mechanics identified in their research can easily be brewed into video games played on PCs and consoles. It would have been easy to describe these game mechanics without starting from traditional games, but, starting from traditional games also opens up a way that allows easy comparison between computer-based games and non-computerized games.

Mike stout (2010) explains how to come up with a better game mechanics when the gameplay is repetitive and boring. Stout describes game mechanics as “ A major chunk of gameplay”. He gives an example of The

Legend of Zelda: A Link to the Past (Nintendo, 1991) and the game mechanics used in the game like: sword combat, block pushing, boomerang throwing, swimming, button based puzzles, Hazard-avoidance, etc. (Stout, 2010)

Amy Jo Kim explains game mechanics applied in functional softwares and social media as “ The system and features that makes games fun, compelling and addictive”. Kim also explains how game mechanics is brewed into social media like eBay, Facebook, YouTube etc, (Kim, 2009).

Game mechanics is a subject that is used in many fields other than video games like, social media, social games and entertainment, consumer products and services etc.

Game Mechanics in Social Media

Social media sites like facebook. com, eBay. com, youtube. com etc.

Implements game mechanics at a very large scale. Amy Jo Kim (2009) explains how collection, points, exchange, feedback and customization mechanics is implemented in social media. For example, ebay. com gives rating and feedback score to the sellers based on the feedback received from customers or buyers. The feedback is accessible through seller’s profile page where any user can check the ratings and score. This mechanics improves the seller services.

Tesco PLC has implemented point mechanics to attract more customers. The customer gets certain points for purchases made at Tesco shops through Tesco Clubcard. Later, they can redeem points for other offers of items.

Tesco makes various offers available through Clubcard points which drive customers to purchase more products. (Tesco, 2010)

Jesse Schell (2010) presented multiple examples of game mechanics used in non-game media in his presentation “ Design outside the Box” at DICE Summit 2010. Schell mentions new Ford Fusion hybrid car that comes with an EcoGuide facility, which is basically an implementation of feedback mechanics. It’s a virtual plant in techno meter; the plant sprouts more leaves as your miles-per gallon go up, indicating how green your motoring is.

(Goodwin, 2009) Here, feedback mechanics is used in such a way that might affect the way people drive their car and possibly encourage them to drive in an eco-friendly way.

MouseHunt (HitGrab, 2008) and other facebook games are mainly based on points, feedback, collection, and customization mechanics and MouseHunt can be the best example of it. The player is required to build a mouse trap to catch mice and when a mouse is caught, the player is awarded with points and gold. The game keeps a track of points and gold on leaderboard. The mice caught by the player are added in his collection.

Game Mechanics in Mainstream Games

Quake (id Software, 1996) popularized rocket jumping mechanics. Rocket jumping is the technique of firing a rocket launcher or similar explosive pointing at the ground or at wall and jumping at the same time. The explosion propels and accelerates the player’s jump to large distance.

Rocket jumping mechanics was introduced in Marathon (Bungie, 1994) and

Rise of the Triad (Apogee, 1994), adapted in Team Fortress 2 (Valve, 2007) Unreal Tournament (Epic Games, 1999) and others. (Wikipedia, 2010)

Another popular game mechanics is slow motion. The gameplay of Max Payne (Rockstar, 2001) involves bullet time-based action sequences. Bullet time slows the passage of time down to a certain level and enables the player to perform special moves. Time based mechanics is also one of the main features in later versions of Prince of Persia series (Ubisoft, 2003). This mechanics makes the prince able to slow down or rewind the time and perform special combat moves.

Portal (Valve, 2007) is a single player Puzzle-Platformer game that consists primarily of a series of puzzles that must be solved by teleporting the player's character and simple objects using the portal gun, a unit that can create inter-spatial portal between flat planes. The game received praise for its unique gameplay and darkly humorous story. Portal seems a perfect combination of Challenge and Skills, though its gameplay consist teleportation based puzzles only. The gameplay contains no combat sequence or rocket jumping or slow motion.

Kill. switch (Namco, 2003) introduced cover and shoot mechanics which was adapted into Gears of War (Epic Games, 2006). As described by Miguel Sicart (2008) Gears of War introduced an effective combat tactic where the player takes cover behind a block or a pillar and patiently shoots enemies. This third-person combat design also influenced Grand Theft Auto IV (RockStar North, 2008) and became highly popular.

But Grand Theft Auto series is more popular for its variety of gameplay which consist of action, adventure, driving, racing, and stealth elements. The GTA series is also a good example of open world type of video game level design concept where a player can roam the virtual world at any point in the game. It also contains sandbox style nonlinear gameplay where the player can complete challenges in any sequence. The Game sold 2.5 million units in the America on the first day. (Mazel, 2008)

The roots of open-world game concept go back to space simulator Elite (Acornsoft, 1984). However, we get to see open-world gameplay implementations in Midtown Madness (Microsoft, 1999), Need for Speed Underground 2 (EA Games, 2005) and Burnout Paradise (EA, 2008) as well.

Game Mechanics in Racing Games

The main gameplay in racing game is driving the car. However, many racing games offer various gameplay that are unique to the game itself.

Need for speed: Underground (EA Games, 2003) has a unique win condition. The player has to finish the race at first place only in order to win the race, even if there are more than two players playing. This finish-first only mechanics deliberately increased the challenge level in the game.

Underground emphasis heavily on import racing scene and featured vehicles associated with it. Cars can be customized to increase performance and visuals. Underground also featured EA Trax (EA Games) which is a collection of soundtracks. Overall, Need for Speed Underground contains multiple game mechanics that appealed many racing game lovers. According to

VGChartz. com, the game sold 6. 49 million units of PS2 version of the game till date. (VGChartz, 2010)

Trials HD (RedLynx, 2009) is a combination of puzzle and stunt bike driving. It doesn't have any competitive race, as in the player has to get through a number of obstacles with as few crashes as possible. The challenge in the game is to balance and control the speed so that the player can pass through obstacles successfully. The game uses 3D graphics but the player can only move forward and backwards. However, the player can lean front or back to perform special moves or stunts. With such limited movement, the controls are also made simple. " Trials HD" also has a leaderboard feature, and when connected to Xbox Live, the player can compare his progress with his friends.

Split Second (Disney, 2010) introduced destructive environment, which, when triggered by player it creates obstacles for other players. As a player performs stunts like drafting, drifting or precision driving, the " powerplay" meter builds up which allows the player to trigger special events like creating obstacles, enabling shortcuts or altering the race track entirely.

High speed racing, imported cars, customization, stunts, crashes and motion blur can be noted as features of a racing game required to make it best selling. Burnout (Acclaim Entertainment, 2002) is noted as the initial in a series of high-speed racing games which also includes high risk gameplay mechanics. Burnout paradise (EA, 2008), the recent release in burnout series, features an open world environment called " Paradise City", with day-night cycle. Game Mechanics include stunts, car crashes, and motorcycles. A

very player favourite and famous gameplay is “ Crash Mode” in which players can cause car crashes. However, in burnout paradise, the “ Crash Mode” is called “ Showtime” and records are kept for player’s biggest crash. The game contains best time for every street in the game which encourages the player to keep on driving to get the best time.

Recently released blur (Activision, 2010) incorporates real world cars with arcade style handling and vehicular combat. It introduces a completely new type of gameplay to the current racing genre. However, it is brewed with the power ups mechanics that has been used in many games. It also uses the ranking and perk system. The race starts without a count-down timer which is currently popular; we can see such game mechanics in Split second and need for speed series.

Results and Contribution

The Definition

I would like to give a brief explanation rather than a definition. It is possible that this has been mentioned some or other way in many articles.

Game mechanics is a set of rules that builds a specific gameplay which makes the game more challenging, interesting and player-involving.

Game mechanics can also introduce new ideas or variety within a game, which ultimately makes a game “ fun”.

Game mechanics can be used to build up such a gameplay that motivates or manipulates human behaviour.

The definition explained here has been used to study and understand the game mechanics and gameplay in a variety of games mentioned in the research.

Game Mechanics In Racing Genre

When it comes to racing games, speed is everything. The faster the gameplay is, the more the excitement, interest and challenge will be. In a racing game, the player is not given a high performance car at the beginning of the game, but as he levels up in the game, faster cars or performance upgrades that can boost up the speed are unlocked. This mechanism creates a need of high performance car, and as the player progresses further, the game feels more rewarding.

Free roam mode or open world environment plays a crucial part in racing games. Player gets a chance to explore the environment and start the race whenever he wants to, which gives a realistic feeling to the game.

Players usually get attracted towards imported cars. Car customization has become an important feature of racing games. Models of original cars are highly praised by players and. They have a tendency to customize their cars and show off as well. Leaderboards allow players to compare their best times, high score and achievements, which also keeps a player engaged in game.

Challenge is not the only element a player is looking for in racing games. A number of games provides stunts and car crash based gameplay. Trials HD (RedLynx, 2009) and Burnout series (Criterion Games) are good examples of it. Player can drive through a signboard or perform a stunt in burnout

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paradise to gain extra boost, where Trials HD is all about passing through obstacles by performing stunt moves. Such game mechanics inserts the element of fun in games.

A few arcade style racing games have been avoiding the use of start up countdown. The round starts with ongoing race and the player gains control of the car after a cut scene. This type of mechanics is seen in triple-A titles like Blur and Split second. However, Simulation style racing games, where the realism is more persistent, follows the traditional countdown start-up of a race.

“ Need for speed underground” featured finish-first only mechanics. In order to win the round, the player has to finish at first place and first place only. This increases the challenge at a high degree, but it also seemed to be improving the player skills.

Other notable game mechanics or gameplay features includes motion blur, car pursuit, allowing player to create tracks etc. Music and soundtracks also play an important part in making the game more interesting. Who wouldn't listen to hip hop or rock music while driving one's favourite car at top speed? It is believed that EA Trax has played an important part in the success of Need for Speed series.

Gameplay is designed by brewing multiple game mechanics together. There is no specific recipe to make a best-selling racing game, but a game with various gameplay is more likely get popular.

Developing a new Game Mechanic for Racing Games

Whether a player is performing stunts, chasing a car, trying to make a huge crash score, or just playing a normal race, the core element is speed.

Wouldn't it be great if a car never lose speed unless it is commanded to?

Here, I have attempted to come up with such a game mechanic. During a race, if a player hits an obstacle, the car will lose health points but not the speed; the car will continue running throughout the track without losing its speed. However, massive loss in health points will ultimately result the player lose the round.

The game presented here demonstrates the game mechanics with some other features as well. The demo consists of a single straight track. Instead of solid obstacles, the player will face white ghosts on track. On colliding with a ghost, the car will go through it but will lose health points. The race does not start with a countdown; instead it begins with the player car running at minimum speed; which increases the challenge from the beginning. On the other hand, if the player runs out of health, or fails to finish the race at first place, he loses the round. But, if the player finishes at first place without losing any health points, he wins a perfect finish.

The demo also features some power ups. If the player picks up a health pack, the car health is restored. Slow motion slows down the game, allowing player to easily move through ghosts. Once activated, the game runs in slow motion for 10 seconds. Another power up is a shield which protects player from getting hurt by ghosts or opponent cars. The shield, once activated, stays active for 5 seconds. Shield provides a great advantage. When activated, the car will run 2 points slower than the real speed. Opponents do

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not collide or influence the player's game; however, if collided with opponent cars, the player car will lose health.

Evaluation

Game Mechanics

The following racing mechanics have been implemented into the demo, speed mechanics, power ups, random obstacle mechanics, competition mechanics, countdown less start up and finish first only. The gameplay was changed regularly as the demo was forming up in order to get the optimum effect of the mechanics. Multiple values were changed to improve the difficulty and challenge. However, it was also ensured that the difficulty is not far above the ground. Besides game mechanics, the gameplay can be improved with better feedback, graphical and visual effects, music and sound, more rewards or other bells and whistles.

The Gameplay

A game demo or a beta version of a game is made for testing purposes. The developers would test the graphics, frame rate or overall performance. Here, the game demo was made for an identical aim. The game demo was given to a group of game enthusiasts. Afterwards the reaction of the players towards the game mechanics was observed.

The demo has a look and feel of classic road fighter (Konami, 1984) and the players did miss the “superman” bonus point.

Random obstacles increased the challenge; it made the demo interesting as well.

The demo has proved to be an ideal combination of challenge and skill. The players had to concentrate more in order to achieve the perfect finish; several players attempted more tactical approach to win the race.

When asked about each feature of the game separately, the replies were encouraging and prove the success of the demo.

User Comments

Here are some comments given by players who tried the game demo.

“ The game is quiet good; the ghosts were terrible as they ate up all my health in the first round. I rate it 4 out of 5.” – Pratik Solanki

“ The concept was different from other games, though the difficulty level was maintained throughout the demo. It seemed easy to win the game, but it was tough to achieve the perfect finish. 3. 5 out of 5” – Kushal Joshi

“ The game gets addictive as soon as you start playing” – Dirk Fortmeier

The Research

Game development is not quite possible without understanding game mechanics. Gameplay is an important factor that attracts a player. The research on game mechanics helped to understand why a particular gameplay is more interesting and player involving.

Conclusion