Level Design research and considerations

For Design Team

Intro
Core elements of racing games
Key elements that positively impact a game's feel/juice and boost core elements
Visual example of racing effects4
Drifting effects
Car collision effects
Guiding the player around the tracks6
Design considerations for the USP7
Track analysis and comparison example8
Pick up placement example9
Track design questions you can ask yourself10
Micro Machine environmental effects11
Corners11
Track Types14
BONUS STUDY
References

Intro

This document covers the elements that make up driving and racing games, but also delves deeper into what adds quality, immersion and how the elements can be achieved.

Core elements of racing games

-Aspects of uncertainty and randomisation (for instance Mario Kart Pickups, traffic)

-Competitivity (podiums, battle for first place, timer, ghost drivers)

-Linear tracks with a readable start and finish

-Sense of mastery (i.e. accurately predicting optimal drift route for corners, improving in general etc)

Key elements that positively impact a game's feel/juice and boost core elements

- Dust clouds/ particle effects appropriate to surface the player is on
- Taillights turning on
- Sound effects
- Speed lines
- Unique and refreshing style (i.e. Need For Speed Unbound)
- Rewarding drifting and adding sparks (particle effects etc) for example Mario Kart 8
- Different surfaces and friction
- Risk vs reward (shortcuts, hard corners, ramps beside the main route of traversal)

Visual example of racing effects

Need for Speed Unbound effects





Car collision effects



Guiding the player around the tracks



-Figure 1a uses arrows, contrasted textures (brick) and contrast in shapes to guide the player towards the opening, as well as pointing them towards the correct direction

-Figure 2a, uses a contrasted texture as a path, to suggest the optimal route to take as well creates depth for the player to observe

-Figure 3a,3b,3c often use real world objects pointing towards the right direction, as well as a track decal. For example, the forks are the natural way up they would be if food was served, so the points almost act as arrows and physical borders. Since the game will be in a store, think about how some objects can convey natural directionality due to their shape and usages.

- repeated patterns such as columns insinuate depth also, so think about that when designing too.



Design considerations for the USP

- Add verticality/blockers to stop players from shortcutting to much of the map
- Map possible shortcut routes visible and in a fair position (i.e., not around a sharp bend)
- Design areas with empty space ahead, so characters can be launched out of the map, yet make sure there is enough room for it to possibly be avoided
- For trap boost pad placement, design some visual obstructions
- Traps cannot be placed on one another
- Players shouldn't be able to just straight from start to finish, boost pad placed shortcuts should give a similar time advantage to other shortcuts in games such as Mario Kart 8

Track analysis and comparison example

Analysis

Cel Damage HD



Gates to pass through to mark progress. All need to be passed through to count an extra lap completed. If not, the others you run through will not count and the arrow points towards the missed gate.

Less barriers mean gates can easily be missed, so colours and arrows are used to define barriers. For instance, the negative bright blue space of the water.

The dirt track throughout the race promotes the optimal route for players to follow, as the friction of the grass is different.

Pickups are placed in a risky position, off the optimal in Cel Damage. track,encouraging risk vs reward and are highly competitive to recieve,due to their relative infrequency (especially in Whilst pick-ups can be placed in more risky positions, often comparison to Mario Kart, where often there is little risk multiple are placed in easy to collect positions, so many pl when running into them).

Pick-ups are placed in isolation and often clearly marked as to which item they contain, so players with a preferred weapon, do not have to swa if its still active.

Mario Kart 8



No gates to pass through, just a finish line to pass through.

Players have no health. The only way they can be "taken out" (del layed significantly then picked up by an NPC) of the race, is by falling off the course. Being attacked by another player, simply stalls their progress.

¹Due to the crowded background and less negative space,it has a mo significantly visually obvious barrier, which could encourage the player to drive closer to them, as there is less risk of falling off, only grating them instead.

Due to less freedom to stray from the intended path, due to more physical barriers, there is no thinner, visual optimal path like in Cel Damage.

Whilst pick-ups can be placed in more risky positions, often multiple are placed in easy to collect positions, so many players can possess the items at once. You cannot tell what is inside eac pick-up, they are randomised. Whilst some may be stronger than others, they can act as counters, for instance a green shell can counter a red, a banana can protect the player from green/red shells.

Pick up placement example

(Cel Damage)



pick-ups often spread similar distances apart which creates placement predictability for players, therefore more anticipation before their presence, then an increase in combat to obtain them

Pick-ups often display what they contain, however sometimes they display a "?" where they contain a randomised pick-up

- Generally, make sure there is equal opportunity for players both inexperienced and experienced to collect them, but harder to take routes could have one as a reward
- Make sure they are spaced out, too many could make the game unbalanced and too chaotic

-

Track design questions you can ask yourself

Does it?

-make the most of the main mechanics and use it in refreshing ways

-make speed prioritised and feel good

-embrace predictability (i.e of upcoming corners) and balance it with uncertainty, forcing players to make choices

-have shortcuts that can appropriately challenging to create a sense of mastery

-have a variety of navigational challenges/obstacles/features, such as tight corners, ramps that are spaced out appropriately to avoid fatigue

-have items appropriately spaced out, to create predictability and competitivity for them, but also equal opportunity to collect them

Micro Machine environmental effects

https://youtu.be/sgRleeglCG4?t=558

In the video above, a real-world object has been implemented as a forced choice to propel players to the next part of the level, changing the pacing.

Corners

In cornering there is an apex route, which is the part of the corner they need to hit to get the fastest lap time they possibly can.

Think about apexes when designing corners, as some games, create additional risk (and thereby satisfaction) if the apex is successfully hit.

Curvature diversity is welcomed amongst inexperienced players, but experienced players like tight corners and long straights due to wanting to maintain high speed, so think about making a compromise when designing your level, by adding curvature diversity but also plenty of opportunities for high-speed areas.

Document where this information was obtained from is below:



For example, Airship Fortress in Mario Kart places manhole covers that pop up near the apex.



Types of corners can also affect the pace of a track, for example, short sharp corners significantly slow down players.

A real-life example is a Chicane corner, which is a serpentine curve which is used to slow down traffic. This could be used after areas of high intensity to syphon players at a steady rate to the next area.





The three main types of corners:

-Before a long straight, which gives players opportunity to overtake

- -Before a short straight
- -Before a sequence of corners

Apex images:



Here are some images of tracks that use interesting corners and are regarded highly within their respective communities. They are from Mario Kart, Crash Racing and Sonic Team Racing.



Track Types Downforce and Power Tracks

Downlotce and Power Track

Downforce track has:

-fewer and shorter straights to have more emphasis on corners (Monaco and Hungary)

Power track has:

A focus on high speed and acceleration, with long straight sections and slow short corners (Italian Monzo is the closest to a power track).

Think about taking inspiration from these types of tracks

Implementing Obstacles

We have:

- -Rolling balls
- -Boost pads
- -Leaking treat bag
- -Falling treats
- -Soapy puddles
- -Bird cage
- -Bird poops splash screen
- -Till with cash drawer that pops out
- -Conveyor



In this short diagram we have vertically rolling balls which force players to swerve more consistently, therefore becoming a longer obstacle to overcome, potentially upping gameplay intensity. This shows how simply changing directionality can have large impacts on the game and should be used sparingly. Due to this obstacle's length, if used in a track I recommend using it this way once as it is tedious for the player to overcome.

Below is a timestamped instance of vertical rolling snow boulders.

https://youtu.be/zCkndSY4ncQ?t=623

Track width and general spacing



Verticality

Thanks to the modular shelf kit, we can use the pieces to create ramps for our game.

BONUS STUDY

When designing a track, you could try to account for areas where visual attention is needed to be the highest, for example after a speed boost around a corner, make sure the necessary information can also be absorbed well with the increased speed.

Visual Areas of interest in driving games

3. DATA ANALYSIS

Four areas of interest (AOIs) on the visual field were determined (Figure 2), for which the number and duration of eye fixations were analyzed. This procedure was performed through the software *ASL Results Plus (version 1.8.2.18)*. These areas corresponded to: AOI 1 = road; AOI 2 = speedometer; AOI 3 = rear view mirror and time; and AOI 4 = any part of the visual field that was not considered an area of interest (outside).



It might be worth considering where the most visual attention will be and how these changes when the players speed up.

A study by Angelo (2017) revealed that when traffic was increased 10% participants increased the efficiency of their attention, favouring spatially closer objects.

References

https://revistas.unisinos.br/index.php/sdrj/article/view/sdrj.2019.123.02/60747765