Analysis of the Current System – F1 23®

Background

Every year, UK-based video games developer Codemasters create a new iteration of their licensed Formula 1 racing simulation game, F1® XX, now published by Electronic Arts. The current iteration of the game, F1® 23, is widely popular amongst both casual and hardcore fans of the motorsport. For several years, Codemasters have run an officially sanctioned eSports series which is qualified for via in-game events accessible to all players. In addition to the officially sanctioned series, many community-based events are accessible through the in-game "leagues" feature as well as third parties boards and discussion forums, often providing prizes for high placing individuals and teams.

In recent years, the popularity of the games have skyrocketed alongside the popularity of the global sport which it attempts to replicate. Independently reported figures of playercounts during the game's launch period show peaks above 14,000[1] on Steam alone, which itself accounts for a small percentage of the playerbase.

Players aspiring to reach the heights of qualification for these eSports series often find themselves reaching ceilings in their improvement, which prevents them from taking the step into more competitive leagues and eSports series. Generally, players at this level understand the basics of driving the car but are inexperienced in advanced driving techniques used by top level drivers such as trail braking, the setup of the car, and the management of fuel levels and tyre wear over the course of a race. While this generally applies only to the more competitive drivers who want to improve against other competitive players, the same can be said for more casual players who are looking to gradually increase the difficulty level of the AI they race against, or improve against friends who also play the game.

As the F1® 23 game is a simulation of Formula 1 motorsports, players at the more amateur/inexperienced levels of competition within the game are often playing at a disadvantage to their more experienced and higher level counterparts, who are more invested in the game. This is because while F1® 23 is an accessible game which caters to all control types, there exists highly expensive and sophisticated wheel, pedal and cockpit setups which aim to simulate the forces felt through a real car. This allows players using these setups to have a greater moment-to-moment understanding of the

[1] F1® 23 - Steam Charts

car's behaviour than players using gamepads, who have to rely solely on eyesight, audio cues and the limited vibration motors inside the controller.

Independent research carried out by third parties[2] shows that there is a great deal of application of simulator/game based telemetry data in the optimisation of a driver's performance. While the study in question focuses on the application of said feedback to a real-world scenario, it can be logically concluded that the same conclusions can be drawn of the efficacy of telemetry data when applied to the same simulations.

Current System

Internal Systems –

Currently, Codemasters offers no way to access recorded telemetry data in-game. The only tools available to a player to gauge their improvement or development is to compare differences in lap/sector times in time trial mode, or to use certain limited 'practice' programmes in select career mode sessions. In the up-to-date game, F1® 23, the information offered through career mode practising programmes is limited to measuring basic percentages against a target determined by the AI difficulty, and does not not give the player a clear path to improvement.

External Offerings –

For the current generation of F1® games, there exists a limited amount of externally maintained and developed telemetry analysis solutions. While these telemetry tools do provide a near complete implementation of the data sent by the game's telemetry protocol, one common issue is that data is presented in an un-intuitive and user-unfriendly format which makes it hard to analyse material from at best, and in the case of the average user, is almost impossible to operate. Another key limitation of existing telemetry analysis solutions is that beyond the display of data (by graph or text), there is little no additional processing done to the data in order to generate personalised improvements or give feedback on the player's behaviour[3].

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[2] Telemetry-based optimisation for user training in racing simulators

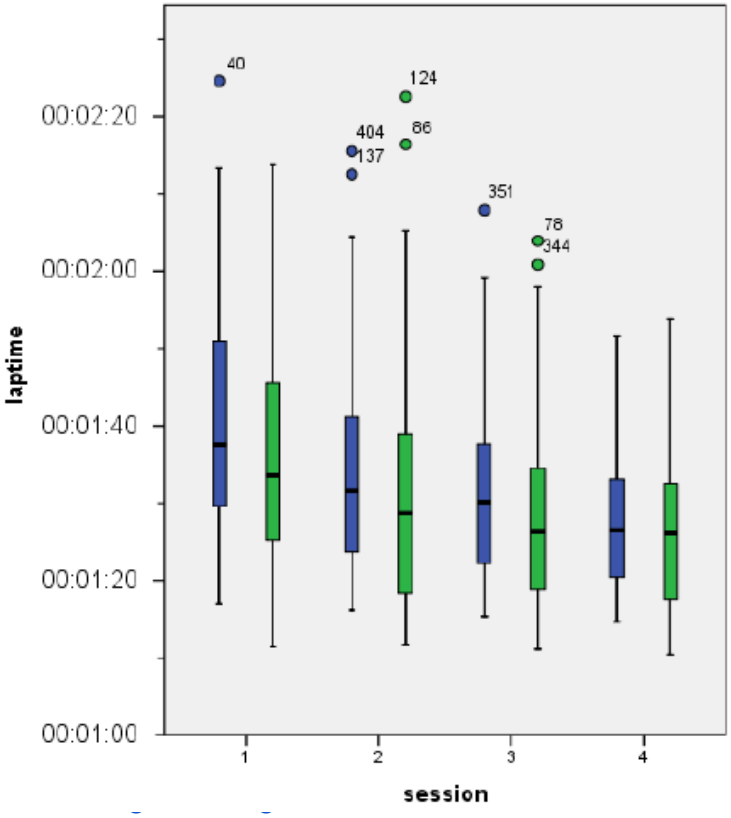
[3] Telemetry Tool for F1 23 (and many other games), Telemetry - F1Laps

For players looking to genuinely improve at all or even some aspects of their driving, their options are extremely limited and all of which require the player to already have a deeper understanding of driving techniques and how they can improve their performance, given the information presented by the applications.

Approaches to Research

In order to better understand the shortcomings of the current system, I interviewed an intermediate level player who felt that they had hit a wall with their improvement, and found diminishing returns in their efforts to improve their performance. They were able to convey their frustrations with certain elements of and address key areas of concern with the existing system. From this interview, I was able to extrapolate requirements and objectives for the solution that I will design to meet/attain.

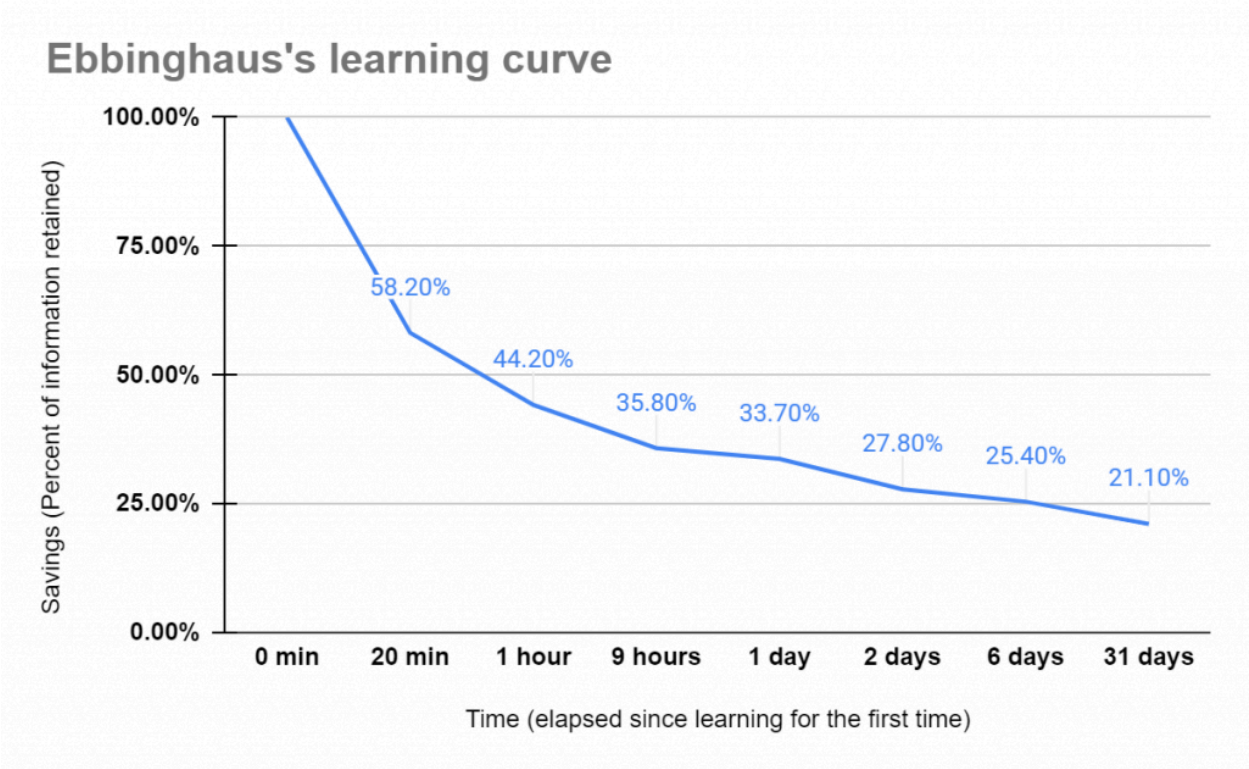
Another facet of my research has been focused specifically on the effectiveness of telemetry-based training programmes and the techniques and mathematical equations used in order to objectively examine player data and generate feedback which can be reapplied in gameplay. A study of 27 participants[4] showed conclusive improvement across the board in measured lap times when players had been subjected to a training programme backed by telemetry data (pictured below).



One conclusion drawn in the study was that when participants who had been subjected to telemetry-based training were then telemetry was disabled afterwards. Therefore, a goal of my solution to the problems faced in the current system will be to implement reminders and daily/weekly practice

[4] Telemetry-based optimisation for

programmes, alternated between areas of improvement, for users of my solution. This is because according to several neuroscientific studies conducted on groups of participants in the past decade[5][6], the utilisation of 'Spaced Learning' techniques, in which learning/practice of a concept is spaced out and repeated in intervals, are likely to result in the promotion of "long-term conceptual understanding and reflective skill development"[6]. The Ebbinghaus curve of forgetting (depicted below), hypothesised by the same psychologist (Hermann Ebbinghaus) who discovered the 'Spacing Effect' referenced in these studies, illustrates the decline in retention of learned information in a subject as time passes. This reinforces the need for my solution to implement regular stimulation, in order to offset the decline of skill which was demonstrated in the study of Telemetry-based optimisation[4].



[5] Making long-term memories in minutes: a spaced learning pattern from memory research in education
[6] Evidence of the Spacing Effect and Influences on Perceptions of Learning and Science Curricula - US National Library of Medicine

User Identification

Potential Users

Players – Players currently only examine limited amounts of telemetry information presented through in-game interfaces, or manually extract verbose information and create their own interpretations of the data.

In my revised system, Players could interact with a tool within the system that would automatically gather telemetry information and generate goals / improvement programmes programmatically, removing the need for the player to make their own inferences and draw their own conclusions from telemetry data.

Other Players – Currently, other players participate in time trial leaderboards on a track-by-track basis, ranking each player by lap time. In addition, other players participate in online grand prix racing; results of these races are not stored anywhere for later comparison or examination.

In an ideal system, other players could compare each other with more metrics than just lap times and immediate race results, using derived scorings of player performances and averages over many laps and in different skill sets in order to produce rankings and comparisons across different facets a player's driving, for example, one driver may be better at tyre management while another excels in raw pace, and this could be compared between both drivers in an ideal system.

Limitations

In my implementation of a revised system there remains a few areas of concern that lie out of the scope of the project as a result of resource constraints. While dynamic video tutorials and truly high level telemetry data extracted from a professional driver would be highly effective tools in order to aid the improvement and training of the user of the system, it is infeasible for me to implement these features as I lack the access to a line of communication with professional or otherwise highly skilled drivers in order to extract/produce the required telemetry data and tutorial videos.