

Project Proposal: Brawlhalla Balance Analysis

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Abstract—This proposal details a project with the goal of providing an accurate forecast for character viability based on previous game balance data. Python code along with public APIs that collect tournament data and balance notes will be used to perform analysis. Results from this project will include graphs and trends that describe the forecasted strength of characters when balance changes happen.

I. INTRODUCTION OBJECTIVE

Brawlhalla is a cross-platform fighting game that is conceptually very similar to the “Super Smash Bros.” franchise. When playing Brawlhalla though, a player will quickly learn how important being at a “frame-advantage”, or similar balance-based factors are in the competitive landscape. These balance factors can range anywhere from making a character’s jump attack one frame faster, or all the way to making the global jump animation one frame slower. Even a one-frame change can have drastic effects.

Frame data being important is a common thing among almost all fighting games. The fighting game player who has won the most championships out of anyone, Justin Wong, also acknowledges the importance of this [1]. Additionally, he has even asked about an app or similar feature for some of his favorite fighting games [2], to have an easier view of all the frame data. This shows that there is a demand for some easy way to digest all the frame data information for a specific fighting game community, and this project seeks to do that. Our goal is to provide an accurate analysis of the current balance data and then add on a balance forecast feature.

Our balance analysis and forecast project seeks to provide the information players want for their game with extra analysis included. This information will not only tell the players who the current statistically best character in the game is, but also show based on balance notes and patches, who should be the best. This insight will provide an easy way to digest information that is traditionally very hard to easily display in a fighting game community.

II. MOTIVATION

The motivation of the team in relation to this project can be separated into two categories: personal and professional.

Personally, each member of the project team has plenty of experience playing Brawlhalla (or similar games) and finds the process of how companies balance their characters fascinating. How does every character have a legitimate chance in every fight? How do the developers know when a character is too strong or too weak? Out of all of the data being collected by

the Brawlhalla developers, which data points are the best indicators of imbalance?

Professionally, without maintaining balance between all of the characters and preserving a relatively fair playing field, game longevity does not exist. It is for this reason that many games like Brawlhalla come and go in extremely short time spans. Development teams that are oblivious to imbalance or choose to take the “if it ain’t broke, don’t fix it” approach to character balancing in their games, the fanbase doesn’t tend to stick around. Therefore, paying close attention to each character and balancing them accordingly over time is essential to a game’s success. The data that we capture and analyze will hopefully give us a glimpse of the strategies that the Development team uses to balance their characters and remain relevant in a field that is so competitive.

III. METHOD

As discussed earlier, we are going to be pulling tournament data from Brawlhalla’s Stats API. This process will involve a good bit of data reshaping since the data structures provided are not in one clean table. First we will start with the get player request.

- A. GetPlayer Request: this returns the players name, SmashID, brawlhallaID, name, and a few other fields. Once we have a complete list of the players we can get all of their matches for each tournament
- B. GetPlayer Request: this returns an array of matches for a given tournament. The data returned includes the MatchID, scores, legends, maps, and opponents. Since we are focused on the legends and their stats, these will be broken down into individual lines based on each character choice and the win result.

To contextualize this data we will have a separate list detailing all the recent tournaments, their date, and the corresponding slug for API lookups. This can either be done through online research, or through the ListEvents Request.

- A. List Event Request: returns a list of tournaments, and it includes information on their slug, tournamentName, eventName, year, isOfficial, isTwos, and startTime.

We will also include the patch data to help guide patch decisions and to find trends. This will be done by referencing the website and adding them to a formatted table.

The process will go as follows: for every patch with a balance update, each change will be listed with its parent patch and date.

It is important to also note the limitations of this process. Matches are stored by best 2/3 or best 3/5 and even as they list the characters used, they may be hard to directly correlate to wins and losses. Percents may need to be used. As the example showed in the API's website, some of the matches may have empty strings for the legends. In some cases, the winds can be associated with the player whose legends are not blank.

IV. TEAM MEMBER RESPONSIBILITIES

Isaiah Weaver will be doing the brunt work of bringing in all of the data. This will include fetching the character data, event list, and patch list. They will be produced as python dataFrames to be used later.

Luke Alexander Farthing has had experience with data science and visualization in both educational and professional settings. His role will be to take the gross data and show both the initial general visualizations of the win totals and decide how to categorize the data. If needed, he will also design needed visuals for the final presentation. His additional role as far as analysis is to determine which characters could use a buff/nerf.

Jackson Dodd has solid experience in data science and statistics. As Luke will focus on the buffs, Jackson will focus on the trends from the past to help support these decisions. These conclusions will be backed up by statistics.

V. TIMELINE

This project is scheduled to be completed over the course of the entire semester, with presentations being in the final weeks. The start date for this project will be October 2nd, 2025, once the project proposals are submitted. At first, the priority for this project will be obtaining the data and getting into the ideal readable format for our purposes. While the data is being collected and formatted, placeholder data will be used to put together graphs and plots as practice for when the real data is available.

Next, the team will be focused on displaying the data and extrapolating meaning from it. Using the graphs and plots already generated (most likely through a Jupyter Notebook), the team will get clear visuals of the data for their own interpretation and eventually for use in the project presentation.

Finally, once the data that is deemed relevant is properly visualized, the project team will focus on interpreting the graphs and summarizing our findings. How heavy of an effect do buffs and nerfs have on the usage of a character? What about the character's win rate? Are the effects of buffs and nerfs more exaggerated on certain characters than others? Why? Is there an efficient way to predict which characters may benefit the best from buffs or nerfs?

Dates	Task to be Completed
10/2	Submit Project Proposal
10/14	Obtain Data
10/28	Transform Data Into Readable Format
11/11	Display Data
11/18	Interpret Data
11/25	Submit Final Project

VI. EXPECTED OUTCOME

Our expected and ideal outcome is providing players with a way to not only easily digest balance data for the game, but also be able to understand why it matters so much. In addition to this, we want to provide players with a way to develop an understanding of the data, by showing the expected balance forecast based on already-existing data. If the player can understand what variables have an impact on the game truly, they can make better informed decisions while playing.

This is important because all players need to understand this to be on the same playing field. While players in professional tournaments may understand all this data after the experience they have acquired, there should be an easier way to gain access to the information. We seek to provide that. Our analysis will hopefully help people better understand the importance of balance-data, and what balance variables make the most significant impact on the game.

REFERENCES

[1] Justin Wong, "Should I challenge or Should I not challenge?" YouTube. [Online]. Available: <https://www.youtube.com/watch?v=E4Q-I8UIETc>. [Accessed: Oct. 01, 2025].

[2] J. Wong (@JWonggg), X (Twitter), Feb. 28, 2024. [Online]. Available: <https://x.com/JWonggg/status/1762893519381840347>. [Accessed: Oct. 01, 2025].