

Parker Beckett u0283152 parkerabeckett1@gmail.com
Jacob Maynard u1350370 jakebrake115@gmail.com
Zachary Sealy u1371543 zacharysealy@gmail.com

Analysis of Player Behavior and Results in Apex Legends

<https://github.com/dataviscourse2024/group-project-apex-legends-analysis>

Background and Motivation:

We chose this topic because we all enjoy playing video games and wanted to explore the idea of mining, analyzing, and visualizing data from a video game. Apex Legends was chosen primarily since Zachary has prior experience playing at a high level, allowing us to understand the data and terminology more meaningfully. While many games have data tracked about them, as a multiplayer online game with a competitive Esports scene Apex Legends has a magnitude of data and special care given to its collection and storage.

We believe that in analyzing a game as complicated as this with as much data, it would be feasible to extrapolate a similar project to many other games of the same nature such as Overwatch or CS:GO. This analysis should provide insight into trends in the professional Apex Legends scene as well as serve as a backbone for any similar analysis for other competitive character shooters. Additionally, the ongoing competitive scene could allow us to test our theories in real-time.

Primary Objectives:

Our primary objective in this project is to use the player and hopefully, detailed match data to identify trends and patterns at the top of the Apex Legends competitive scene. Since these players are the most technically sound, it would be interesting to find which characters and weapons, as well as which combinations of these two, have the best performances.

We also plan to analyze their histories as well as the data surrounding the less experienced or skilled players to shed light on the behavior of the lesser-ranked players in contrast to their top-ranked counterparts. This could be beneficial in illuminating new players about the pitfalls they may or may not face, as well as paths to success that other players have been able to take. We strive that by the end of the visualization, we will have a complete understanding of the competitive scene and hierarchy, which could enhance a spectator's experience and ability to more properly predict the outcome of a given match.

Data:

Numerous leaderboards track all sorts of data such as character picks and weapon usage as well as statistics for a multitude of players. We plan to mainly analyze the players at the top of the charts, but we will also experiment with scrapping for global usage data if possible. A tool

will be implemented to gather the data from these leaderboards so that we will not have to manually enter the data into our workspace.

The ALGS website will give the most insight into competitive matches, with details such as team composition and damage with each weapon being valuable to tracking success. We will design a scraper so that we will not have to navigate the website with all of its drop-down menus manually.

[Tracker.gg](#) API for Player stats

[ApexLegendsStatus](#) Competitive

[ApexLegendsStatus](#) API

[ApexLegendsStatus](#) Player

Data Processing:

As the nature of the game dictates that a player will have good or bad games, we do not necessarily anticipate removing data points from the dataset as a whole. However, we will plan on separating the data into different subsets to distinguish the best players from those closer to the bottom of the ranked scene. Since all of these players play many matches, outliers should not sway the data too much in either direction and should be treated as an inevitable part of the game. We may decide to analyze these outliers or remove them to create additional visualizations.

We plan to derive a multitude of quantities from the data such as weapon usage, character usage, and player performance. We can use this data to construct additional datasets that can suggest the characters or weapons with which players find the most success be it kills or wins, as well as analyze matches to explore the importance of team composition. This data may be misleading, so if possible we will try to ascertain whether or not the familiarity between the players is a more significant factor. The individual match statistics of the ALGS series are quite in-depth but will be difficult to scrape and store so we must be sure to handle those with care. This will perhaps be our most informative data source and will provide us with many data points and attributes from which we can derive a multitude of interesting connections.

Visualization Design:

See last five pages of document.

Must-Have Features:

Each of the 3 main visualizations we came up with should be included as they give different critical information elements to the user. Being able to see their rank allows them to track and follow their progress in improving their elements. The ability to see how pros balance kills and placement is also critical to knowing risk vs reward for how a player stacks up in their games. Finally having charts with weapon and character information can let the user know how their

comfort picks compare to the pros and what weapons are currently considered strong with their usage and overall damage output.

Optional Features:

A tab navigation system would be nice to have so that the user can easily switch between different visualizations. More specific notifications. Adding flavor to visuals such as pictures and animations. More specific pro team data on how they earn elimination points.

Project Schedule:

Update Process Book at the end of every week

Week 5: Project Review with Staff / Build web scrapers / implement API for statistics

Week 6: Project Review with Staff / Gather and organize data into subsets

Week 7: Construct the backbone of the website with the basic layout from prototype

Week 8: Ensure data structures are in place to allow visualizations, test these

Week 9: Ensure front-end and back-end of website are working, basic content clear

Week 10: Project Milestone due Friday 5pm / Start implementing interactivity

Week 11: React accordingly to feedback from milestone, finish implementing interactivity

Week 12: Finish implementing the last visualizations, test them to ensure correctness

Week 13: Finalize layout of website, polish visualizations according to late class standards

Week 14: Project Screencast Submission due Friday 5pm / Practice, record, edit screencast

Week 15: Any remaining polish and tweaks before submission

Week 16: Final Project Submission due Friday 5pm / Finalize submission

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Five Design Sheets:

Brainstorm

Ideas: short concepts that could be part of a whole

Circle charts for weapons and characters
Correlations between characters / weapons and kills / win rates
Drop down menus for weapons and characters that can show data pertaining to them
Data for each tier of competitive play
Split the data into many different subsets (per character, per weapon, etc.)
Team damage / kills comparison (Data Points)
Team rankings on damage to position or points (Bar graph)
Damage over game time progression, player vs pro (line graph)

Filter: remove duplicates / impossibles

Damage over time is not shown in the data set.

Categorize: order / group ideas

Player weapons, characters, general stats, and rank scores
Match data as attribute-rich data points to use in many visualizations
Team & pro player stats from competitive games in damage, eliminations
Comparison of average player to pro player

Combine & Refine: organize into bigger solutions / views

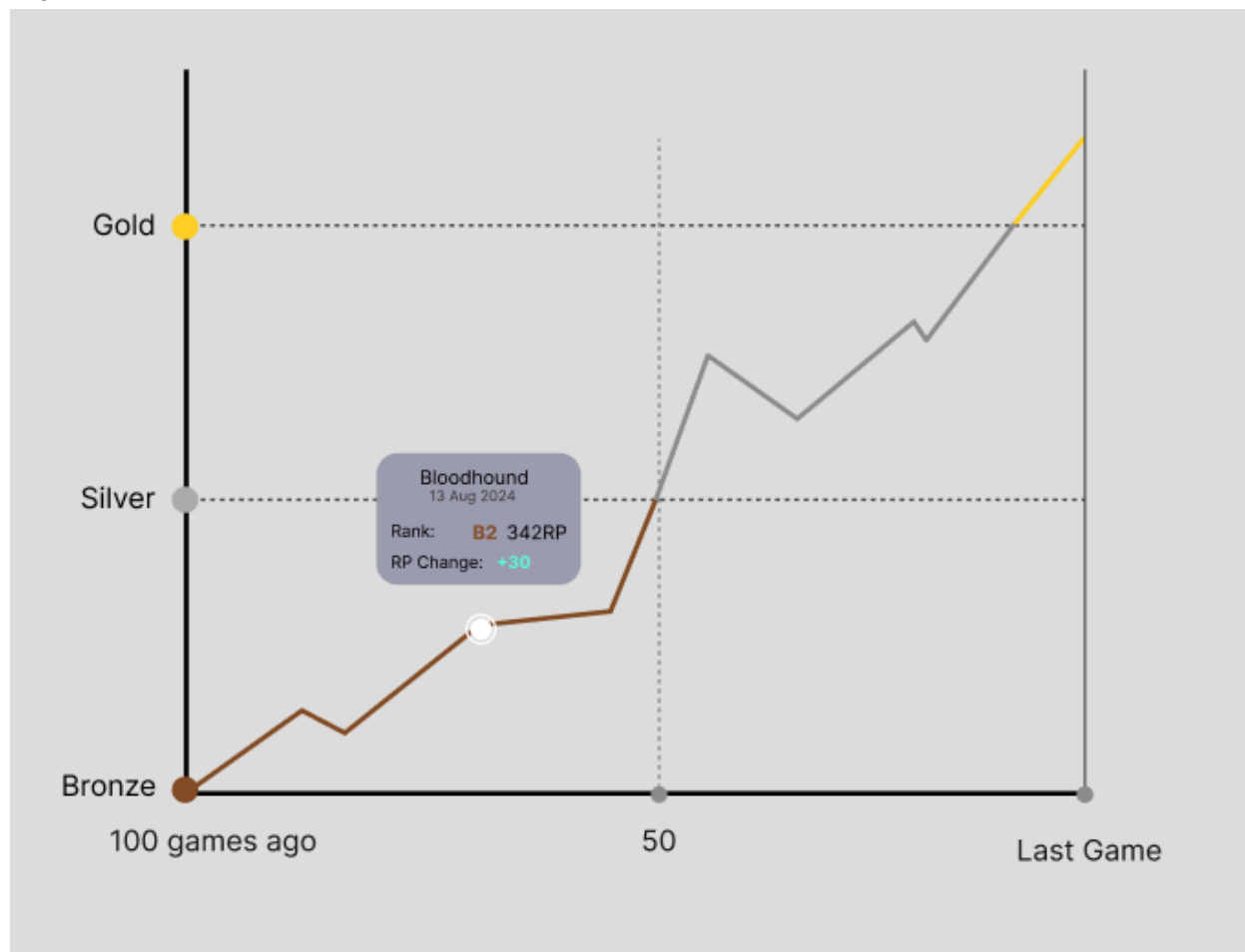
Aggregate character data and success rate over all players
Aggregate weapon data and success rate over all players
Team stats
Team comparisons

Question: does this provide a solution to the task?

We are aiming to illustrate the trends in the dataset that try to answer the question 'what are the best / worst characters and equipment to use in order to win at Apex Legends', and these four high-reaching data sets and systems should serve as a good template upon which we will attempt to answer that question.

Jacob Maynard

Layout



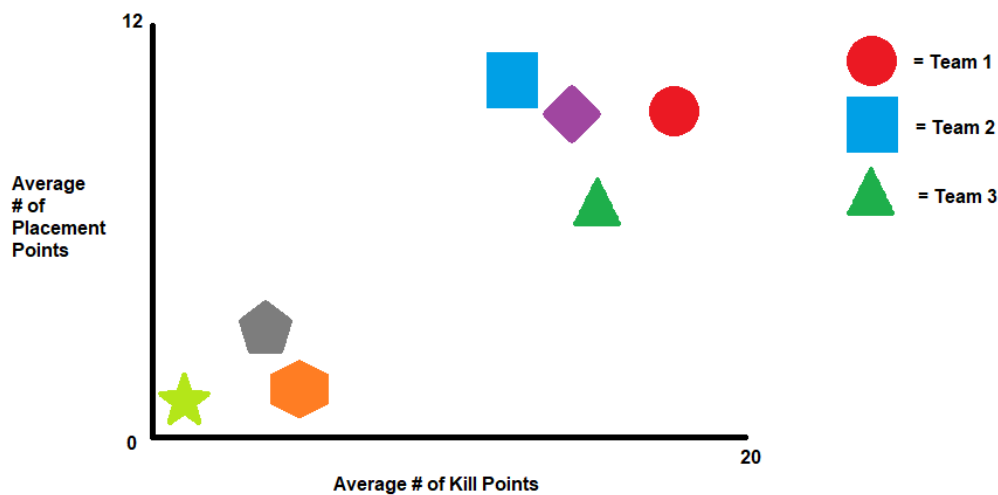
Focus: The focus of the visualization is on the progression through the ranked system. The user can interact by highlighting over the line to reveal the nearest match played to the cursor. For example I showed an example of a user hovering over the game they played on August 13th 2024 which shows their rank at that time and that they played Bloodhound and won their game gaining 30 RP.

Operations: The only operation to use the visualization is for the user to hover their mouse over the graph. The disadvantage of the interaction is that it is not immediately apparent to the user that hovering over the graph will have any specific interaction with the graph.

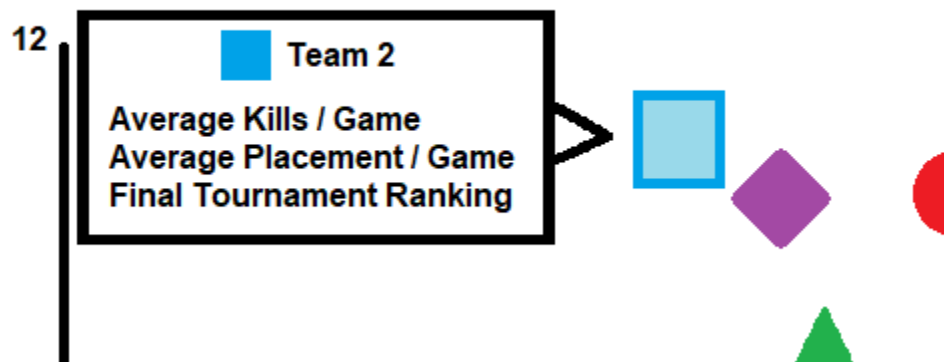
Discussion: This type of visualization allows a player to easily track how they are progressing (or not progressing) through the ranks. It is satisfying to look at and shows their trends over time.

Zach Sealy | 9/13/24 | Apex Legends Analysis

Layout



Focus

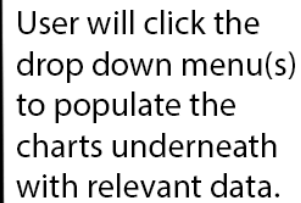
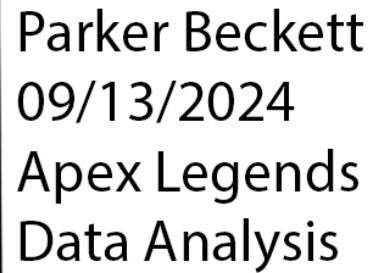


Operations

The user can click on one of the team's logos to get a better idea of the exact stats that are related to the team. While not drawn, ideally we could change which game the data is being pulled from and see how teams compare in individual games as well.

Discussion

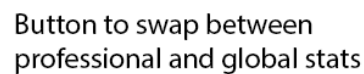
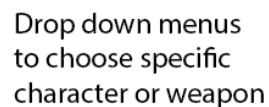
This display of the team's points is a great way of comparing how different team's strategies impact their overall score. A line drawn at 45 degrees shows a team that is scoring the same amount of placement points as kill points. Whether a team's logo is above or below that line would indicate whether a team is scoring more from their placement or their eliminations. It also shows the total scores a team earns as the higher-scoring teams will find themselves further along that line.



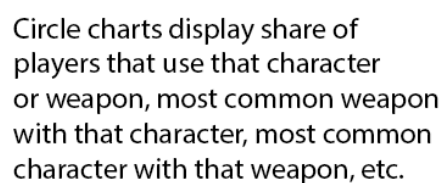
The swap button will change the back-end data source between global and pro play

Layout

Focus



Shows win rate and average kills



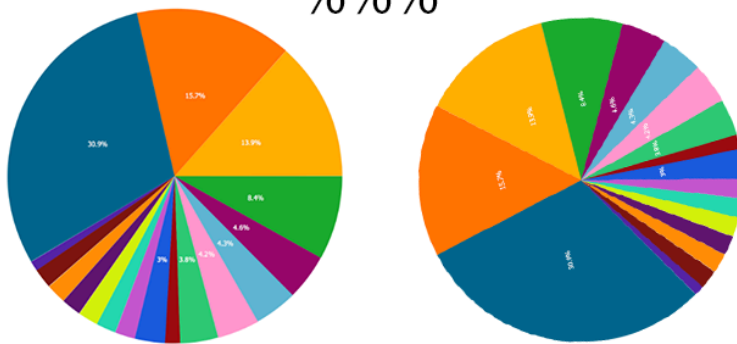
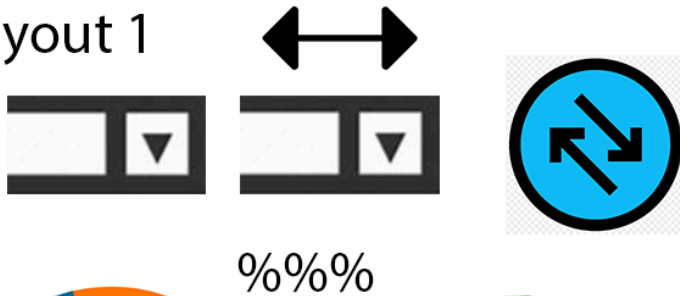
This visualization answers our question of which weapons and characters have the most success at either the pro or casual levels. It also shows their popularity for context

- + Will allow the user to view particular data about each weapon or character in either pro or casual play

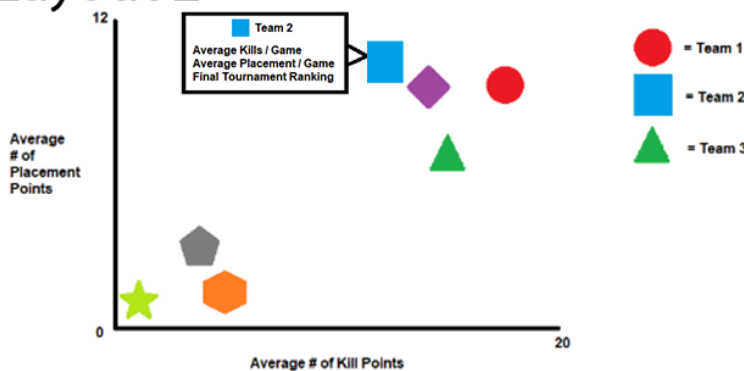
Only shows weapon and character data which is limited information

Doesn't show whether the popularity leads to success

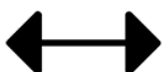
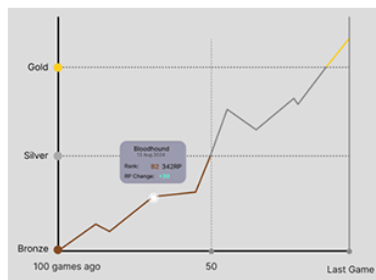
Layout 1



Layout 2



Layout 3



The final prototype combines the previous prototypes in order to show as much relevant data as possible

The main new addition will be a button to switch between the two views

Focus

Beckett, Sealy, Maynard Apex Legends Data Analysis

All operations used by prior prototypes will remain the same

A new button will switch between the different displays

All data for all teams and characters / weapons will be pre-loaded and filtered

Will need to collect data from the leaderboards using an API, may need to develop a scraper to properly navigate and extract the match data archives from pro play

Data will either have to be organized into multiple tables or a robust query system will have to be made

Drop down buttons and team buttons must be coded to be interactable

Will have to hide / show the pages rather than reload

& other detail factors from the combined prototypes from earlier