



Call of Duty Player Performance Analysis

Group 10

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Overview

- Motivation
- Dataset Description
- Methodology
- Analysis & Observations
 - Player Statistics
 - Weapon-Related Data
- Summary



CALL^{OF}DUTY.

1. Motivation

What is Call of Duty (COD)?

- Competitive FPS video game
- Holds world championships

Why does analysis matter?

- Reveals how the game is been competitively played
- May provide insights helpful for pro players and game developers



2. Dataset Description

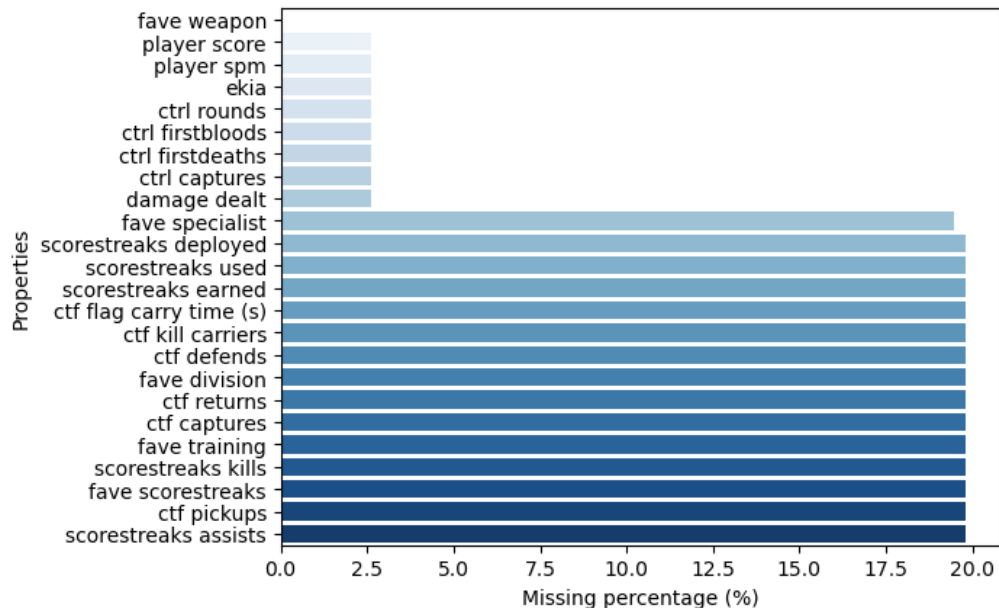


What data do we have?

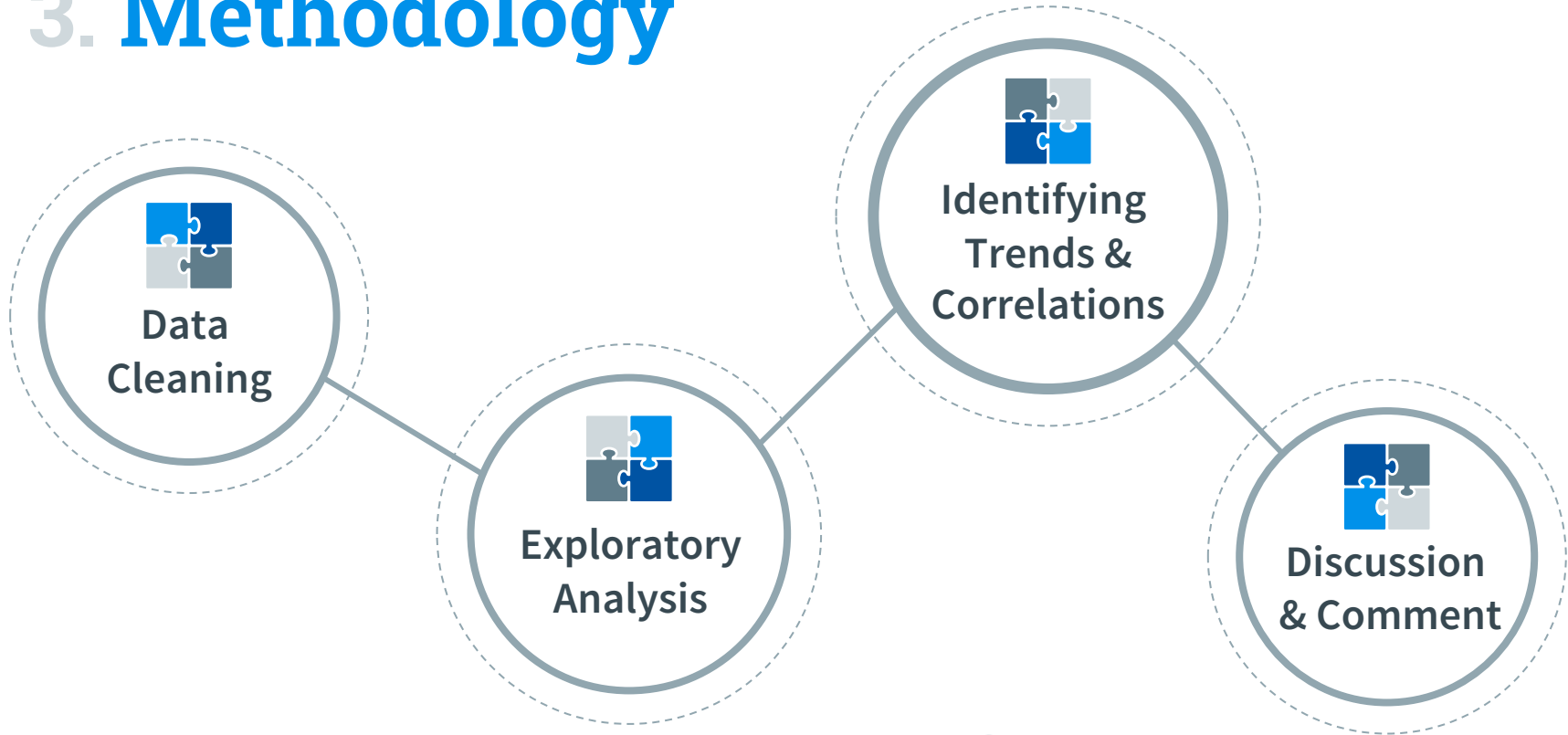
- ◎ COD World League (2017-2019)
- ◎ 18,552 data points & 76 features
- ◎ Adequate despite missing data

Why this dataset?

- ◎ Officially released by **Activision** the developer of COD and organizer of championships
- ◎ The relatively **consistent mechanics** of COD make it still useful for today's analysis



3. Methodology



A decorative network diagram in the top-left corner, featuring a complex web of interconnected nodes and lines, with some nodes highlighted in grey and others in white.

4.

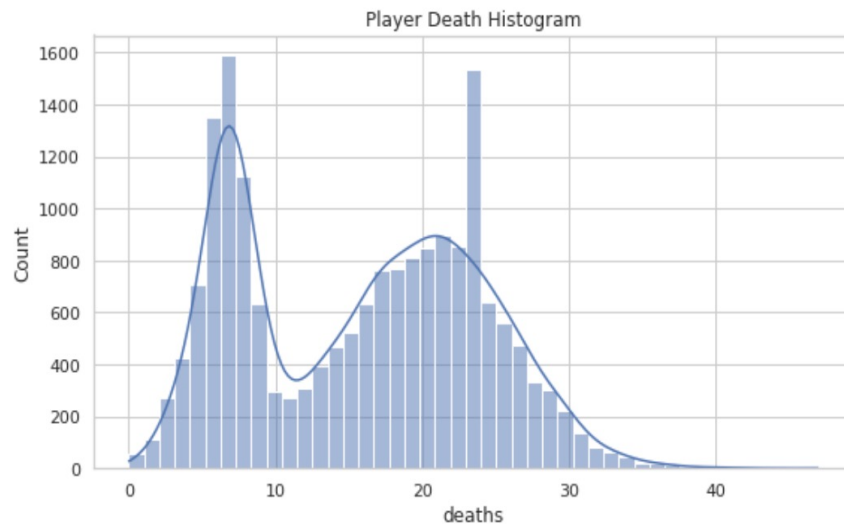
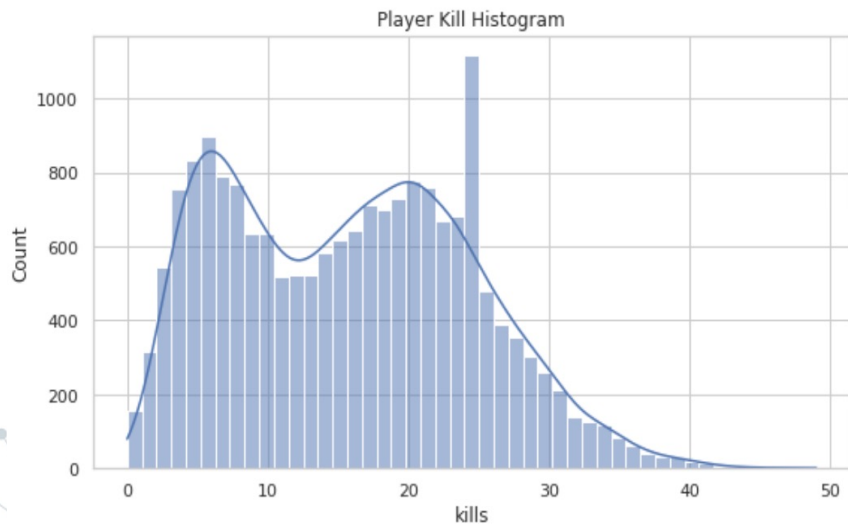
Analysis & Observations

Player & Weapon-related Statistics

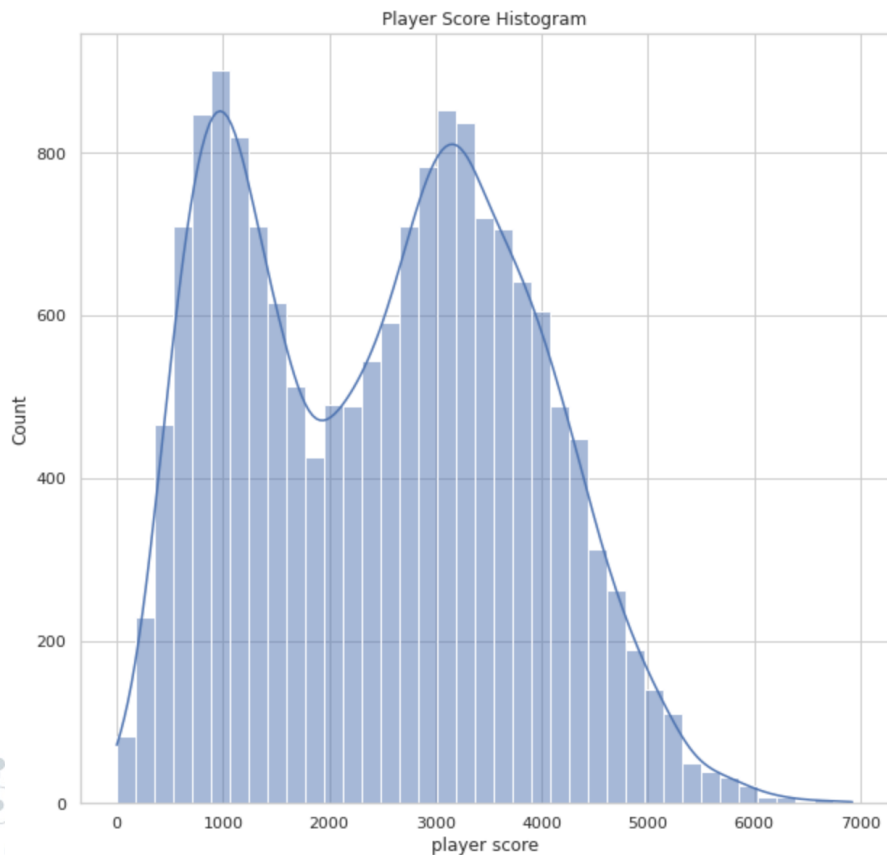
Player Kill & Death Counts

- ◎ The most fundamental player statistics
- ◎ Observe similar two peak distributions
- ◎ The lower peaks display higher density

Score	Kills	Deaths	Confirms	Denies
3200	26	7	21	4
2505	26	8	9	4
2150	20	14	9	6
2010	16	13	12	4
1375	10	12	9	2
1070	4	12	5	4



Player Score Distribution



Player score explained:

- Comprehensive **contribution** to the match outcome
- Players get scores in many ways, e.g. completing objectives

Our observation:

- Expected deviations from kill & death count distributions
- Still a two-peak distribution similar to kills & deaths distributions.

Headshot Kills vs Kill-Death Count

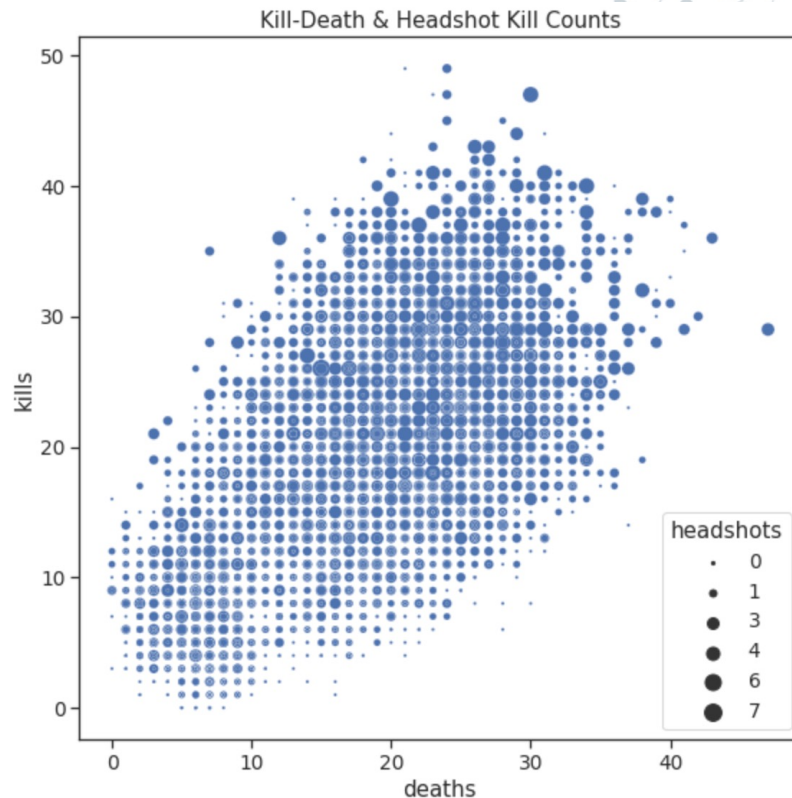
Headshot explained:

- Shooting enemies in their heads
- Requires good aiming skills
- Inflicts much greater damage

Our observation:

- The further the data points deviate from the origin (zero point), the higher the headshot kills

*We'll revisit the headshot data later



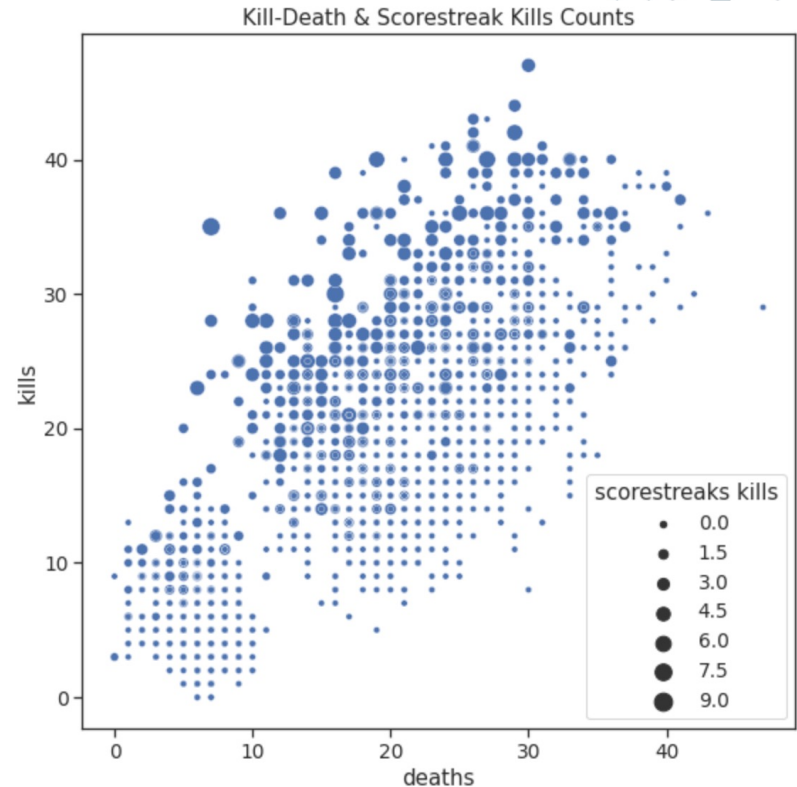
Scorestreak Kills vs Kill-Death Counts

Scorestreak explained:

- Additional abilities earned by the player during a match
- Can achieve multiple kills in a row

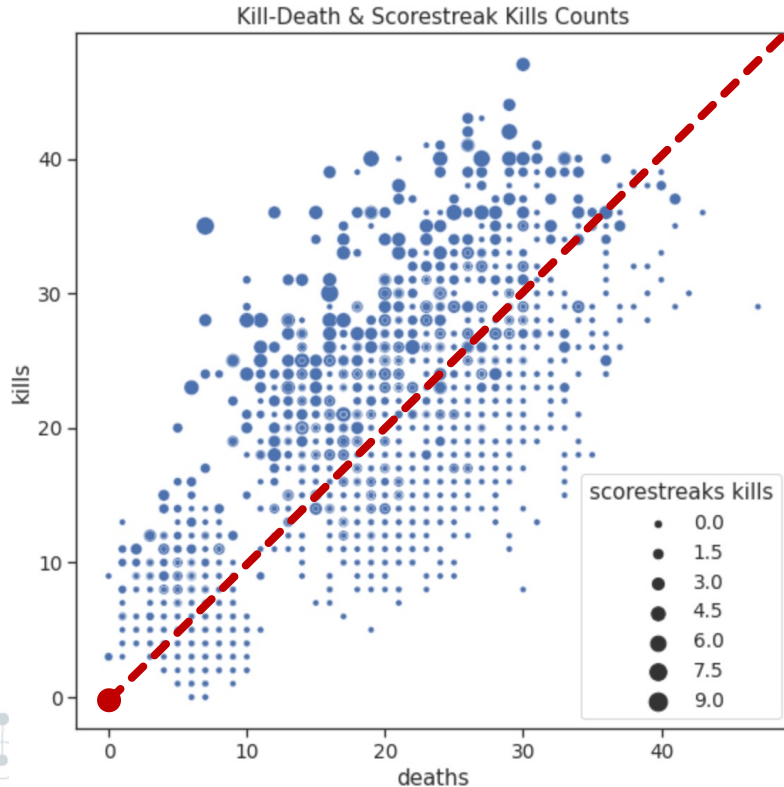
Our observation:

- Higher scorestreak kill data clusters at higher kill count sections
- Players with high kills tend to take better advantage of scorestreaks



Kill/Death (K/D) Ratio

Use '**K/D**' for short in the following content



Another interesting finding:

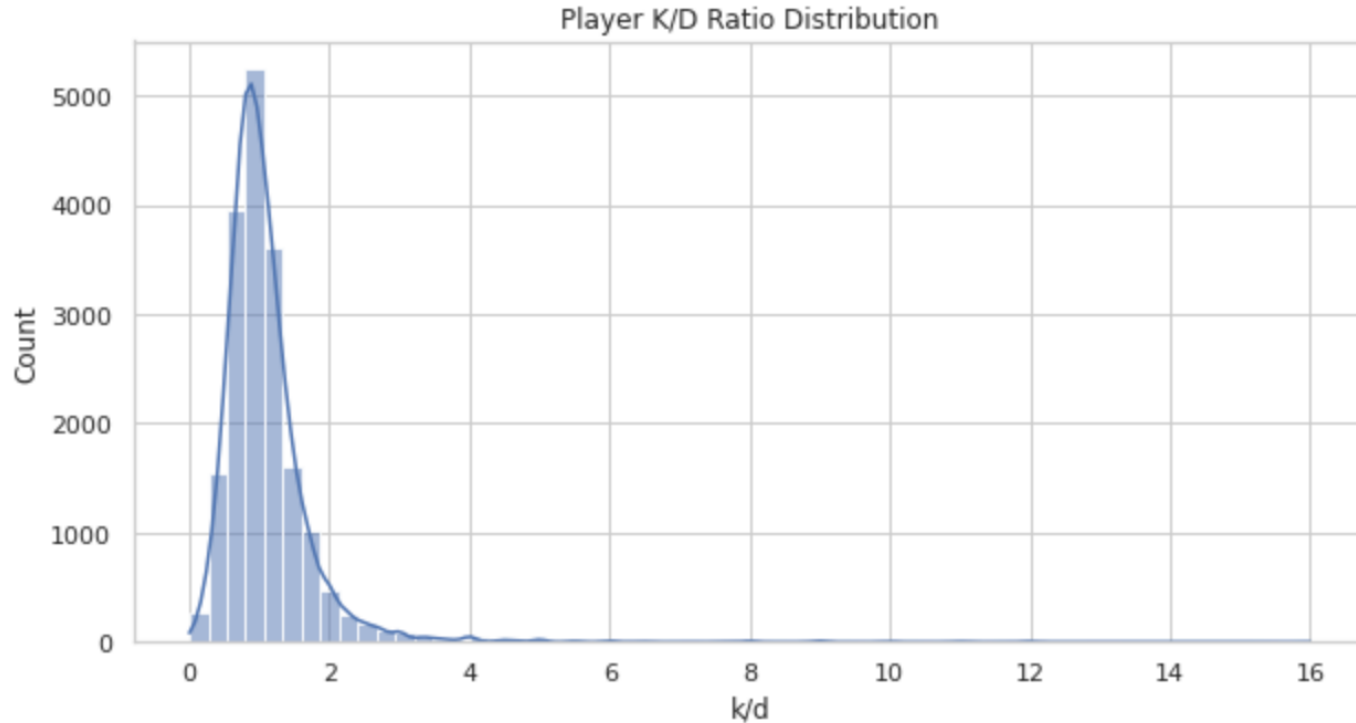
- Slope of a line viewed as the ratio of the kills and deaths for the data points on the line
- The larger the slope, the higher the weight of scorestreak kills at these data points

Introducing K/D ratio:

- The ratio between kill & death counts
- Coincides with a similar concept in real wars called **Loss Exchange Rate**

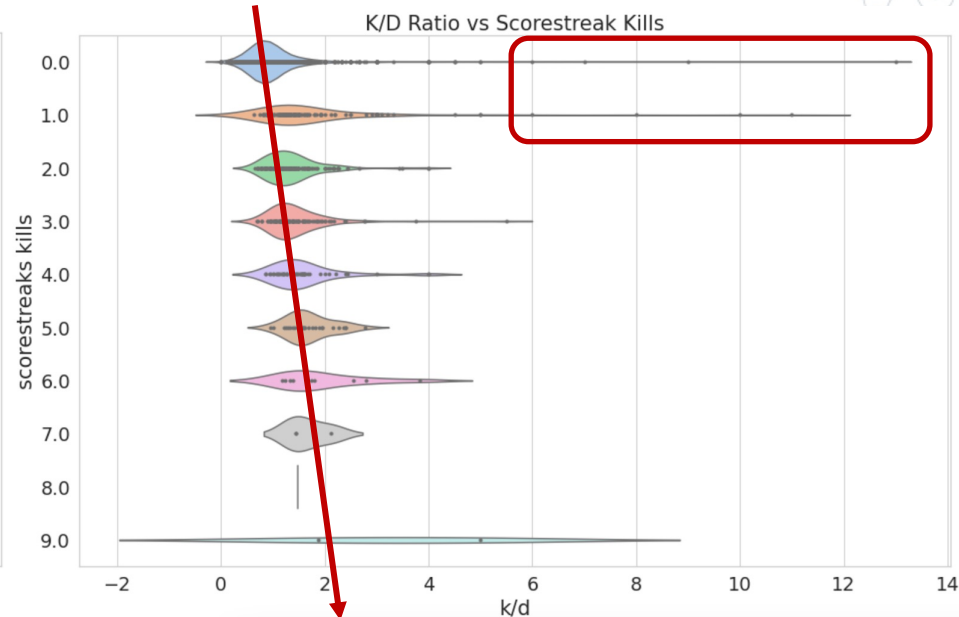
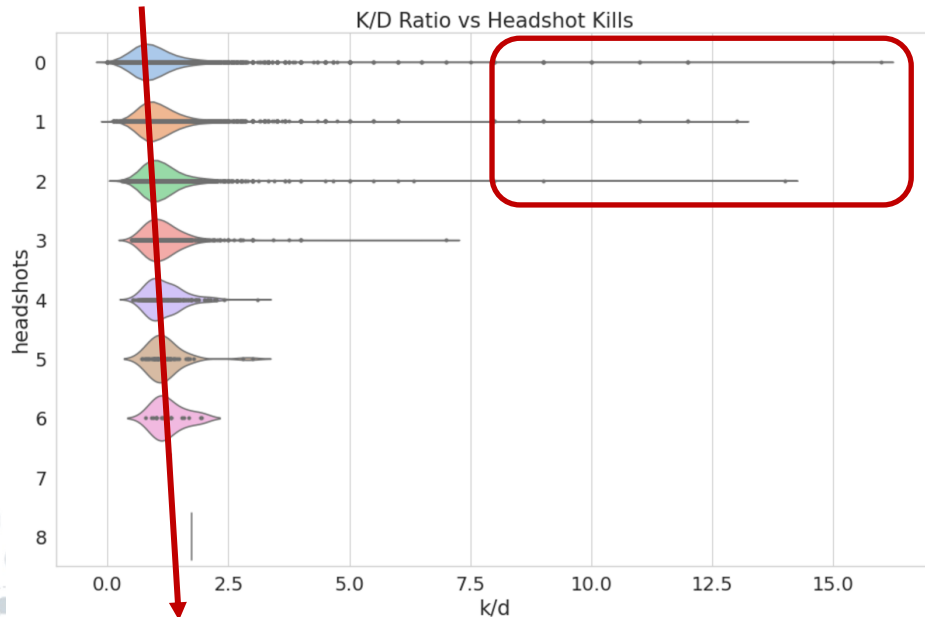
Overall K/D Distribution

Most players' K/D concentrate between 0 and 2



Headshot & Scorestreak Revisited

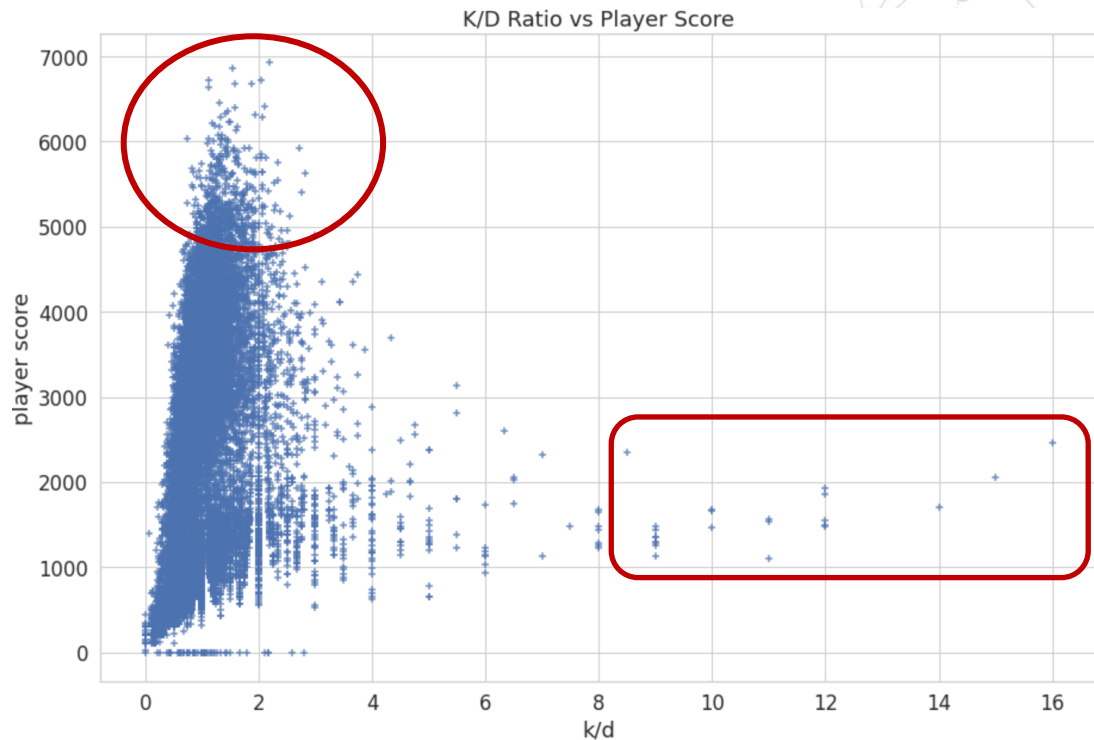
- Increase of average K/D with higher headshot/scorestreak kills
- High K/D data clusters at low levels of headshot/scorestreak kills



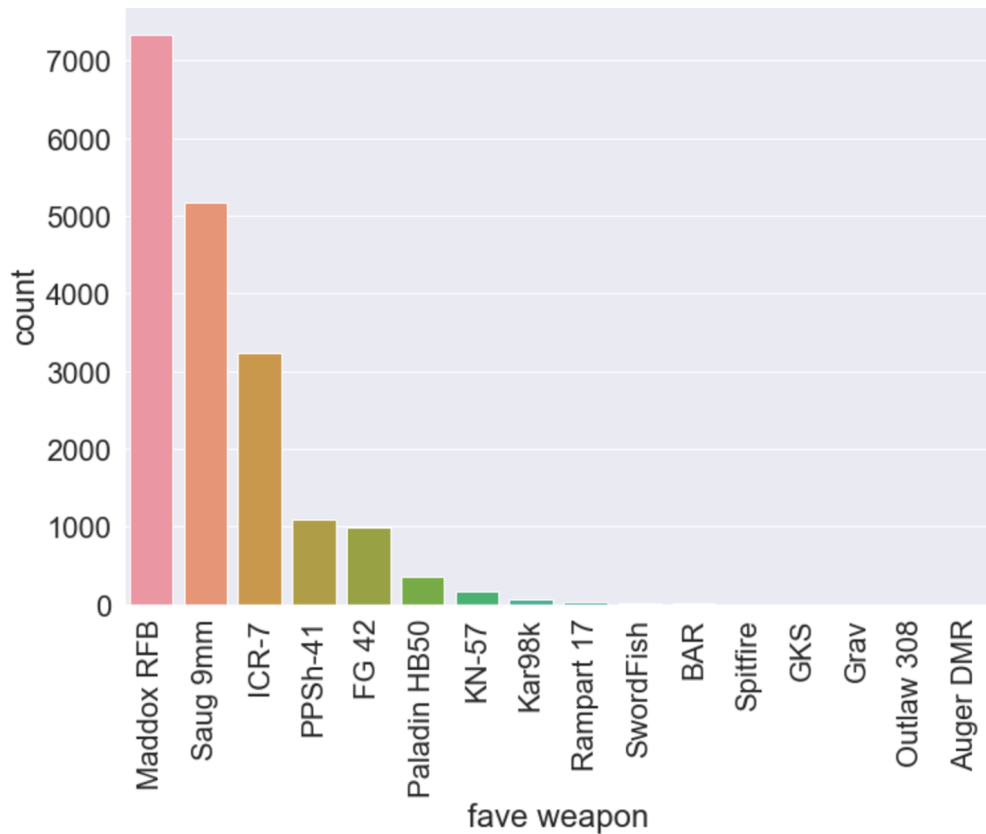
Player Score vs K/D

Our observation:

- ⦿ Players with high K/D tend to have relatively low scores
- ⦿ The K/D of players who achieve high scores concentrates at around 2
- ⦿ High K/D may not mean high contribution to the match outcome



Most Common Weapons Used



Ranked popular weapon choices

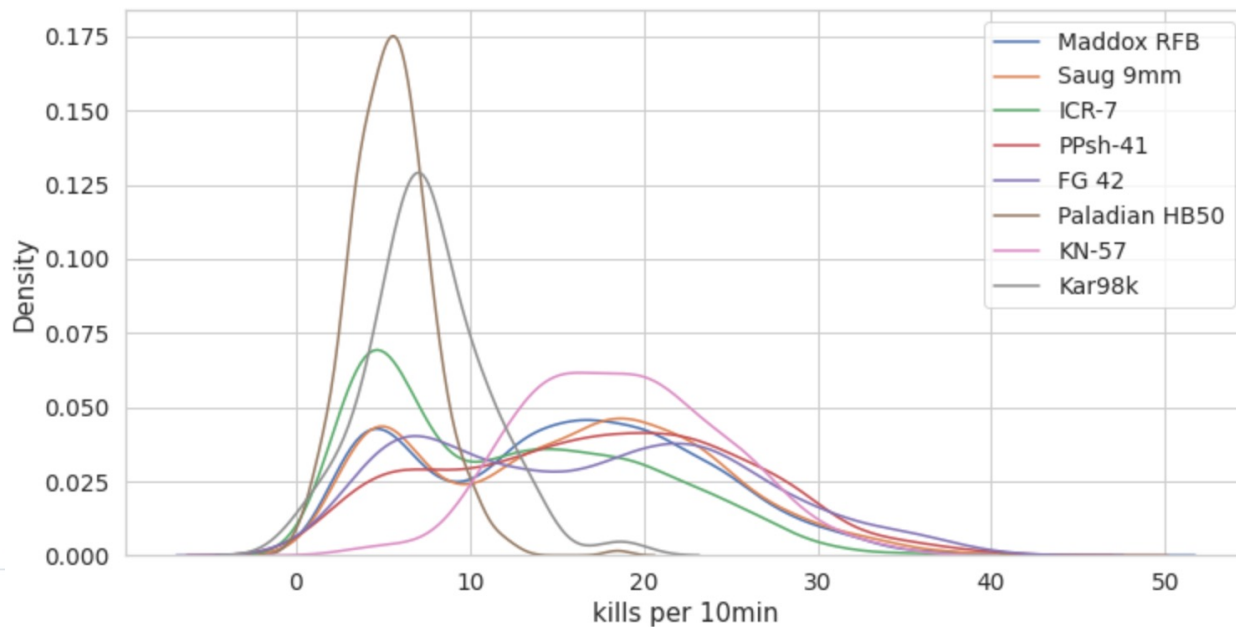
Our observation:

- Most players tend to use a few of the weapons
- Some weapons are rarely used
- The most popular weapon: Maddox RFB



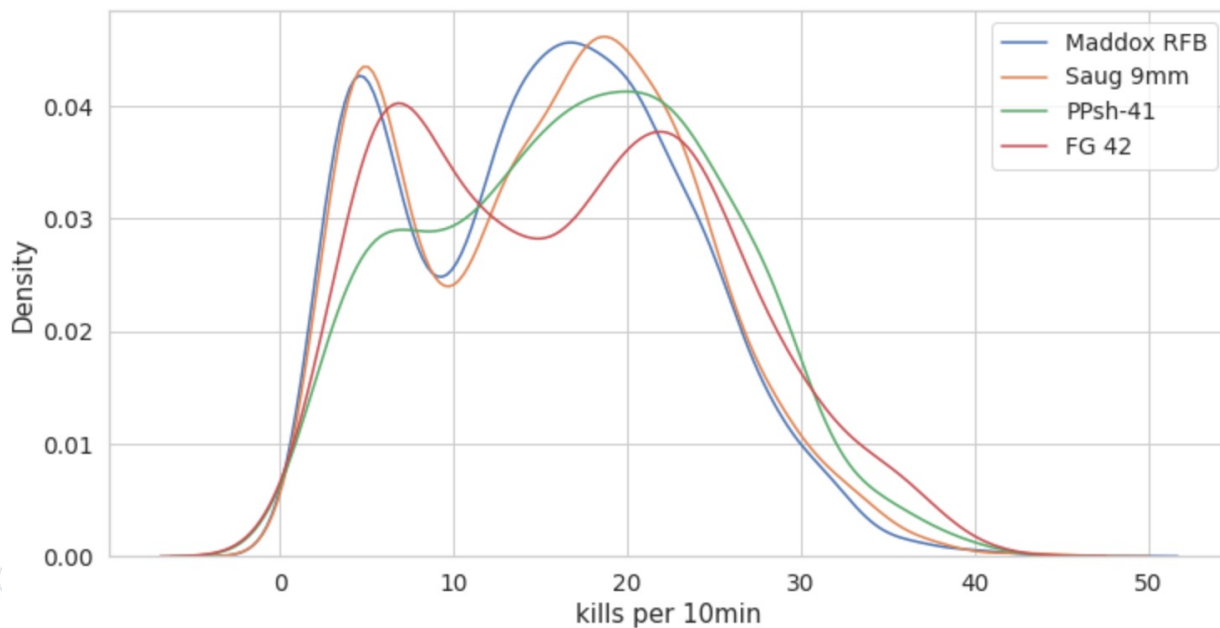
Top 8 Most Used Weapons Compared

- Kills per 10min: measures the 'efficiency' of killing enemies
- Observed different distributions with different weapons (to explain in subplots)



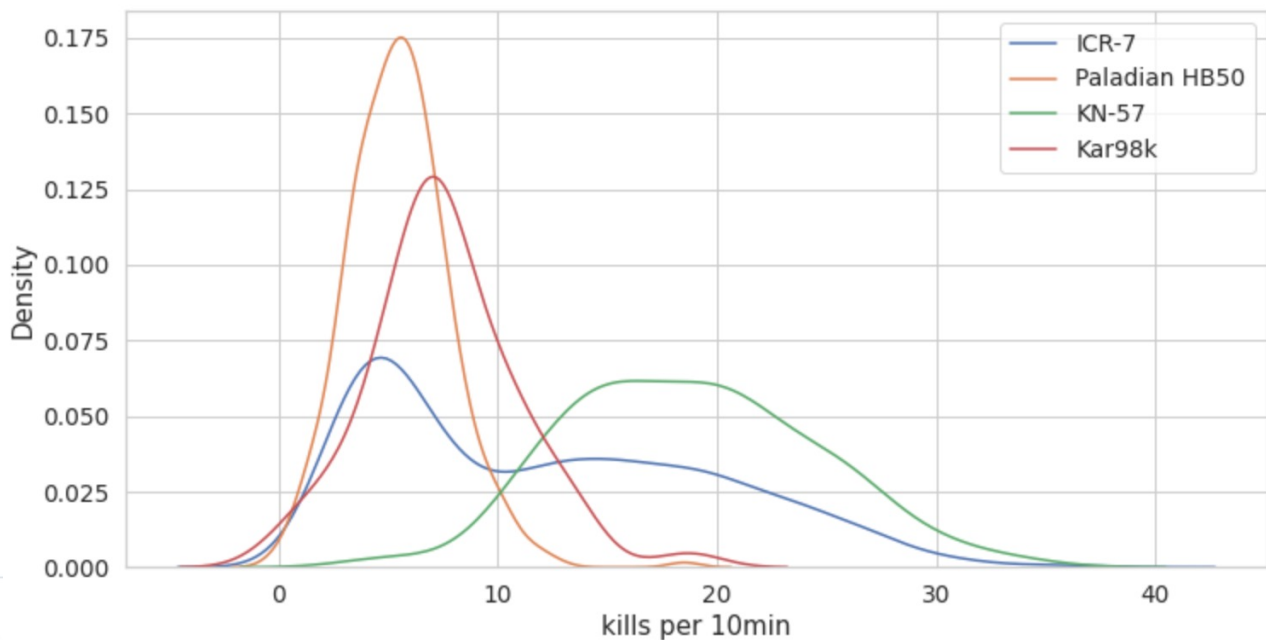
Weapons Exhibiting Similar Distributions

- Observed two peak distributions
- Potentially demonstrate features favored by most players



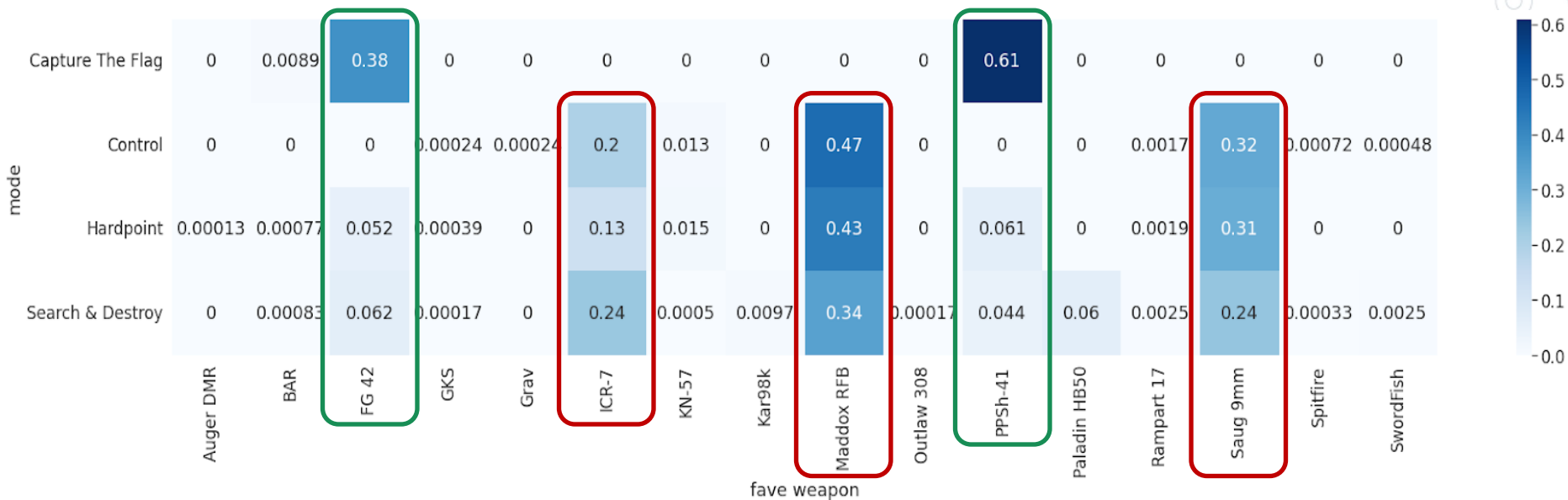
Weapons Displaying Different Trends

- ◎ **Paladian HB50** and **Kar98k** have a large peak at a low 'kills per 10min' count
- ◎ Potentially due to the distinctive designs of these weapons



Weapon Popularity vs Game Modes

- ◎ **Maddox, Saug 9mm, ICR-7** remain the most popular choices in 3 game modes
- ◎ Most players only use **PPsh-41** and **FG 42** in Capture The Flag mode



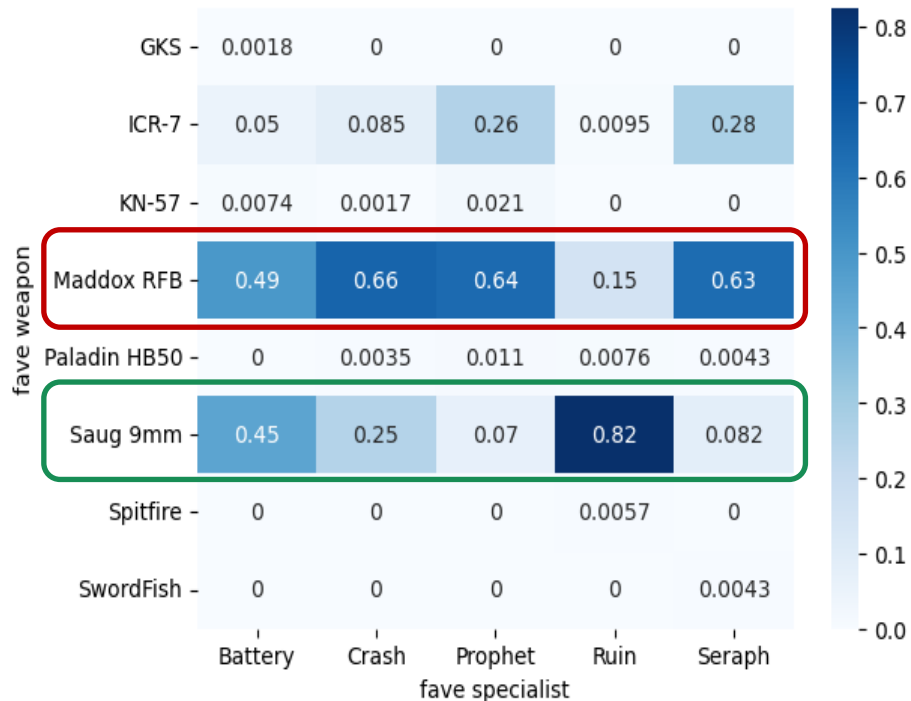
Weapon Popularity vs Specialists

Specialist explained:

- ⦿ Characters with different sets of capabilities & traits

Our observation:

- ⦿ **Maddox** remain the most popular weapon choice for most specialists
- ⦿ **Saug 9mm** seems to work even better than **Maddox** on the specialist **Ruin**
- ⦿ Potentially due to good combination of weapon characteristics and specialist traits



5. Summary



Player kills, deaths and score have similar distribution patterns



High K/D ratio doesn't seem to suggest great overall gaming technique or contribution to the match outcome



Different weapons exhibits different efficiency in killing enemy players



Weapon popularity is different depending on the specialist in use and the game mode at play



Thank you!

Any questions?