GDC

Identify your Players' Builds from In-Game Data

The BaT Approach

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Massive Entertainment

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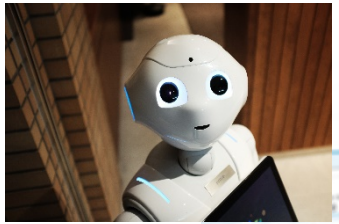
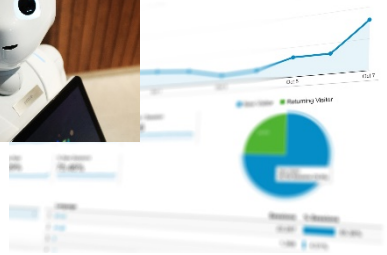
KEY LEARNINGS

PART 1

INTRODUCTION

WHO AM I





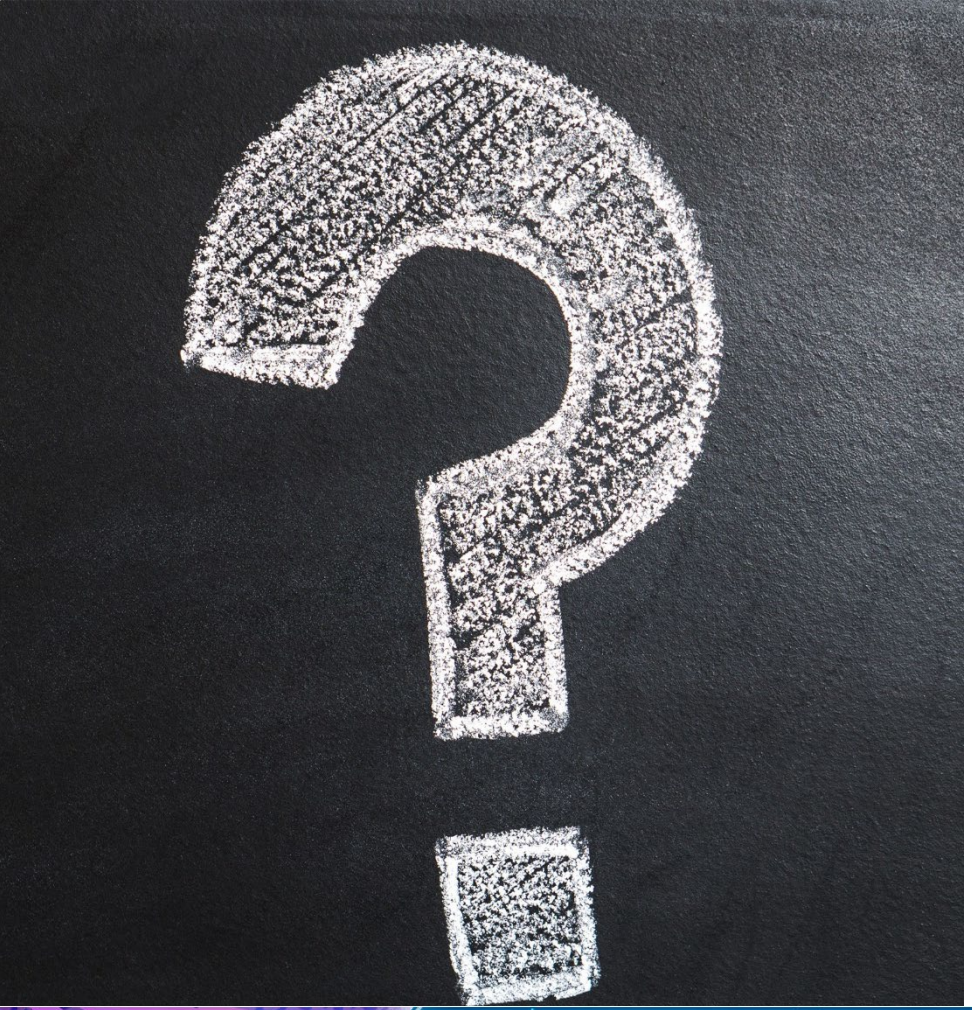
David Renaudie

MASSIVE

MASSIVE ENTERTAINMENT | A **UBISOFT** STUDIO

TOM CLANCY'S
THE DIVISION 2

Source: YouTube, "The Division 2 | Crazy Light Machine Gun (LMG) Crit Build Guide - 16+ Mil DPS For Heroic and Challenging Missions!" (March 9th, 2020)

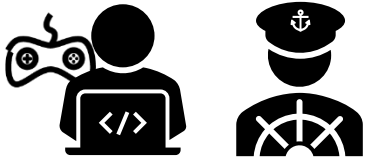


PROBLEM SPACE

Title update

Goal

Stakeholders



CHALLENGES

Data is big

Unsupervised machine learning is hard

Results interpretability is key

PART 2

A JOURNEY

EXPLORATION

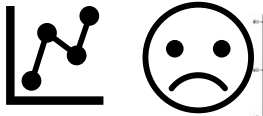
Data exploration & preparation

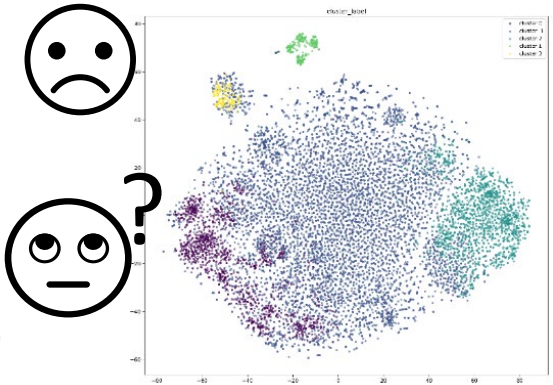
~ 300K-500K LINES

~50-100 COLUMNS

K-means + 1-hot encoding

6000





DBScan

Gower's Distance

Visualization (T-SNE)

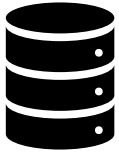
BUILD
AS
TEXT

THE IDEA IN A NUTSHELL: BAT

PART 3

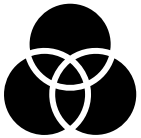
METHOD & EXAMPLES

HOW IT WORKS

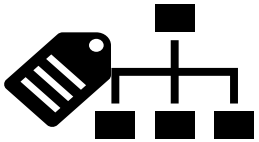


Data Extraction

Data Encoding

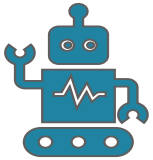


Topic Modelling



Allocation Criteria

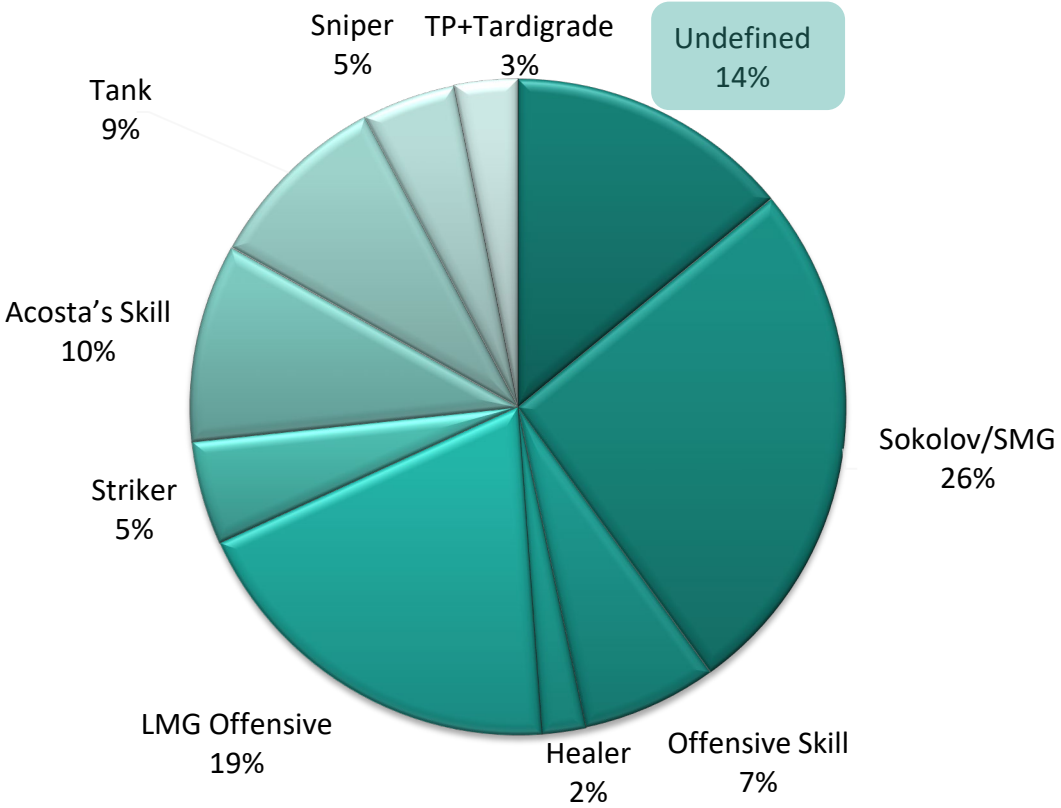
Report Creation

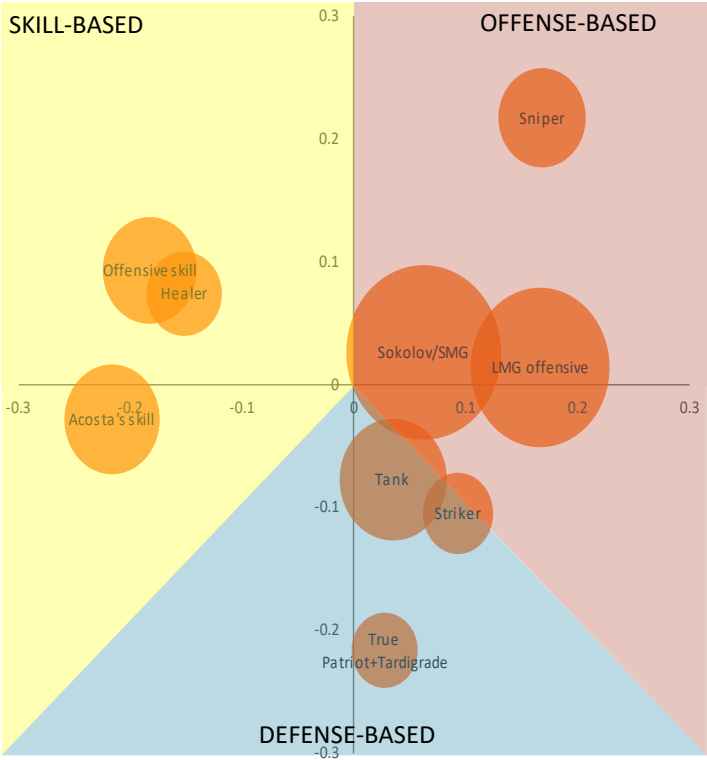


Latent Dirichlet Allocation (LDA)

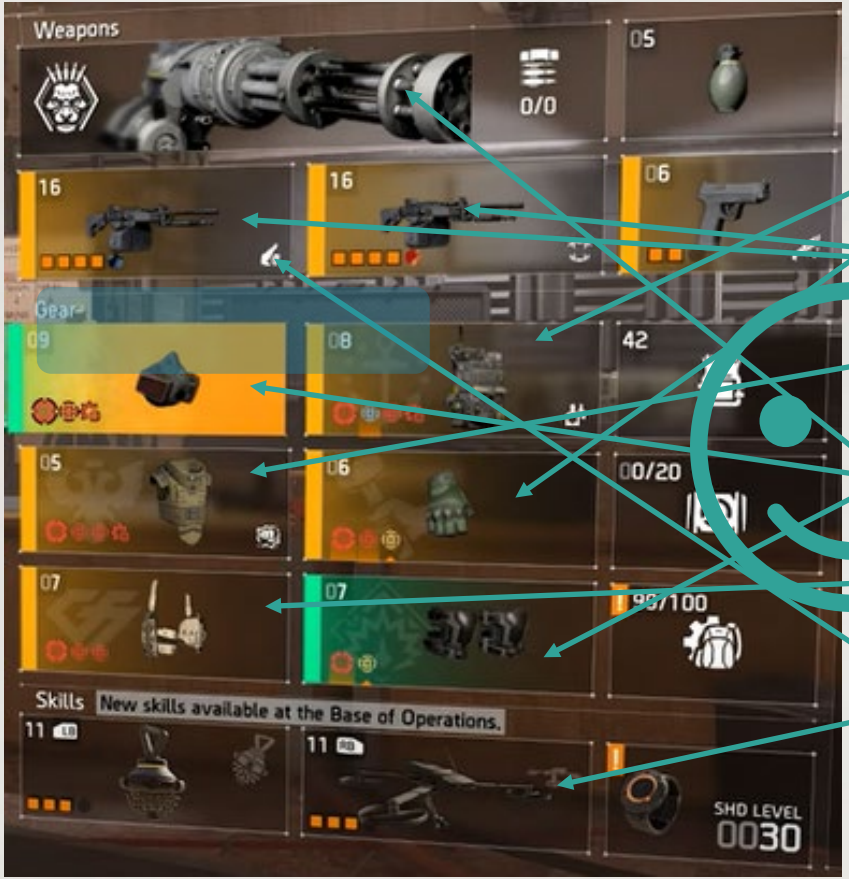
Game Experts

RESULTS

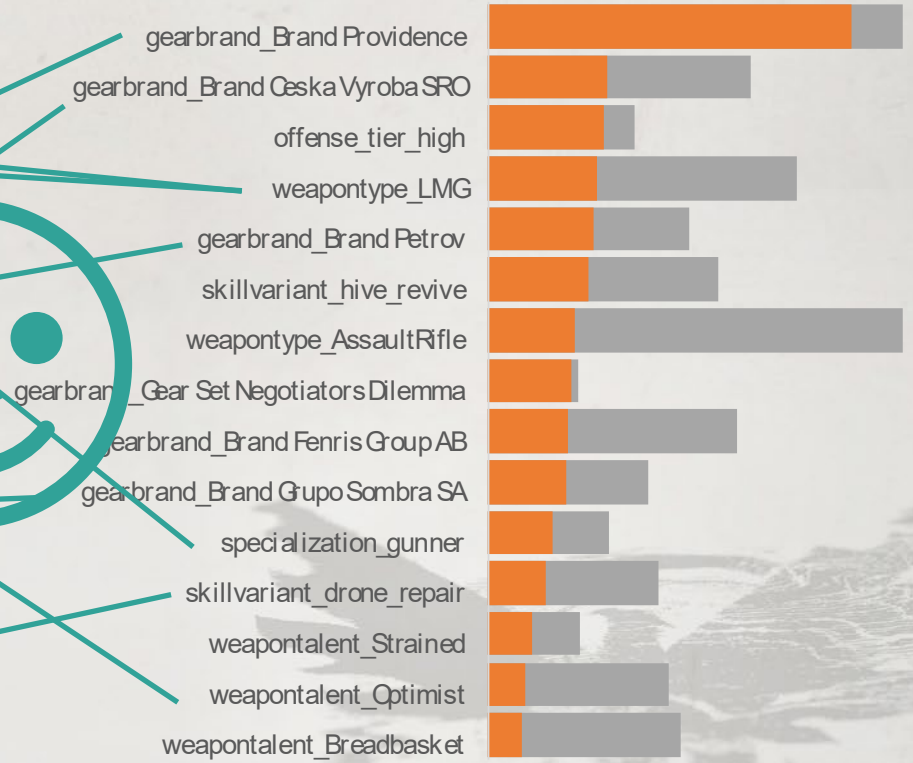

Sniper
5%
TP+Tardigrade
3%
Undefined
14%
Tank
9%
Acosta's Skill
10%
Sokolov/SMG
26%
Striker
5%
LMG Offensive
19%
Healer
2%
Offensive Skill
7%


SKILL-BASED
OFFENSE-BASED
DEFENSE-BASED
Sniper
Offensive skill
Healer
Sokolov/SMG
LMG offensive
Acosta's skill
Tank
Striker
True
Patriot+Tardigrade
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.3
-0.2
-0.1
0
0.1
0.2
0.3

BUILD: LMG OFFENSIVE



MAIN CHARACTERISTICS



BUILD: HEALER

TOM CLANCY'S THE DIVISION 2

PLAYER POPULARITY
2%
9k PLAYERS

AVG MISSION COMPLETION TIME
38 min

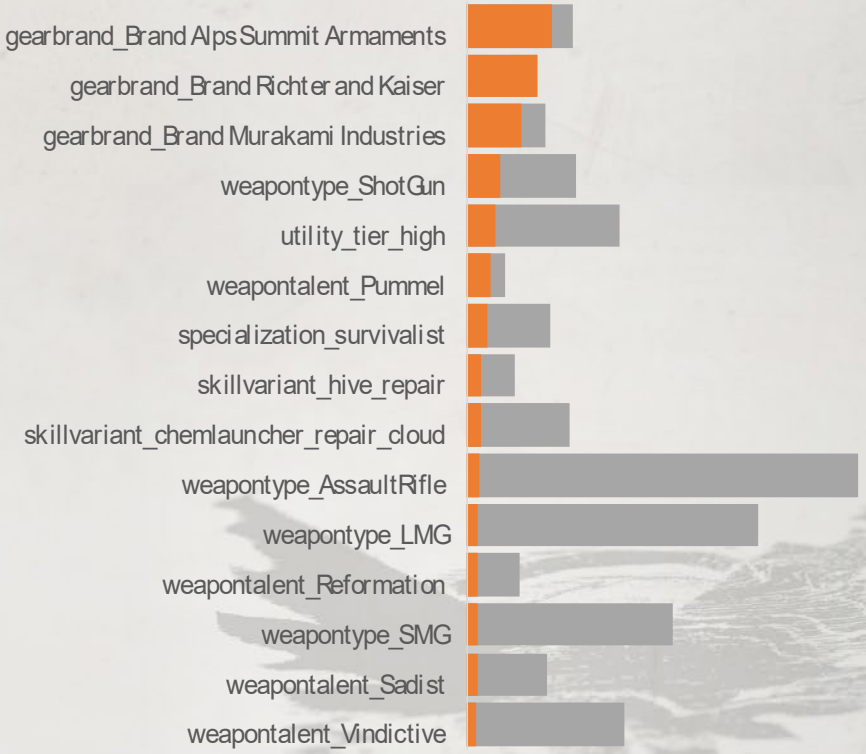
PLAYTIME SPLIT

MISSIONS	45%
DZ	2.0%
OTHER	53%
GROUP	56%

REPRESENTATIVE STATS

HEALTH	283k	OFFENSE	2.9
ARMOR	684k	DEFENSE	3.7
SKILL-POWER	5.06	UTILITY	12.3

MAIN CHARACTERISTICS



BUILDS EVOLUTION

Pre Expansion

- Tank
- SMG Sokolov
- Sniper
- Seeker Mine
- Casual Joe
- Clutch
- Standard Raid
- Easy Exotic
- Gunslinger

Post Expansion

- Tank
- SMG Sokolov
- Sniper
- Offensive Skill
- LMG Offensive
- Healer
- Striker
- Acosta's Skill
- True Patriot+Tardigrade

FEEDBACK

*"When we were **planning TU12**, we knew we needed to focus on something other than offensive build - any fool could see that was the dominant strategy for top-level players - but we had trouble really **identifying where players really focused their strategies**. So we looked at the **Player Builds data** and saw that we really didn't have competitive builds which made use of the drones and turrets. **Skill builds were relatively unpopular**, and even those tended to focus on status effects or big damage.*

***So we went all in**, we made a new gear brand to boost all skills, and a gearset to focus on long-sustain deployable skills. An exotic weapon with damage based on skill cores and which boosted equipped skills, and an exotic gear piece which boosted skills further and did not dominate the more valuable backpack and chest slots.*

And we saw the results with the next builds report**. Not only was the new gear seeing **wide acceptance**, but that prompted players to dive deeper into skill builds which didn't even utilize the new gear. **The insight from the Player Builds data led us down the right path to spur our players to experiment more.“

Trick Dempsey

Expert Game Designer @ The Division 2

PART 4

LEARNINGS

DIFFICULTIES

SNAPSHOTTING POLICY

How to make sense of micro changes in character configurations?

FREQUENCY-BASED
+ PLAYTIME-BASED

NUMBER OF CLUSTERS

How to choose number of builds?

TOPIC COHERENCE METRIC
+ GAME EXPERTISE

CONTROLLING 'UNDEFINED'

Where to put the limit for the 'undefined' group?

NORMALIZED ENTROPY
+ THRESHOLDING

TAKEAWAYS

IT IS POSSIBLE

We have an operational solution: simple, fast and scalable

Top 3 priorities: data quality, data quality, data quality

THE DEVIL IS IN THE DETAILS

Smart data encoding based on game knowledge is key to success, not machine learning per se

Exception by design: unique items & abilities

IT CAN BE ADAPTED TO MANY GAMES

Regular title updates, high volume of players, mechanics for builds variety

Any game with (light-) RPG mechanics, loot, character customization

THANK YOU

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UBISOFT

Image by Pexels from Pixabay