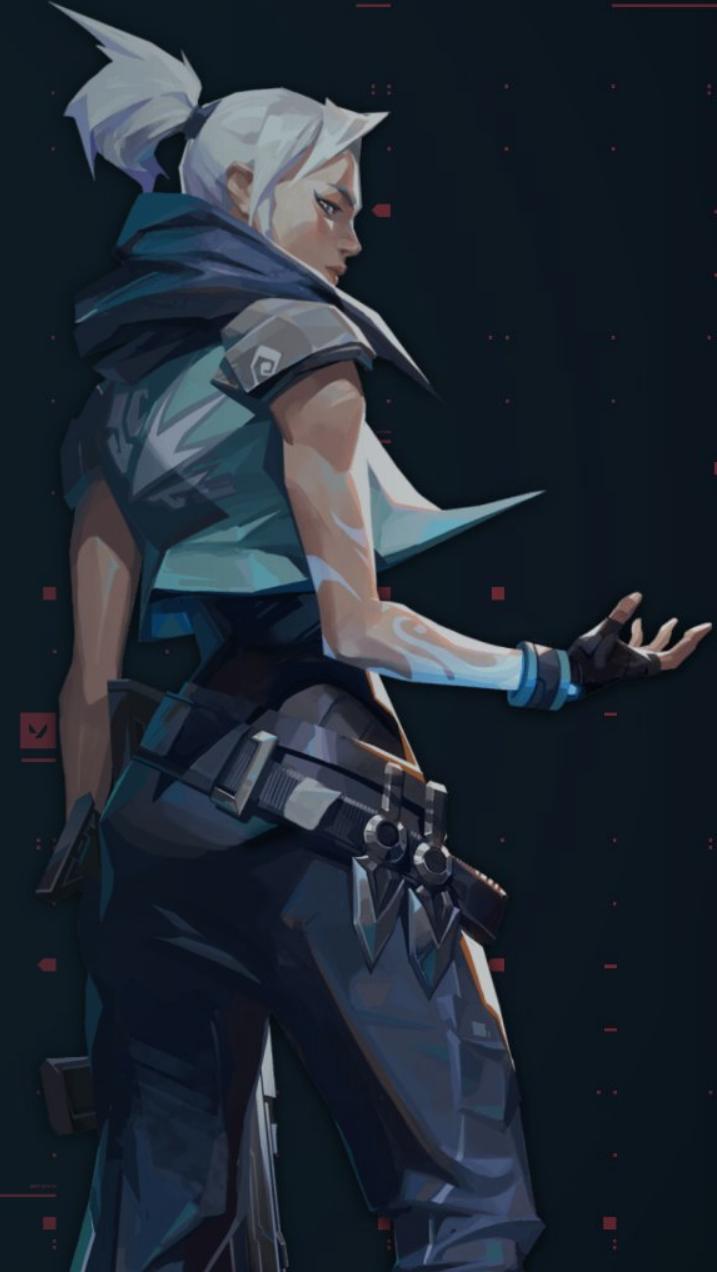


PROJECT X

THE VENGEANCE
STRIKING



THE DEATH
STRIKE

.00

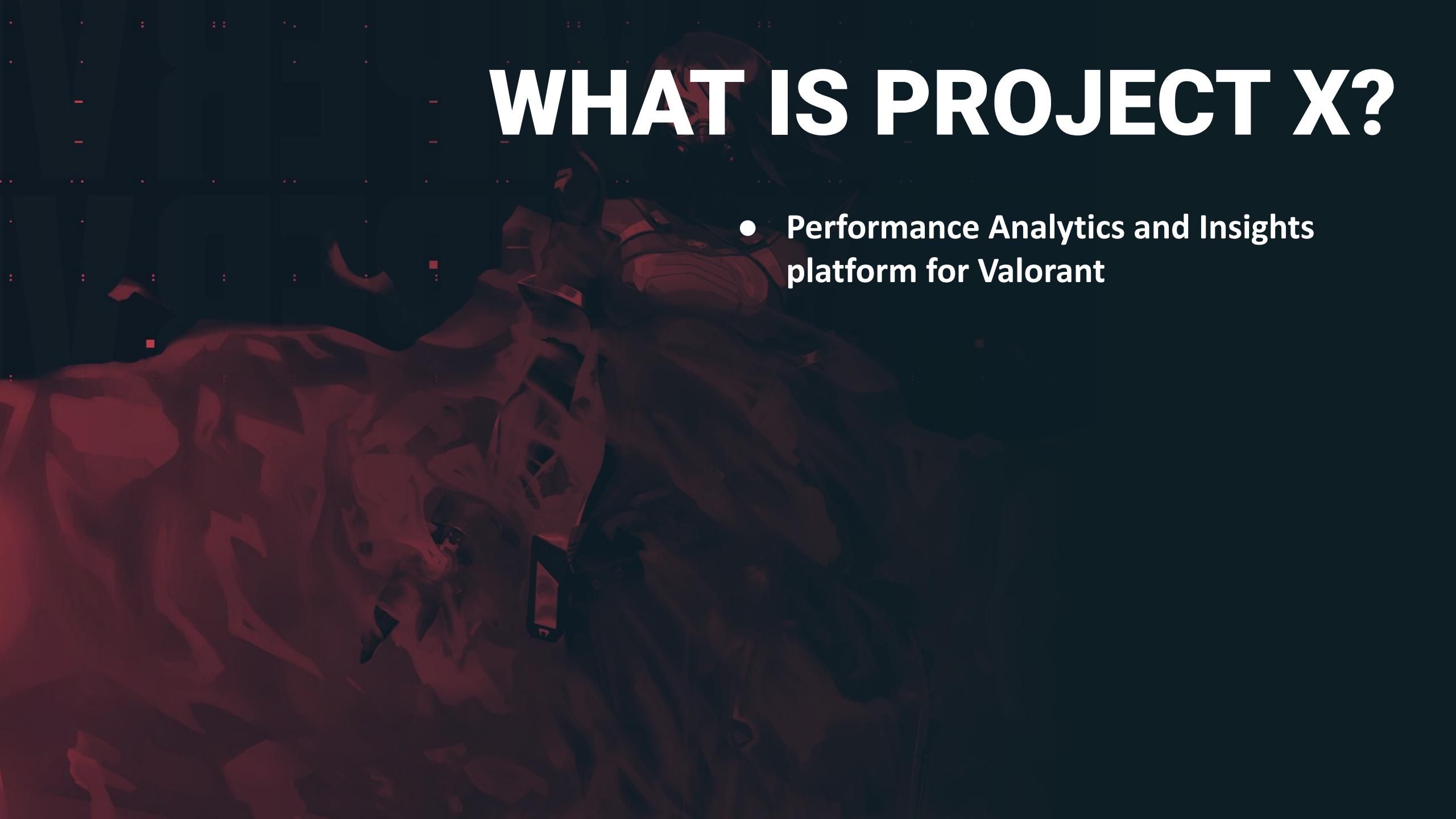
.05

AGENDA

- ❖ Project's Overview
- ❖ Introduction of Valorant
- ❖ Heatmaps & “Replay System”
- ❖ App Demonstration
- ❖ Data Approach - Object Detection
- ❖ Data Approach - OCR
- ❖ Limitations & Future Improvements



WHAT IS PROJECT X?



- Performance Analytics and Insights platform for Valorant

WHAT IS PROJECT X?

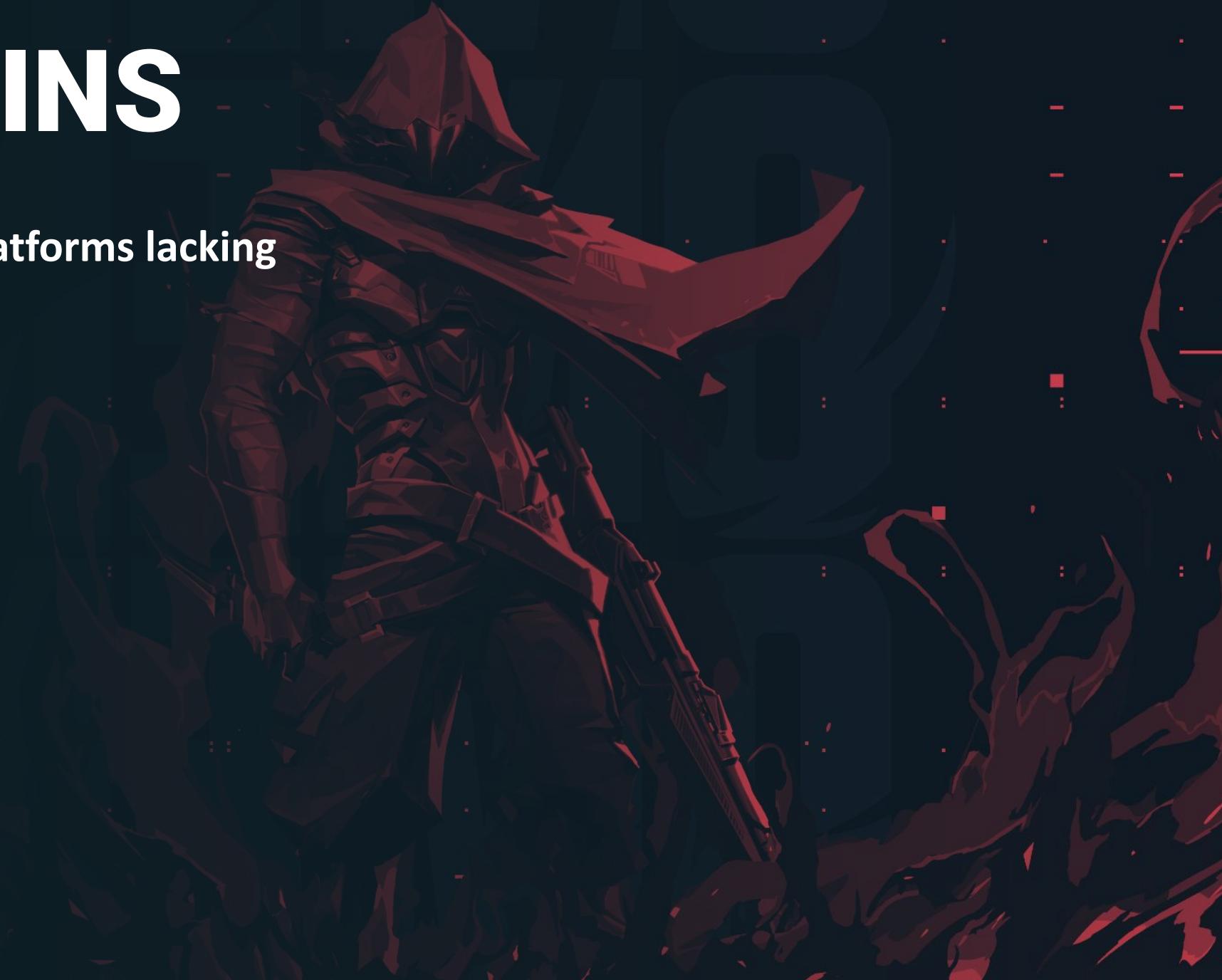
- Performance Analytics and Insights platform for Valorant
- Aid stakeholders in decision-making for Valorant-related matters
 - Developers
 - Coaches
 - Players

WHAT IS PROJECT X?

- Performance Analytics and Insights platform for Valorant
- Aid stakeholders in decision-making for Valorant-related matters
 - Developers
 - Coaches
 - Players
- Most comprehensive platform

THE ORIGINS

- Features by existing platforms lacking in depth



THE ORIGINS

- Features by existing platforms lacking in depth
- Key features
 - Heatmaps
 - Pseudo-Replay System

THE ORIGINS

- Features by existing platforms lacking in depth
- Key features
 - Heatmaps
 - Pseudo-Replay System
- Verify with KOLs

THE ORIGINS

- Features by existing platforms lacking in depth
- Key features
 - Heatmaps
 - Pseudo-Reply System
- Verify with KOLs



THE ORIGINS

- Features by existing platforms lacking in depth
- Key features
 - Heatmaps
 - Pseudo-Reply System
- Verify with KOLs



WHAT IS VALORANT



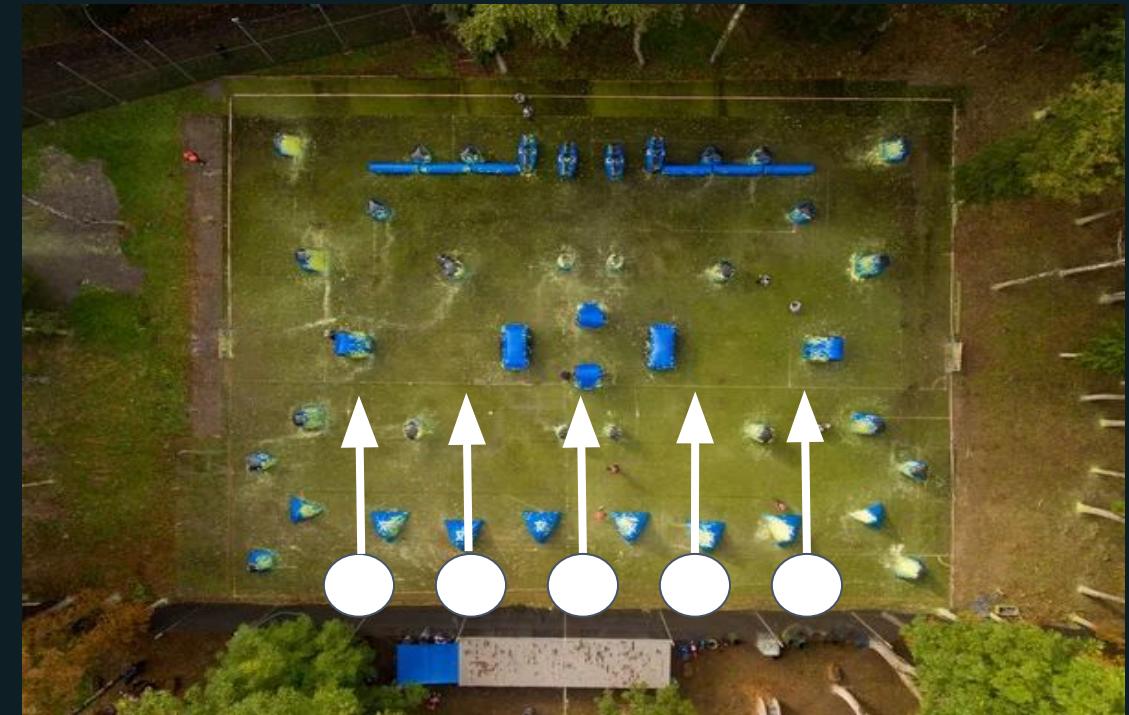
WHAT IS VALORANT

- Commonly described as a ‘tactical shooter’ game
 - Similar to a 5 vs 5 paintball game



WHAT IS VALORANT

- Commonly described as a ‘tactical shooter’ game
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WHAT IS VALORANT

- Commonly described as a ‘tactical shooter’ game
 - Similar to a 5 vs 5 paintball game



WHAT IS VALORANT

- Each team selects 5 ‘agents’ from a pool of 19 agents with different abilities



WHAT IS VALORANT

- Each team takes turn to attack and defend for 12 rounds each
- First to 13 rounds win



WHAT IS VALORANT

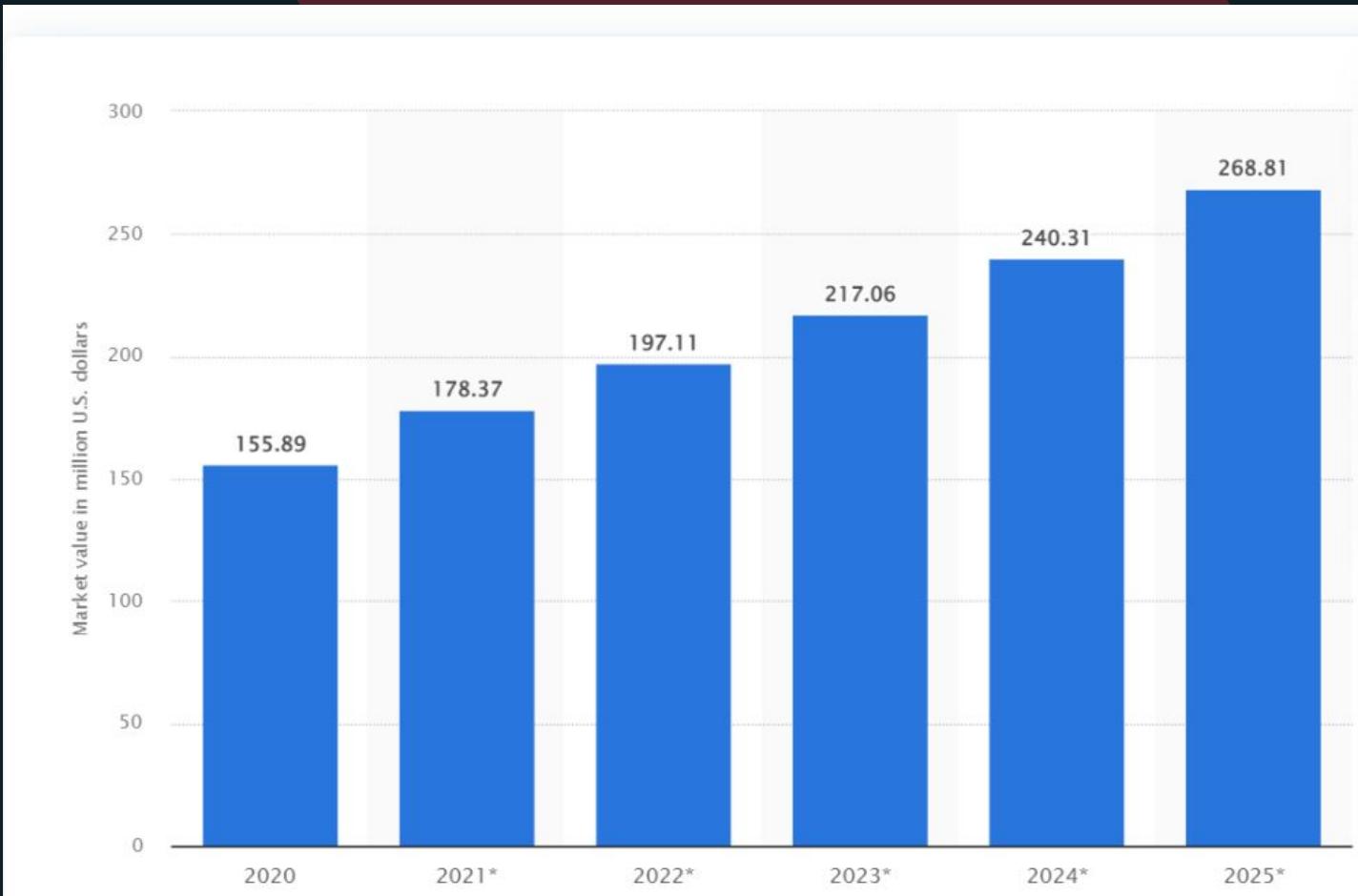
- 22.5 million active monthly players
- 116.8 million active monthly viewers (only Twitch)

Figure excludes other platforms

- Facebook
- Youtube - Russia, Japan
- Douyu/Huomao - China
- Afreeca - Korea

Source: <https://activeplayer.io/valorant/>

Video Game Market Size



Source: Statista.com

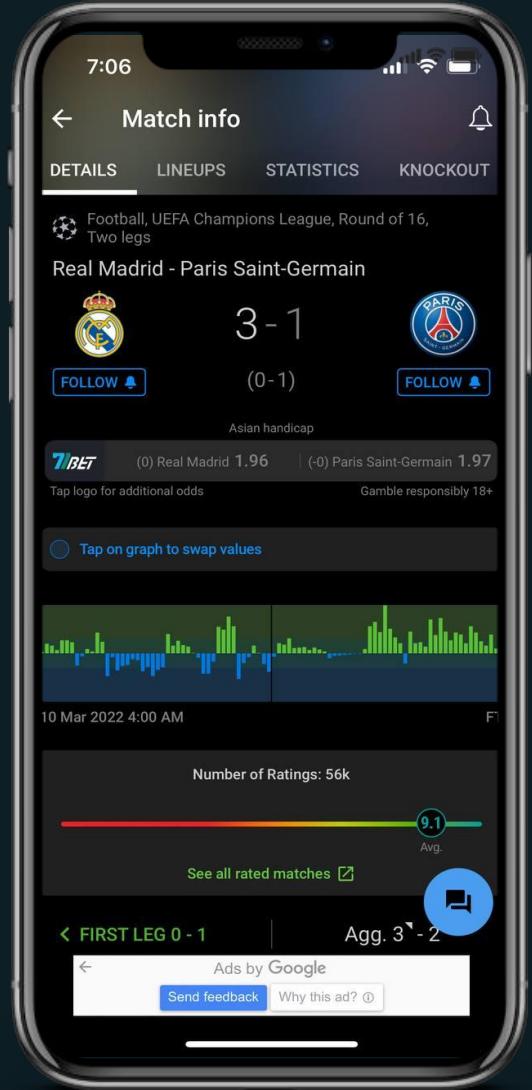
Notable Brands



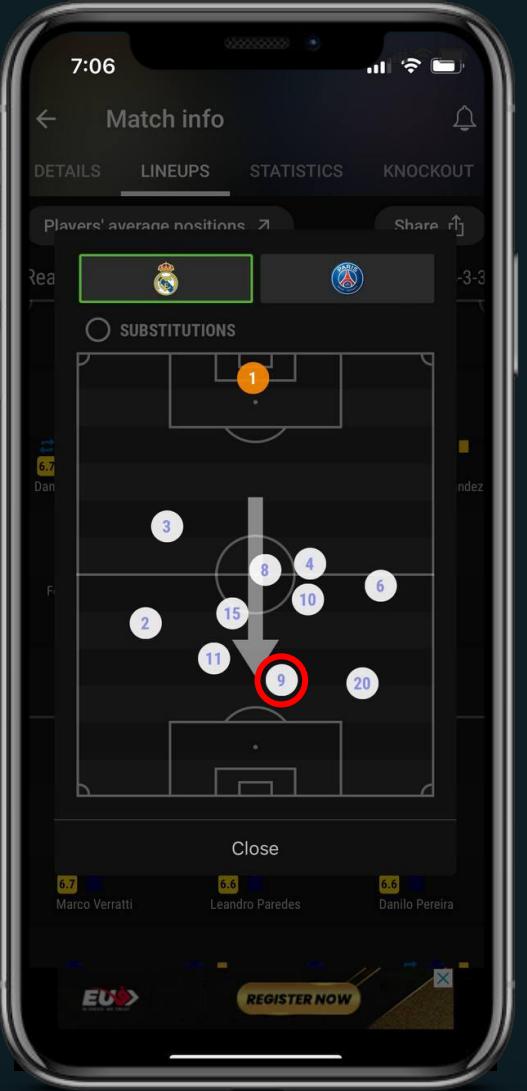
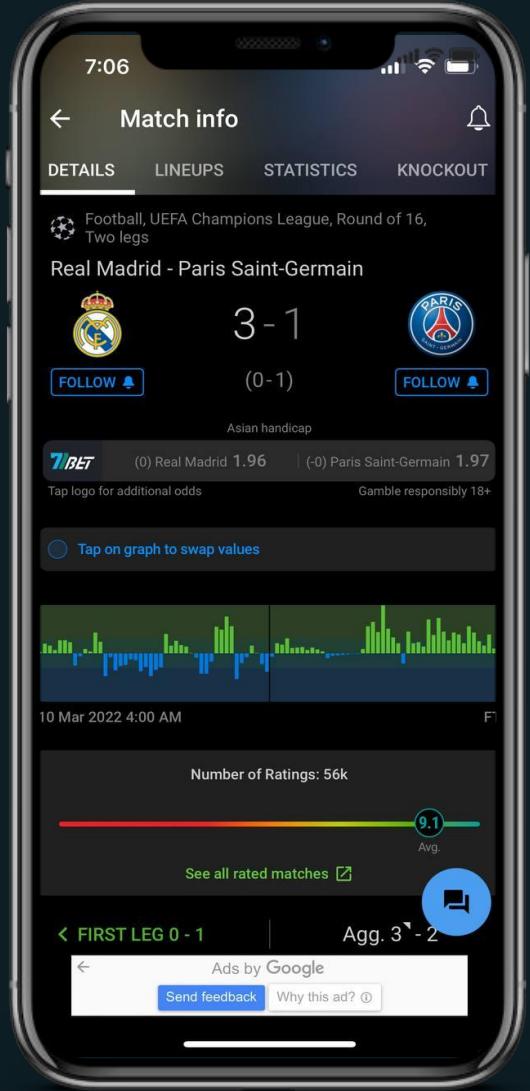
1. The Value of Heatmaps

Big Picture of a Game

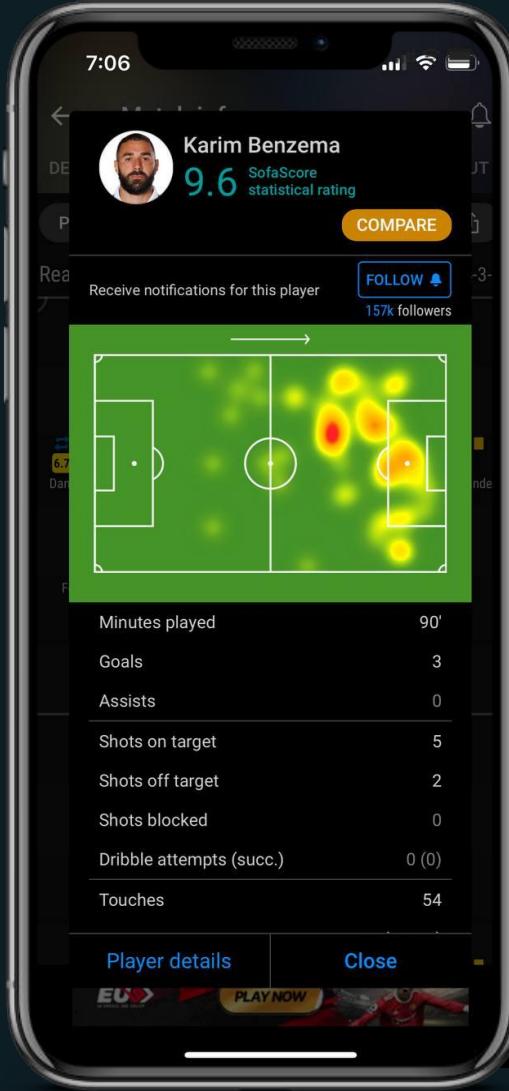
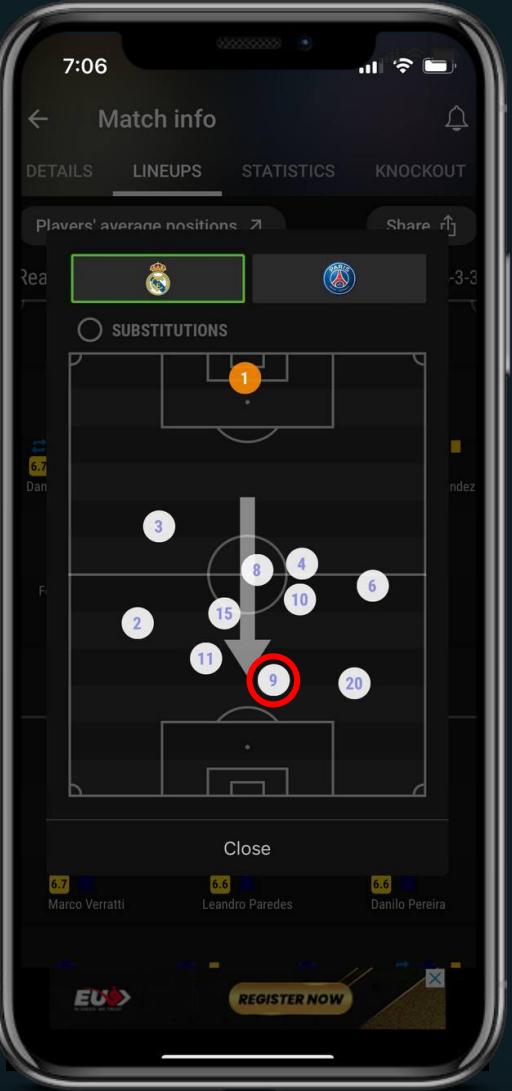
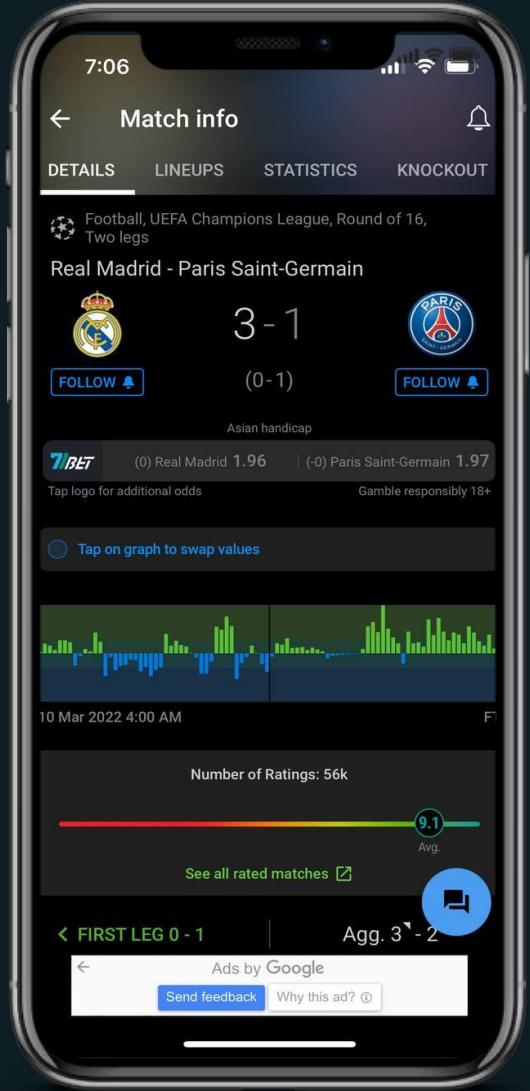
- Overall flow
- Each team's strategy
- Each team/player's tendencies



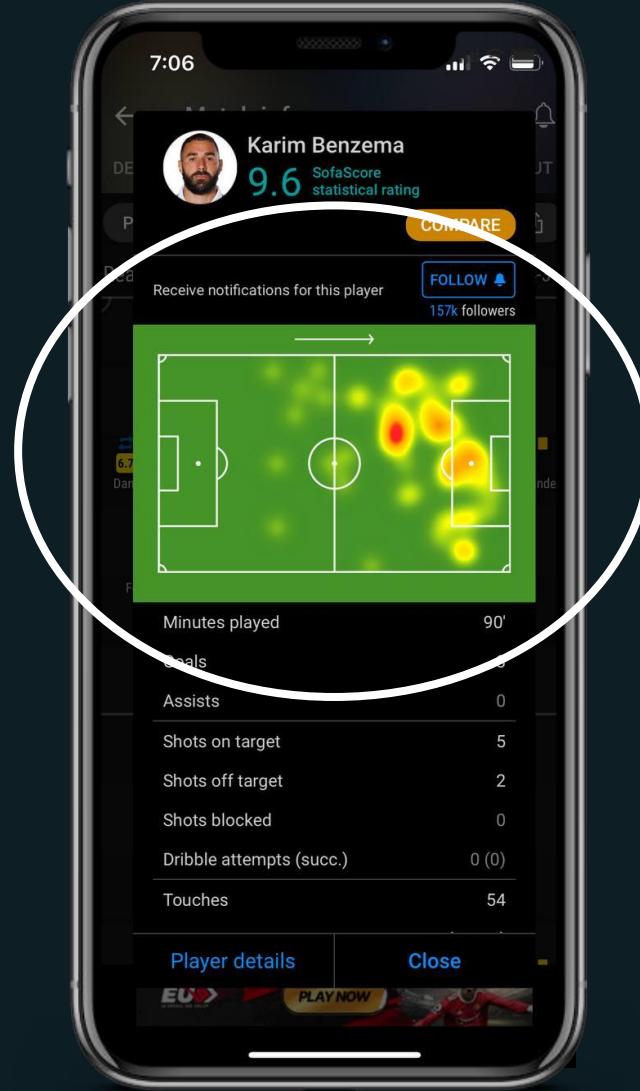
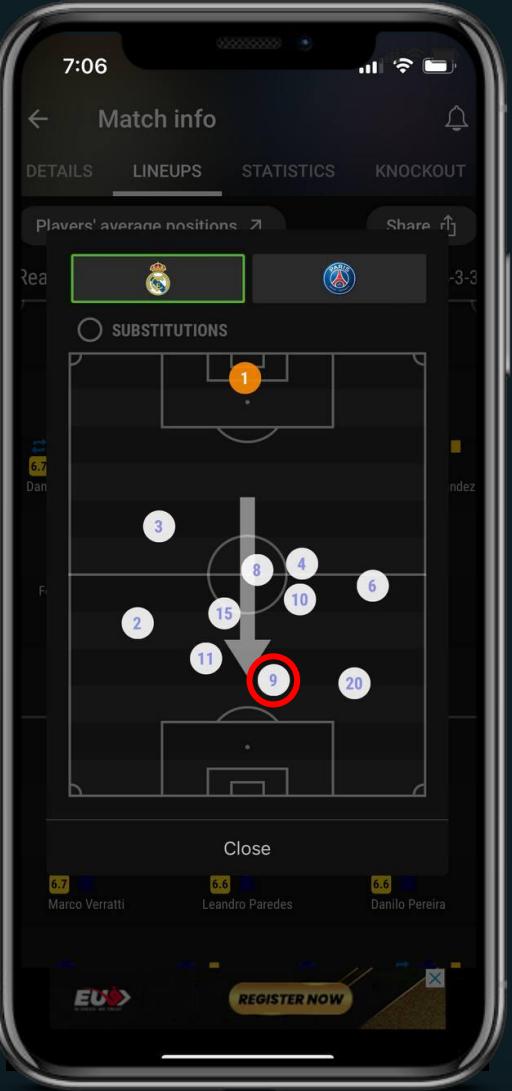
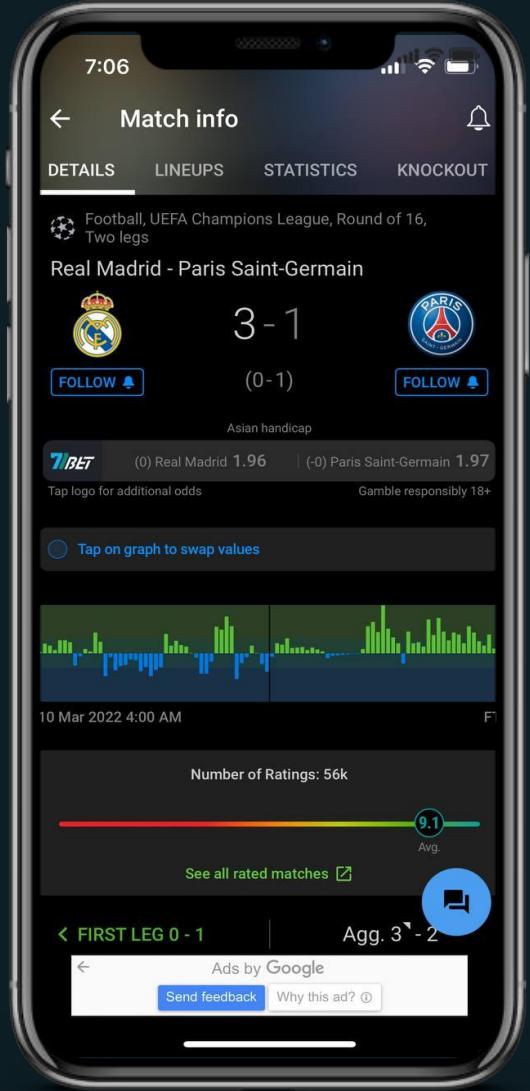
Images courtesy of SofaScore



Images courtesy of SofaScore



Images courtesy of SofaScore



Images courtesy of SofaScore

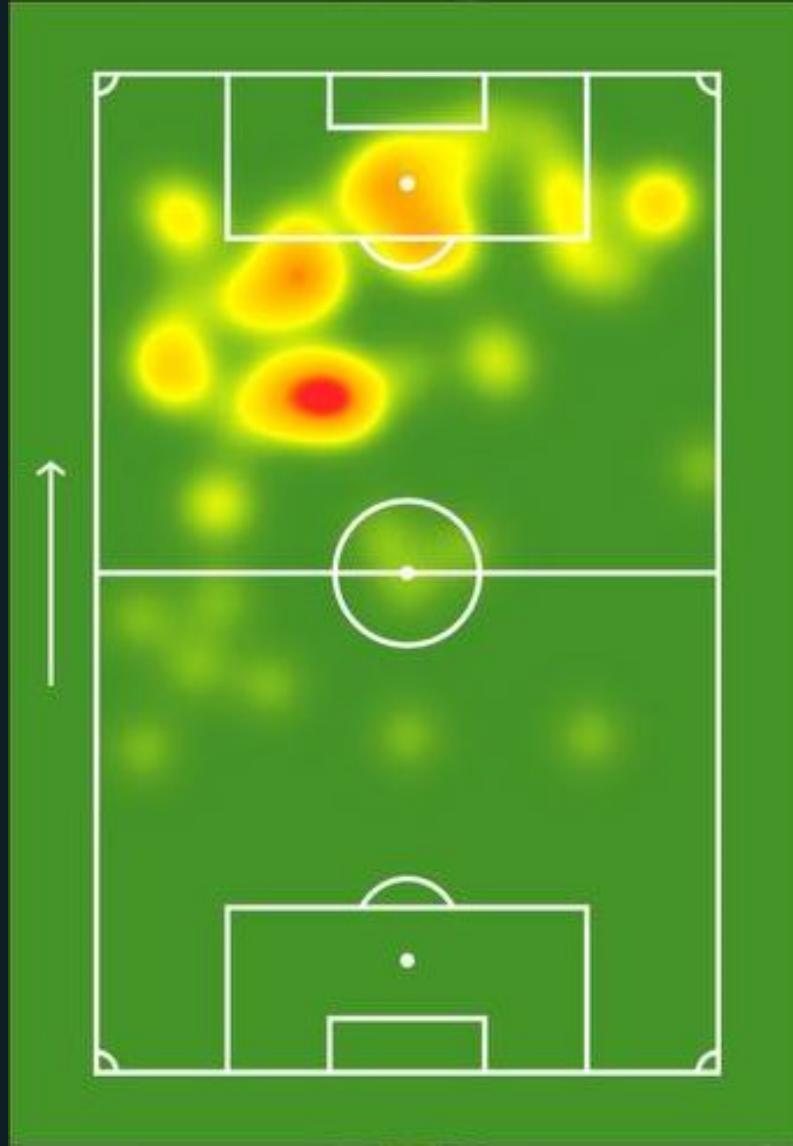
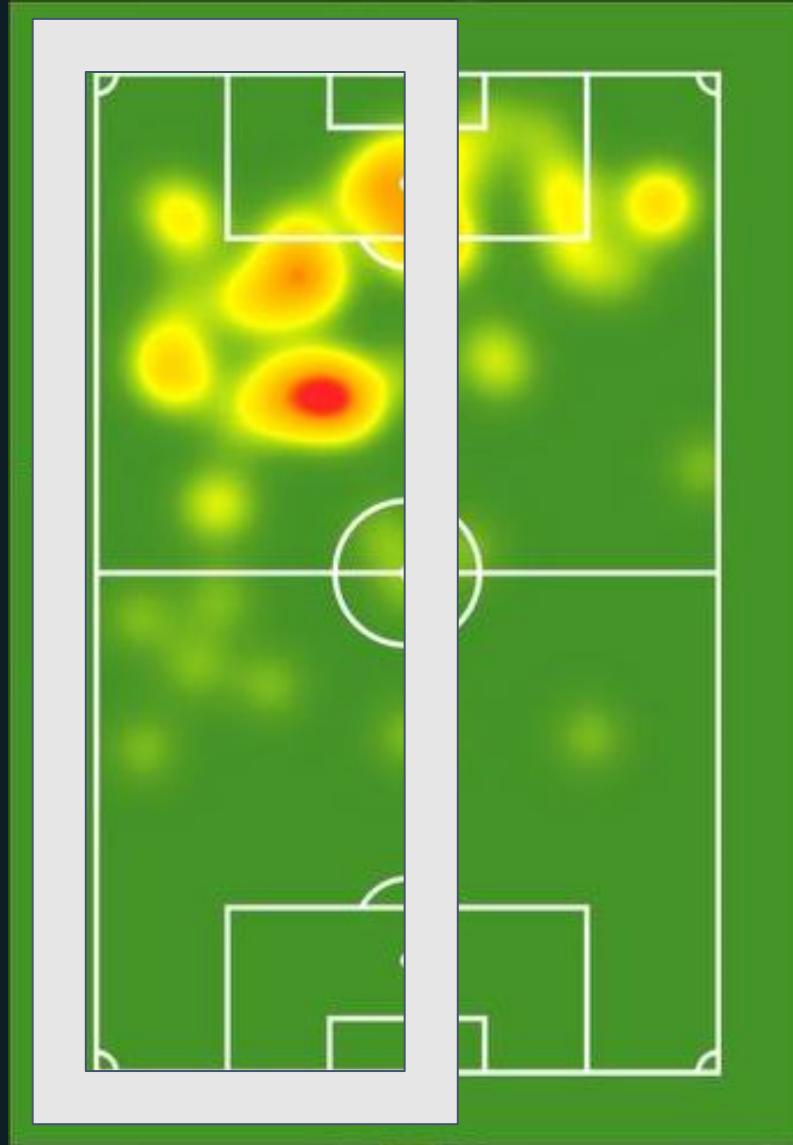
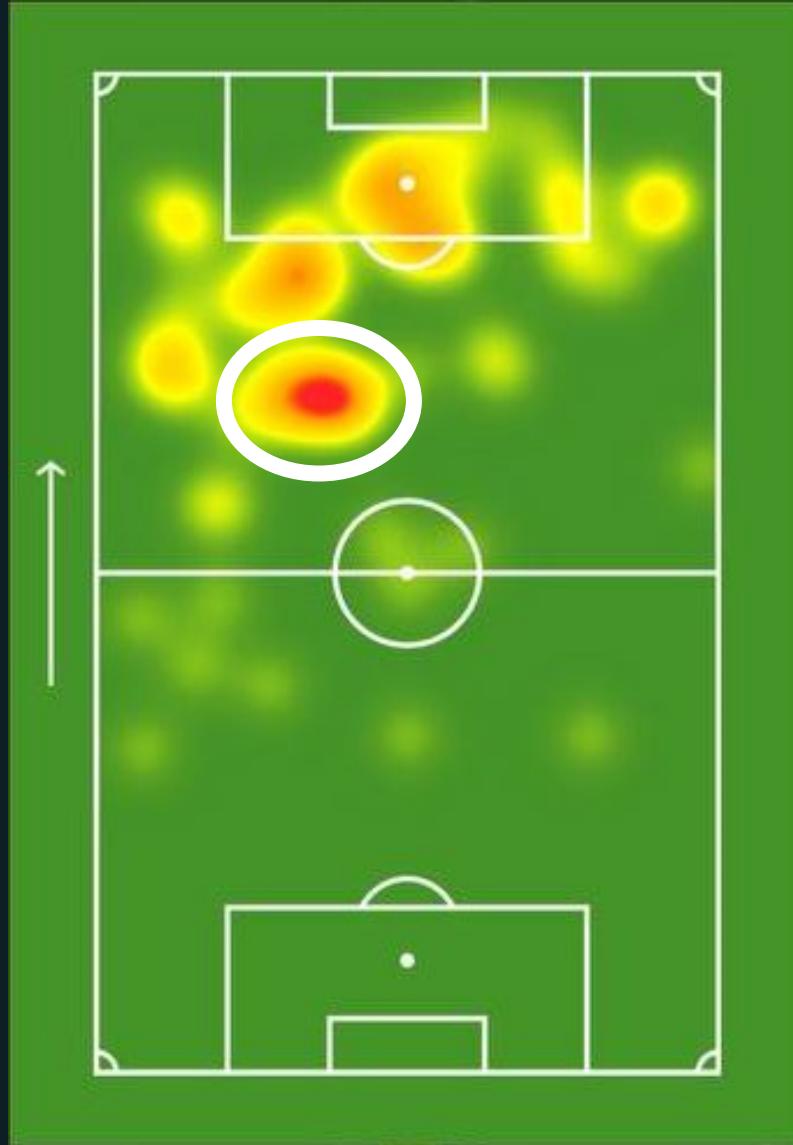


Image courtesy of SofaScore



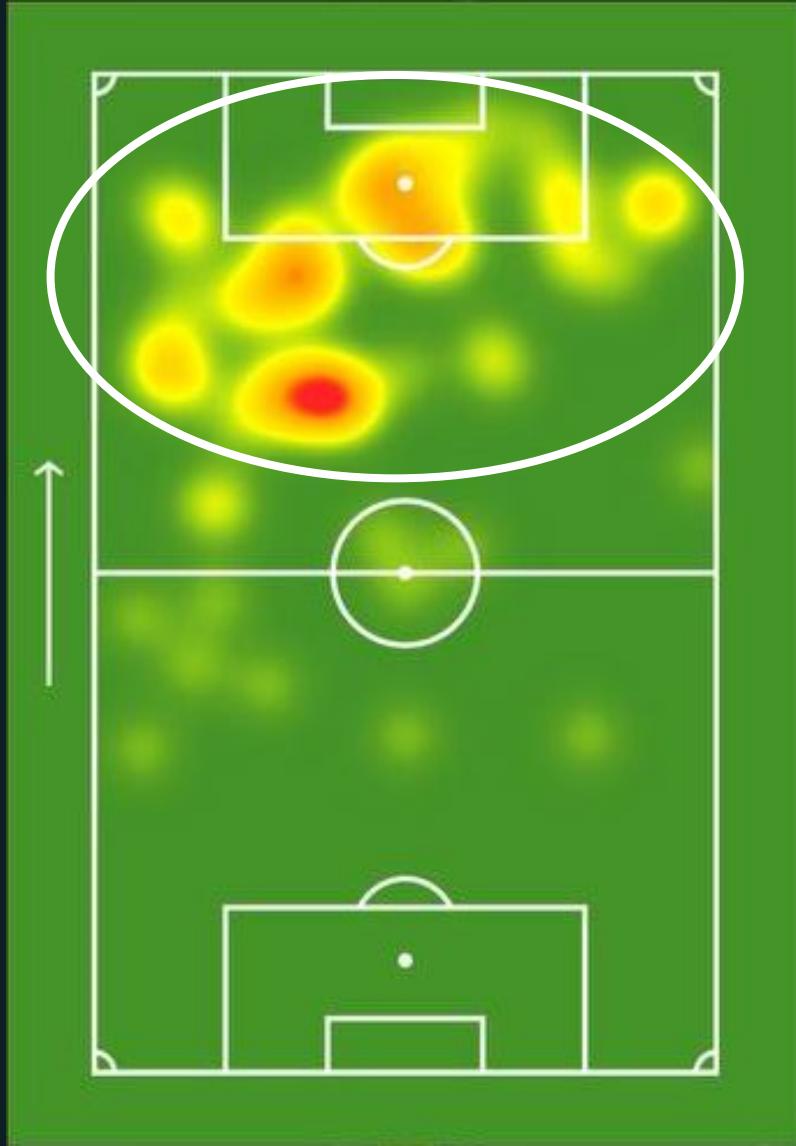
1. More focused on the left half

Image courtesy of SofaScore



1. More focused on the left half
2. Where he spent most of his time

Image courtesy of SofaScore



1. More focused on the left half
2. Where he spent most of his time
3. The range and distribution of his movements

Image courtesy of SofaScore

2. Pseudo-Replay System

- A replay system is the most highly demanded feature
- Not expected anytime soon



Applying to Valorant



11

REYNA

DUELIST

TM

VALORANT

Demonstration

WARNING:

This segment contains flashing images that may trigger seizures in those with photosensitive epilepsy.

Viewer discretion is advised.

[Link](#)

CURRENT: PEARL

NEXT: ICEBOX

DECIDER: HAVEN

EA
EDG

5

ROUND 10
0:254
APAC
PRX SECRET
LAB

	650	84
CHICOO	◆◆◆◆◆	[18]
	150	100
ZmjKK	◆◆◆◆◆	[25]
	1,400	100
Haodong	◆◆◆◆◆	[50]
	150	100
nobody	◆◆◆◆◆	[50]
	650	93
Smoggy	◆◆◆◆◆	[35]



	2,450	84
Benkai	◆◆◆◆◆	[50]
	5,300	100
mindfreak	◆◆◆◆◆	[50]
	2,000	100
d4v41	◆◆◆◆◆	[50]
	4,900	100
f0rsakeN	◆◆◆◆◆	[50]
	2,000	93
Jinggg	◆◆◆◆◆	[35]

The image shows a split-screen view of a Counter-Strike: Global Offensive (CS:GO) match between EDG and PAX. The top half displays the game interface with a map, score (EDG 5, PAX 4), and timer (0:25). The bottom half shows a player's perspective on the Decider: Haven map, looking down a hallway towards a purple glowing area.

Annotations highlight specific elements:

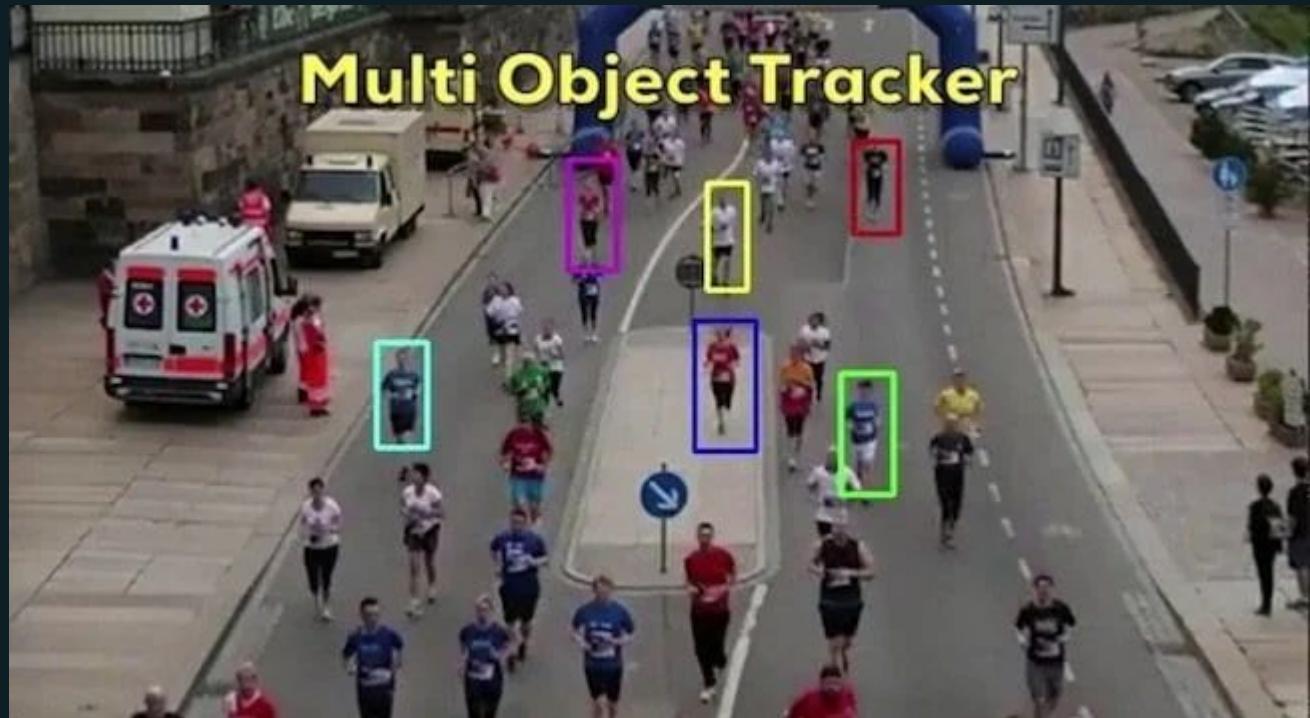
- Top Left:** A green circle highlights the mini-map in the top-left corner.
- Top Right:** A green circle highlights the scoreboard in the top-right corner.
- Bottom Left:** An orange circle highlights the player stats and equipment in the bottom-left corner.
- Bottom Center:** A cyan arrow points from the bottom-left stats to the purple glowing area on the map.
- Right Side:** A large orange arrow points from the bottom-left stats to the rightmost column of the log table.
- Log Table:** A detailed log table on the right side tracks various events across frames 334 to 347. It includes columns for team1, team2, frame, t1s, t2s, round_w_time, spike_planted, round, time, p1a_cast, and p1b_cast. A green arrow points from the top-right scoreboard circle to the frame column. A cyan arrow points from the bottom-left stats circle to the agent column. An orange arrow points from the bottom-left stats circle to the p1a_cast column.

team1	team2	frame	t1s	t2s	round_w_time	spike_planted	round	time	p1a_cast	p1b_cast
334	team_liquid	leviathan	334	1	0 ROUND 2>>0:00>	FALSE	ROUND 2	0:00	0	0
335	team_liquid	leviathan	335	1	0 ROUND 2>>1:39>	FALSE	ROUND 2	1:39	0	1
336	team_liquid	leviathan	336	1	0 ROUND 2>>1:39>	FALSE	ROUND 2	1:39	0	0
337	team_liquid	leviathan	337	1	0 ROUND 2>>1:39>	FALSE	ROUND 2	1:39	0	0
338	team_liquid	leviathan	338	1	0 ROUND 2>>1:39>	FALSE	ROUND 2	1:39	0	0
339	team_liquid	leviathan	339	1	0 ROUND 2>>1:38>	FALSE	ROUND 2	1:38	0	0
340	team_liquid	leviathan	340	1	0 ROUND 2>>1:38>	FALSE	ROUND 2	1:38	0	0
341	team_liquid	leviathan	341	1	0 ROUND 2>>1:38>	FALSE	ROUND 2	1:38	0	0
342	team_liquid	leviathan	342	1	0 ROUND 2>>1:38>	FALSE	ROUND 2	1:38	0	0
343	team_liquid	leviathan	343	1	0 ROUND 2>>1:37>	FALSE	ROUND 2	1:37	0	0
344	team_liquid	leviathan	344	1	0 ROUND 2>>1:37>	FALSE	ROUND 2	1:37	0	0
345	team_liquid	leviathan	345	1	0 ROUND 2>>1:37>	FALSE	ROUND 2	1:37	0	0
346	team_liquid	leviathan	346	1	0 ROUND 2>>1:37>	FALSE	ROUND 2	1:37	0	0
347	team_liquid	leviathan	347	1	0 ROUND 2>>1:36>	FALSE	ROUND 2	1:36	0	0

Suitable Methods

2 Options

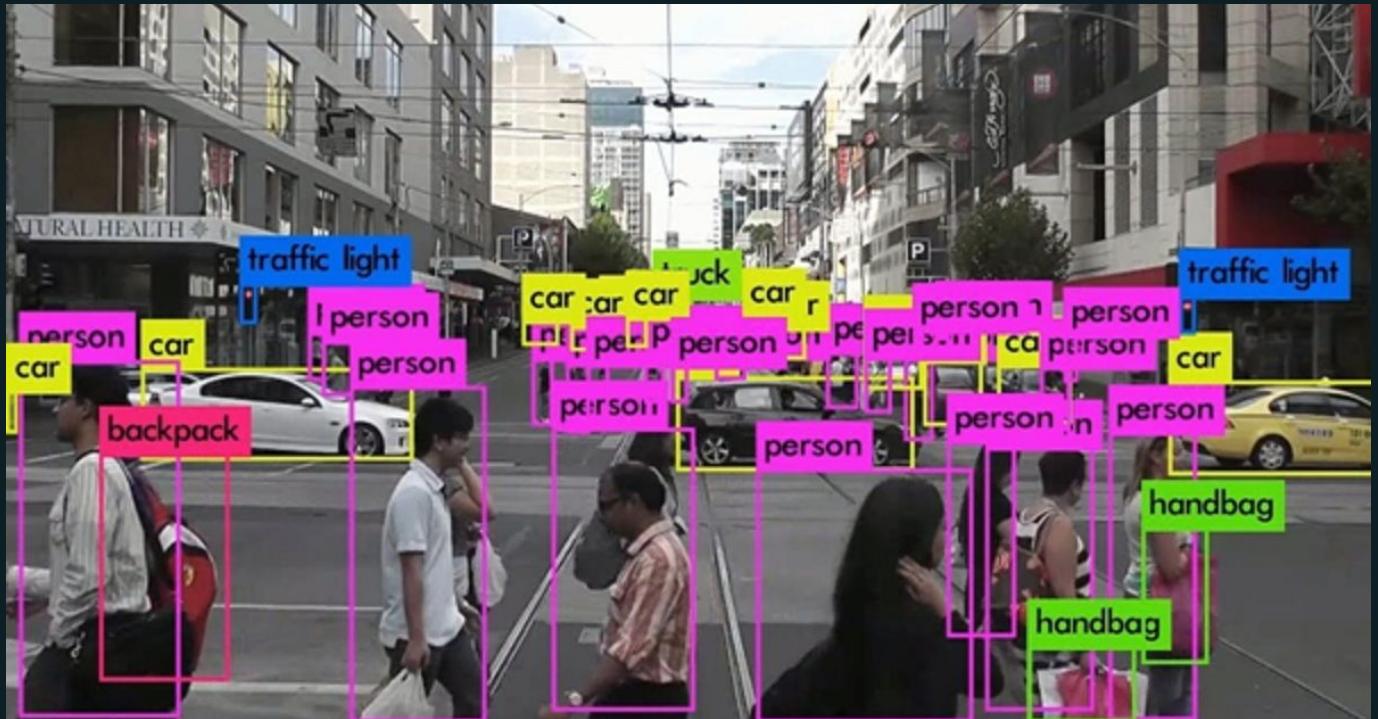
1. Object Tracking



Suitable Methods

2 Options

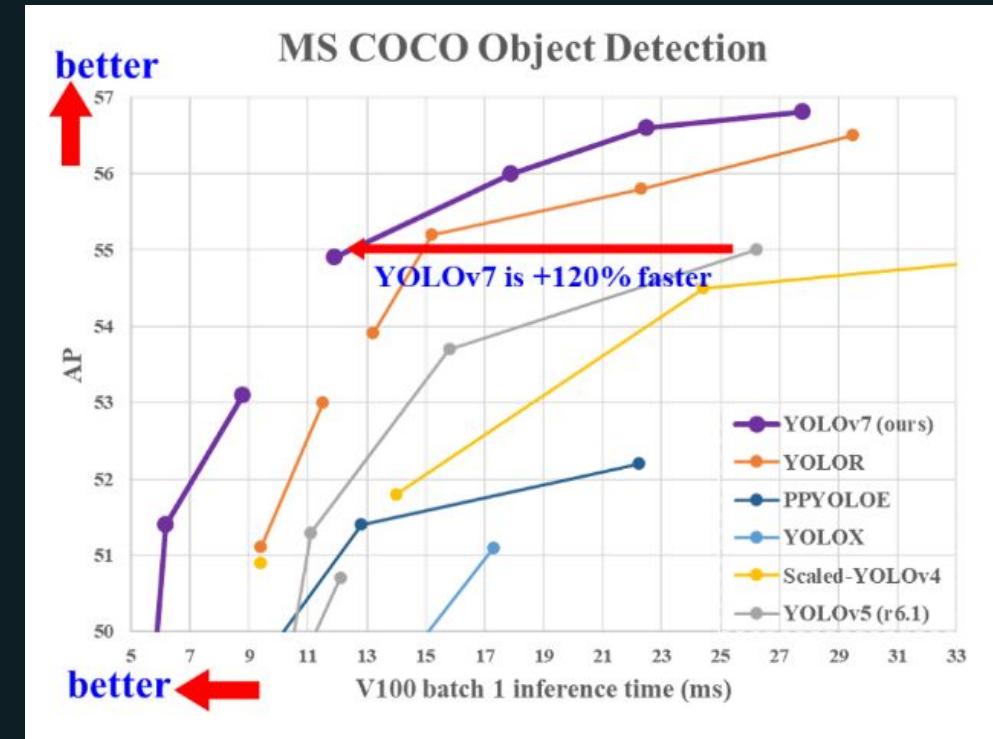
1. Object Tracking
2. Object Detection



Object Detection

- YOLOv7 (You Only Look Once)

AVERAGE PRECISION

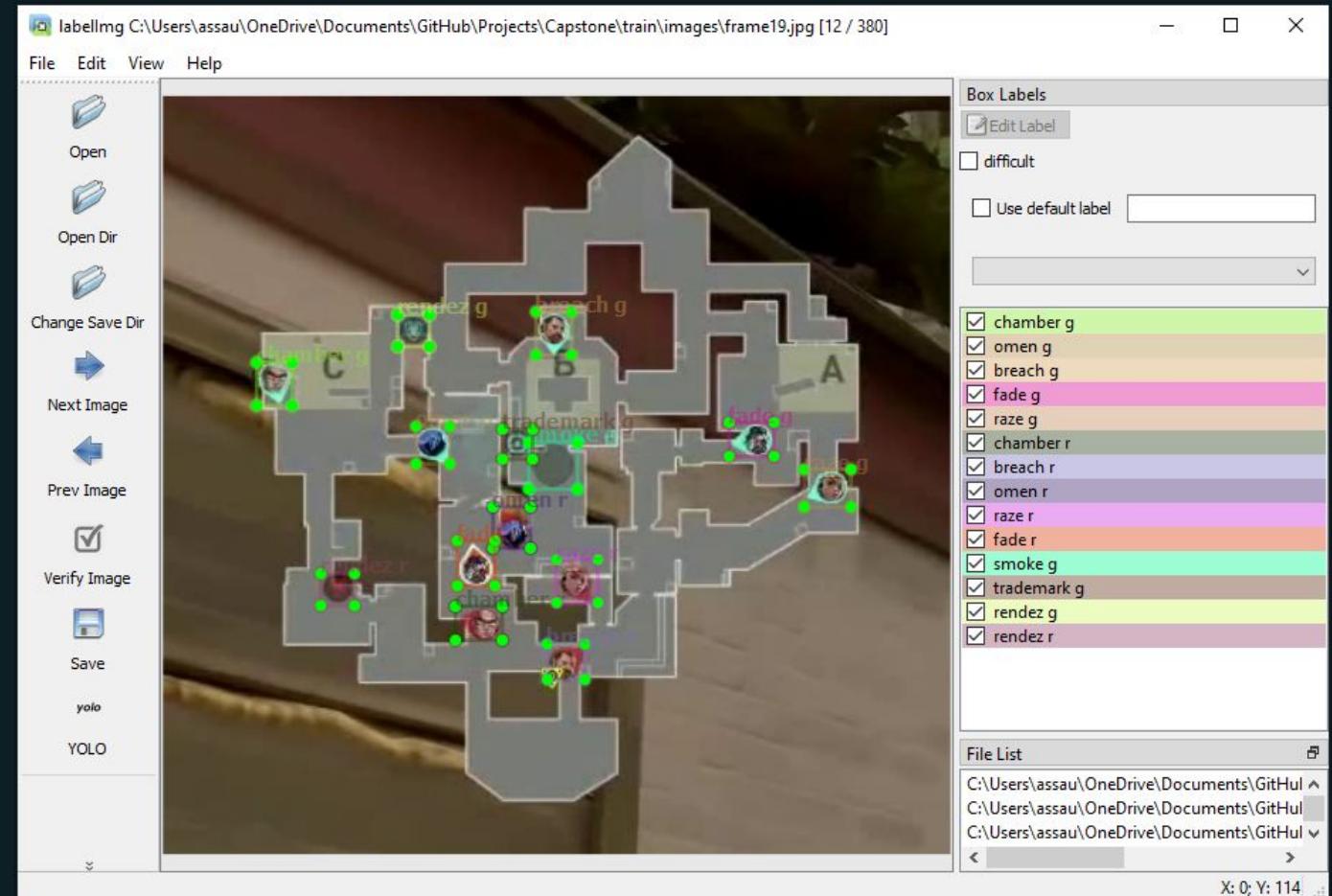


Object Detection

- YOLOv7 (You Only Look Once)
- Image Annotation

Object Detection

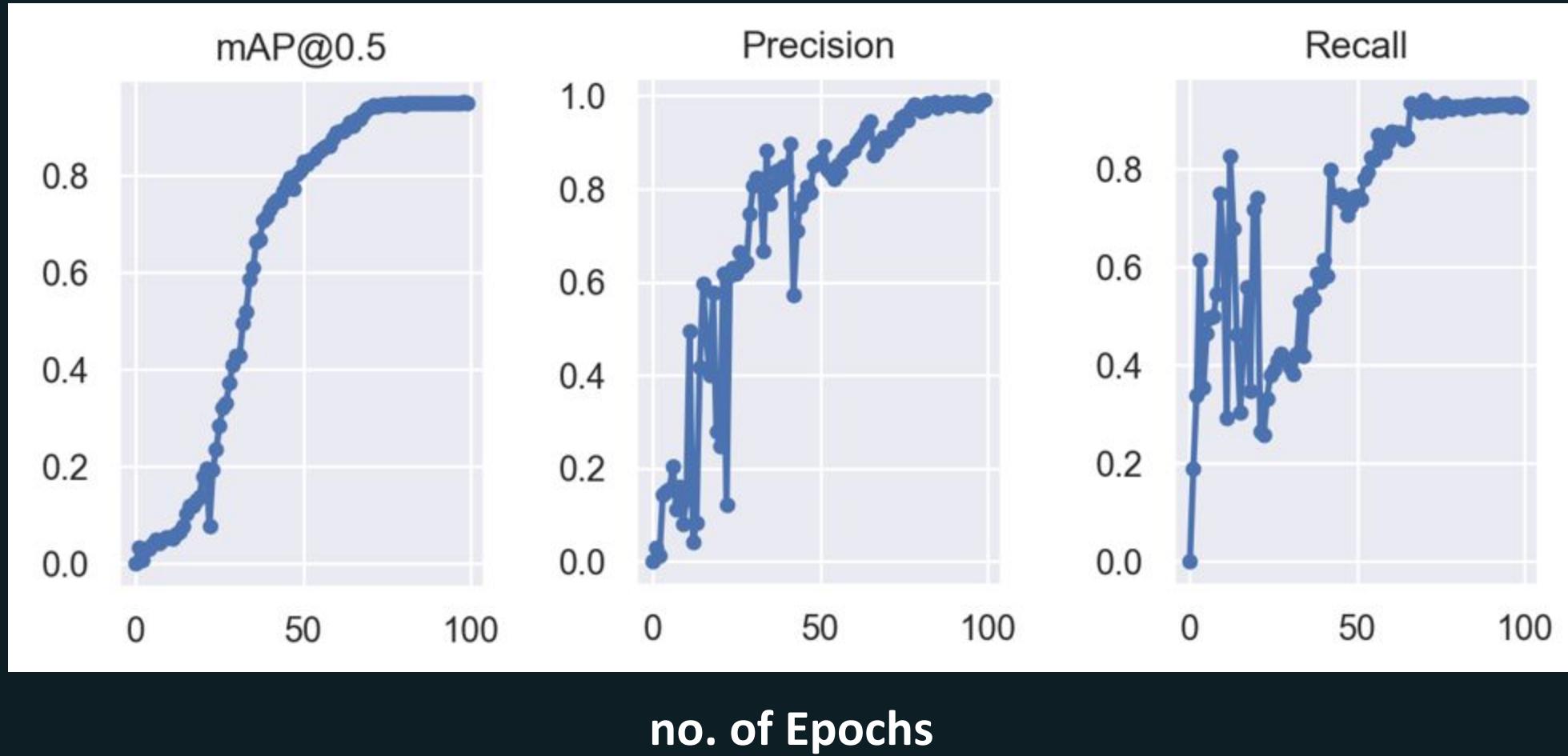
- YOLOv7 (You Only Look Once)
- Image Annotation



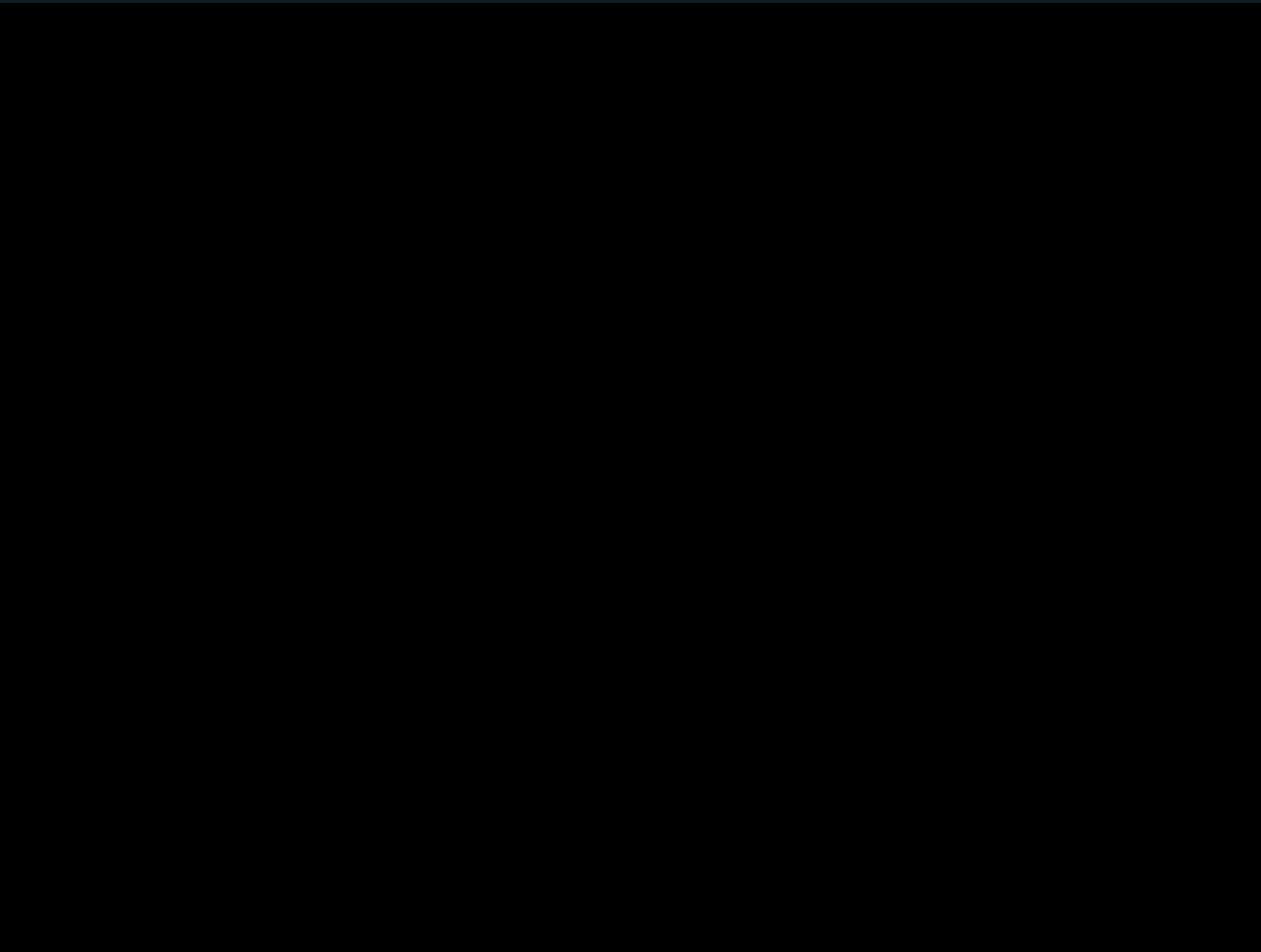
YOLOv7: Final Dataset & Parameters

Images(Train)	1143
Images(Val)	285
Epochs	100
Batch Size	16

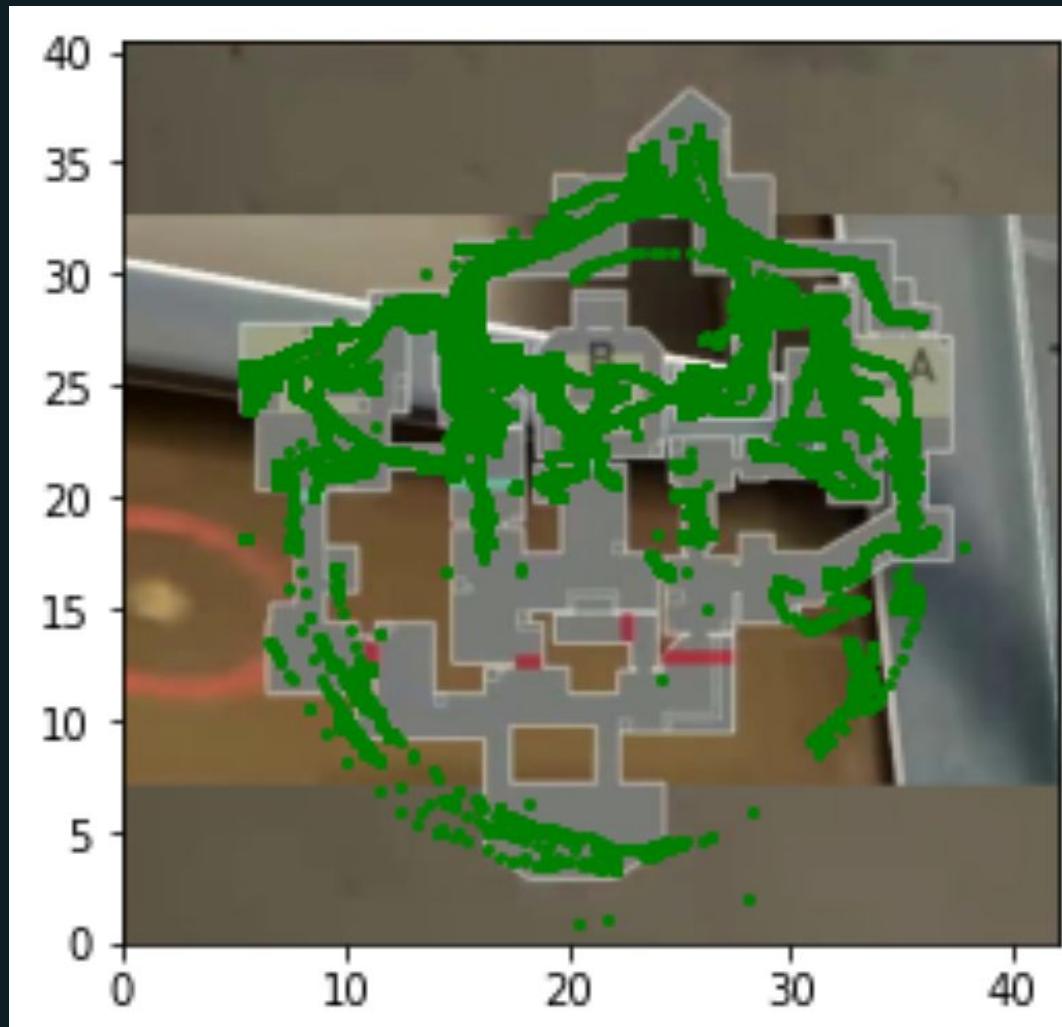
Model Results



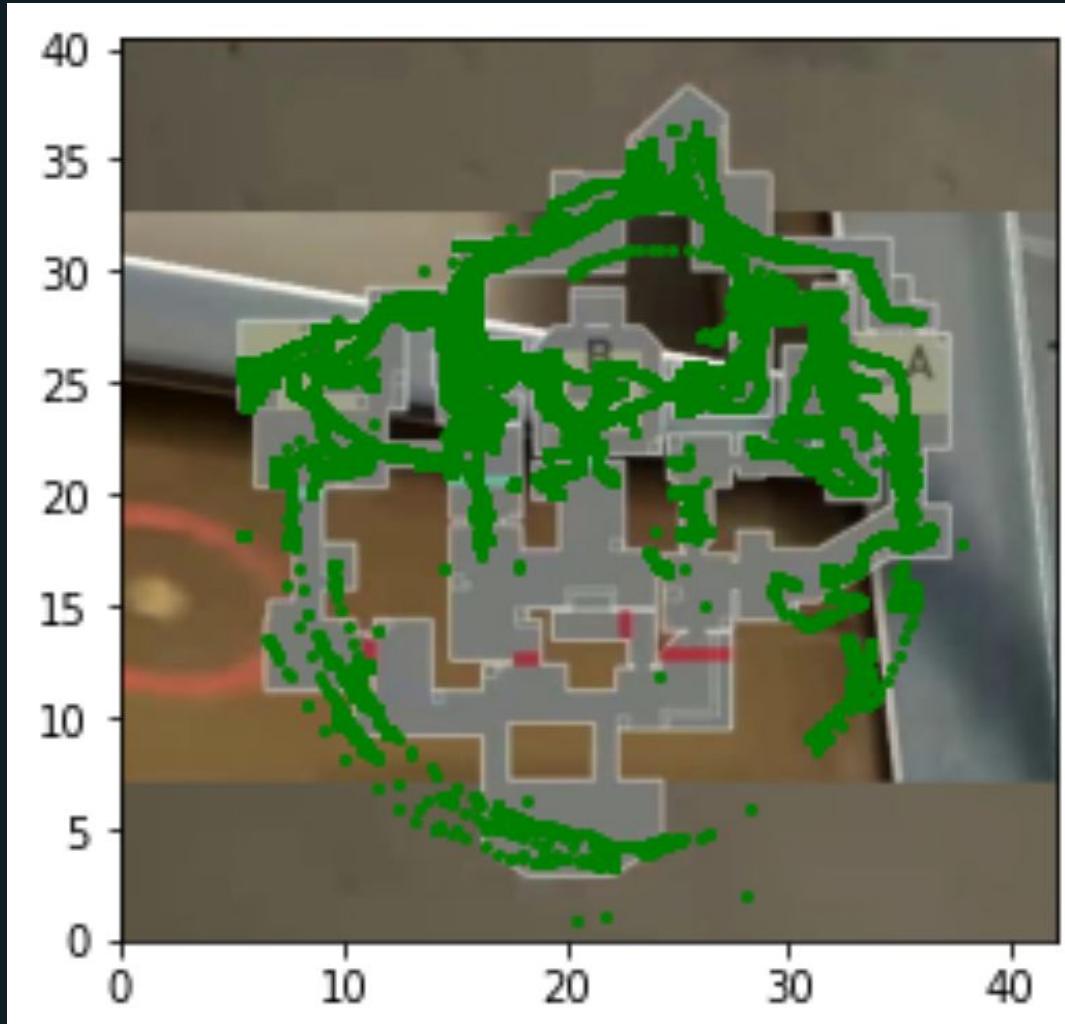
Test on Video



Plotting the coordinates



Plotting the coordinates



+ Timestamps

TESSERACT OCR



TESSERACT OCR

Challenges

1. Image Boundaries



TESSERACT OCR

Challenges

1. Image Boundaries



TESSERACT OCR

Challenges

1. Image Boundaries



TESSERACT OCR

Challenges

1. Image Boundaries
2. Cleaning the Image

TESSERACT OCR

Challenges

1. Image Boundaries
2. Cleaning the Image



TESSERACT OCR

Challenges

1. Image Boundaries
2. Cleaning the Image



TESSERACT OCR

Challenges

1. Image Boundaries
2. Cleaning the Image



TESSERACT OCR

Challenges

1. Image Boundaries
2. Cleaning the Image



TESSERACT OCR

Challenges

1. Image Boundaries
2. Cleaning the Image
3. Model's Parameters
 - a. Page Segmentation Mode

TESSERACT OCR

Challenges

1. Image Boundaries

2. Cleaning the Image

3. Model's Parameters

a. Page Segmentation Mode

Page segmentation modes:

- 0 Orientation and script detection (OSD) only.
- 1 Automatic page segmentation with OSD.
- 2 Automatic page segmentation, but no OSD, or OCR.
- 3 Fully automatic page segmentation, but no OSD. (Default)
- 4 Assume a single column of text of variable sizes.
- 5 Assume a single uniform block of vertically aligned text.
- 6 Assume a single uniform block of text.
- 7 Treat the image as a single text line.
- 8 Treat the image as a single word.
- 9 Treat the image as a single word in a circle.
- 10 Treat the image as a single character.
- 11 Sparse text. Find as much text as possible in no particular order.
- 12 Sparse text with OSD.
- 13 Raw line. Treat the image as a single text line,
bypassing hacks that are Tesseract-specific.

DATASET CREATION

- 1. Merge Datasets**
- 2. Data Cleaning**
 - a. Cannot simply drop null values**

LIMITATIONS



FUTURE IMPROVEMENTS

1. Reduce Workflow Duration

Video Preprocessing



50 mins

Object Detection



12 mins

Image Preprocessing &
OCR



14 mins

Data Cleaning



9 mins

2. Model Tuning

- Increase Accuracy
 - Larger Dataset
 - Occluded Images
- Model Parameter Tuning

2. Model Tuning

- Increase Accuracy
 - Larger Dataset
 - Occluded Images
- Model Parameter Tuning

3. Add. Information

- More Matches
- More object classes
- Information through API

07

VALORANT™

THANK YOU

