# Military Fandom Analysis through World of Tanks

# Hello!

**We are team Pew Pew Pew**

**Comprised of Meng Cheng, Carl Xi, Jie Zhu**

# Military Fandom

- Crosses geographical region and generations
- Interest in play soldier, guns, tanks, jets
- Traditionally revolved around physical play

- The rise of the information age brought with it military games
    - Online battles, across country, gender, age, race
    - Many of these games have their own fandoms built around them (CounterStrike, World of Tanks)

- Our project focuses on World of Tanks
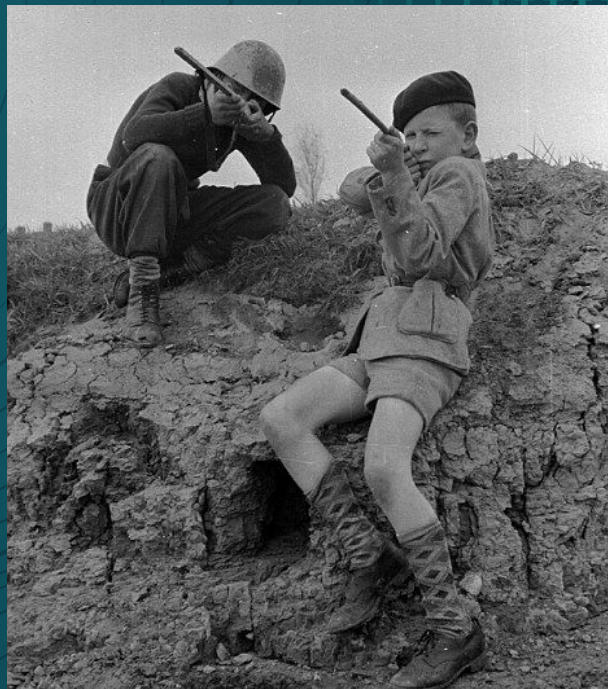
# World of Tanks



- Belarusian developer
- The most popular game in most former-soviet countries
- Focuses on armored vehicles between WWI and the Cold War
- Popular along military fans
- Average age 30+ vs popular military games

# Our Analysis Process

| Data Scraping | Exploratory Data Analysis | Modeling |
|---|---|---|
| - Collecting & Scraping data using APIs and Javascripts from official API ports, websites and fan websites | - Finding unique trends and patterns in our datasets and drawing conclusions on Fandom differences across geographic region | - Regression analysis of popularity based on vehicle parameters and in-game performance based on vehicle parameters<br>- Comparing the results of the two models |

# Datasets

| Sheet Name | Vehicle Parameters | Expected Performance | Actual Performance |
|---|---|---|---|
| Sheet Dimensions | 55 variables x 707 vehicles | 9 variables x 707 vehicles | 9 variables x 707 vehicles |
| Sheet Details | Parameters that define each vehicle's role and combat efficiency | Each vehicle's average expected performance per match | Each vehicle's average actual performance per match |

# Vehicle Parameters

**M48A5 Patton**
Tier X American Medium Tank

## Weaponry

| | |
|---:|:---|
| **2,922.50** | DPM |
| 390 | Damage |
| 268 | Penetration (mm) |
| 8.01 | Reload time (sec) |
| 7.49 | Rate of fire (rnds/min) |
| 1.82 | Aim time (sec) |
| **0.35** | **Dispersion** |
| 0.10 | ... moving |
| 0.10 | ... tank traverse |
| 0.08 | ... turret traverse |
| 3.84 | ... after firing |
| 1.92 | ... damaged |
| | . . . |
| 150 | Damage vs. modules |
| 105 | Caliber (mm) |
| 1,478 | Shell velocity (m/s) |
| 720 | Max range (m) |
| 57 | Ammo capacity |
| 22,230 | Potential damage |
| 1,000 | Shell cost |

## Mobility

| | |
|---:|:---|
| 45 | Top speed (km/h) |
| 20 | Reverse speed (km/h) |
| 810 | Power (hp) |
| 16.97 | Power/weight (hp/t) |
| 52.14 | Tank traverse (°/sec) |
| | **Effective traverse** |
| 49.54 | ... hard (°/sec) |
| 44.03 | ... medium (°/sec) |
| 22.02 | ... soft (°/sec) |
| | **Terrain resistance** |
| 0.77 | ... hard |
| 0.86 | ... medium |
| 1.73 | ... soft |
| | . . . |
| 19 | Gun elevation (°) |
| 9 | Gun depression (°) |
| 35 | Gun traverse (°/sec) |
| -180 / 180 | Gun traverse range (°) |
| 41.71 | Turret traverse (°/sec) |

## Everything Else

| | |
|---:|:---|
| 152.4 / 76.2 / 25.4 | Hull armor (mm) |
| 254 / 76.2 / 50.8 | Turret armor (mm) |
| 20 | Track armor (mm) |
| | . . . |
| **2,000** | Health |
| 285 | Engine health |
| 142 | ... repaired |
| 250 | Track health |
| 190 | ... repaired |
| 260 | Ammo rack health |
| 180 | ... repaired |
| | . . . |
| 50,350 | Max load (kg) |
| 47,719 | Total weight (kg) |
| | . . . |
| **420** | View range (m) |
| 776.93 | Radio range (m) |
| 12% | Fire chance |
| 6,100,000 | Tank cost |

## Gun constraints
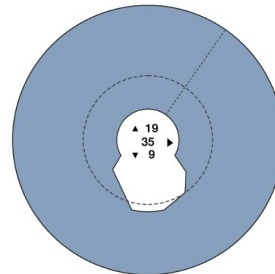


## Crew

**Commander**
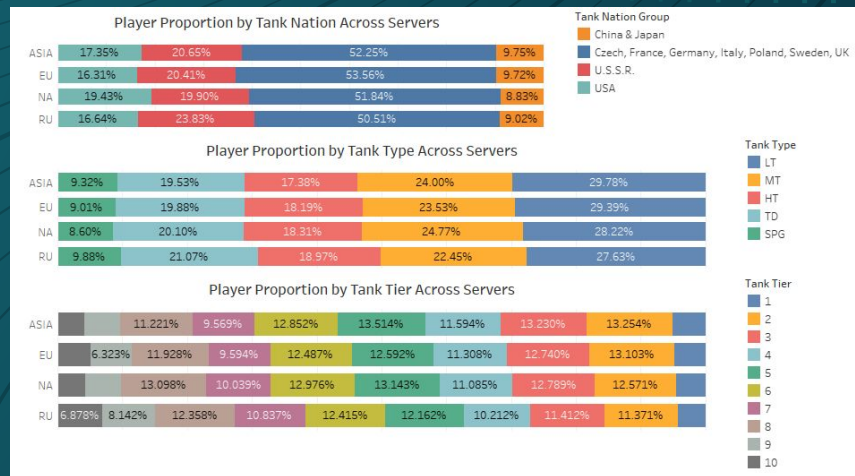**Gunner**
**Driver**
**Loader** — Radioman

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# Vehicle Choice Across Regions

We look at differences in vehicle tier, nationality and type choice across different regions

Notably:

- RU (CES) players like playing Soviet vehicles

- NA (Americas) players like playing American vehicles

- RU players love indirect fire vehicles (SPG) and Heavy Tanks (HT)

# Vehicle Choice Based on Parameters

We look at the 57 parameters of each vehicles, and use them to predict vehicle popularity.

Notably:

- Vehicles with bad gun depression and horsepower/ton are preferred by CES players, these are typically Cold-War Soviet Tanks

- EU players' preference is all over the place. The region is too diverse.

- ASIA players prefer WWI/WWII era tanks. Their involvement in the Cold War was minimal

- NA players prefer lower health but highly flexible tanks. These are typically American tanks

| #Players~ | Significantly Negative | Significantly Positive |
|---|---|---|
| RU | Damage, Penetration (mm), Tank traverse (°/sec), Gun depression(°), Power(hp) | Aim time (sec) |
| EU | Damage, Penetration (mm),Tank traverse (°/sec) | Aim time (sec) |
| ASIA | Damage, Penetration (mm), Tank traverse (°/sec), Gun depression(°) | Aim time (sec) |
| NA | Damage, Penetration (mm), Tank traverse (°/sec), Health | Aim time (sec) |

# Vehicle Parameters that Matter

We look at the 57 parameters of each vehicles, and use them to predict win rate.

Notably:

- Vehicles with low survivability but high damage per minute and gun traverse range win more on CES ( Tank Destroyers)

- Vehicles with low penetration but high frontal hull armor win more on EU (Heavy Tanks)

- Vehicles with high gun depression and frontal hull armor win more on ASIA (Western Medium Tanks)

- Vehicles with low health but high gun depression win more on NA server (Western Medium/Light Tanks)

| Average Win Rate~ | Significantly Negative | Significantly Positive |
|---|---|---|
| RU | Ammo rack health | DPM, Gun traverse range |
| EU | Penetration (mm) | Hull front |
| ASIA | | Gun depression(°), Hull front |
| NA | Health | Gun depression(°) |

# Preferred vs Effective Parameters

If we look at the previous two tables together, interesting conclusions can be drawn:

- CES/RU: Heavy tanks that fight close range are the most popular, so tank destroyers, which are Heavy tank's natural predator, are the most successful

- EU: There is no one most popular tank type, so heavy tanks, which can handle the most diverse range of situations, are the most successful

- APAC/ASIA: WWII/WWI Historical tanks are the most popular, so Western Cold-War era tanks that are technologically superior, are the most successful

- Americas/NA: Vehicles that have low survivability parameters (e.g. health) and rely on distance, natural cover and tactics are the most popular, so tanks that also rely on distance and tactics are the most successful

| Common Parameter | Significantly Negative |
|---|---|
| EU | Penetration (mm) |
| NA | Health |

# Conclusions

## We found that:

- Each server has different popular vehicles

- Players in different servers prefer different vehicle characteristics

- Vehicles, based on class, tier, and country of origin, have different trends of win rate across servers

- For every region, the most popular characteristics are not the most effective ones for winning

## This is because:

- Each region has different playstyle

- These playstyles reflect the vehicle design philosophy of these regions in history

- The vehicles that directly counter the most popular tanks are the ones that win the most often
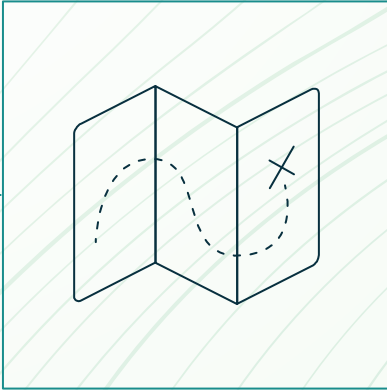
# Thanks!

**Time for Q&A**

# Appendix - Regression

- formula = Players ~ factor(Tier) + Damage + `Penetration (mm)` +  `Reload time (sec)` + `Clip size` + `Aim time (sec)` + `Shell velocity (m/s)` +  `Max range (m)` + `Power (hp)` + `Power/weight (hp/t)` +  `Tank traverse (Â°/sec)` + `Gun depression (Â°)` + `Ammo rack health` +  `Total weight (kg)` + `Radio range (m)` + DPM + Dispersion + `Top speed (km/h)` + `View range (m)` + Health + gun_traverse_range +  hull_front + hull_side + hull_back + turret_front + turret_back

- formula = Average_Win_Rate ~ factor(Tier) + Damage + `Penetration (mm)` +  `Reload time (sec)` + `Clip size` + `Aim time (sec)` + `Shell velocity (m/s)` +  `Max range (m)` + `Power (hp)` + `Power/weight (hp/t)` + `Tank traverse (Â°/sec)` + `Gun depression (Â°)` + `Ammo rack health` +  `Total weight (kg)` + `Radio range (m)` + DPM + Dispersion + `Top speed (km/h)` + `View range (m)` + Health + gun_traverse_range + hull_front + hull_side + hull_back + turret_front + turret_back

# Server Locations

Americas

European

Central &
Eastern Europe

Asia Pacific