

Data-Driven Long-Term Gaming Dynamics & User Experience

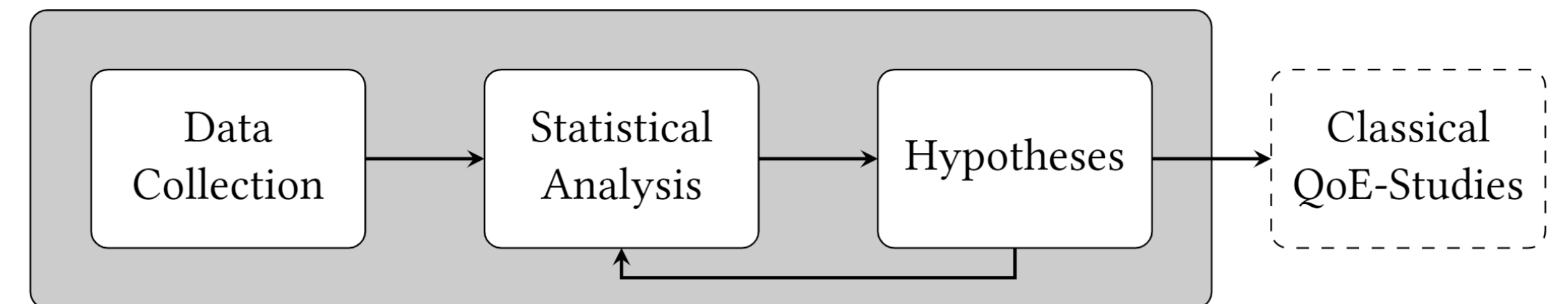
Dataset:



Motivation: How to study games played for months or years?

Long-Term Game rounds

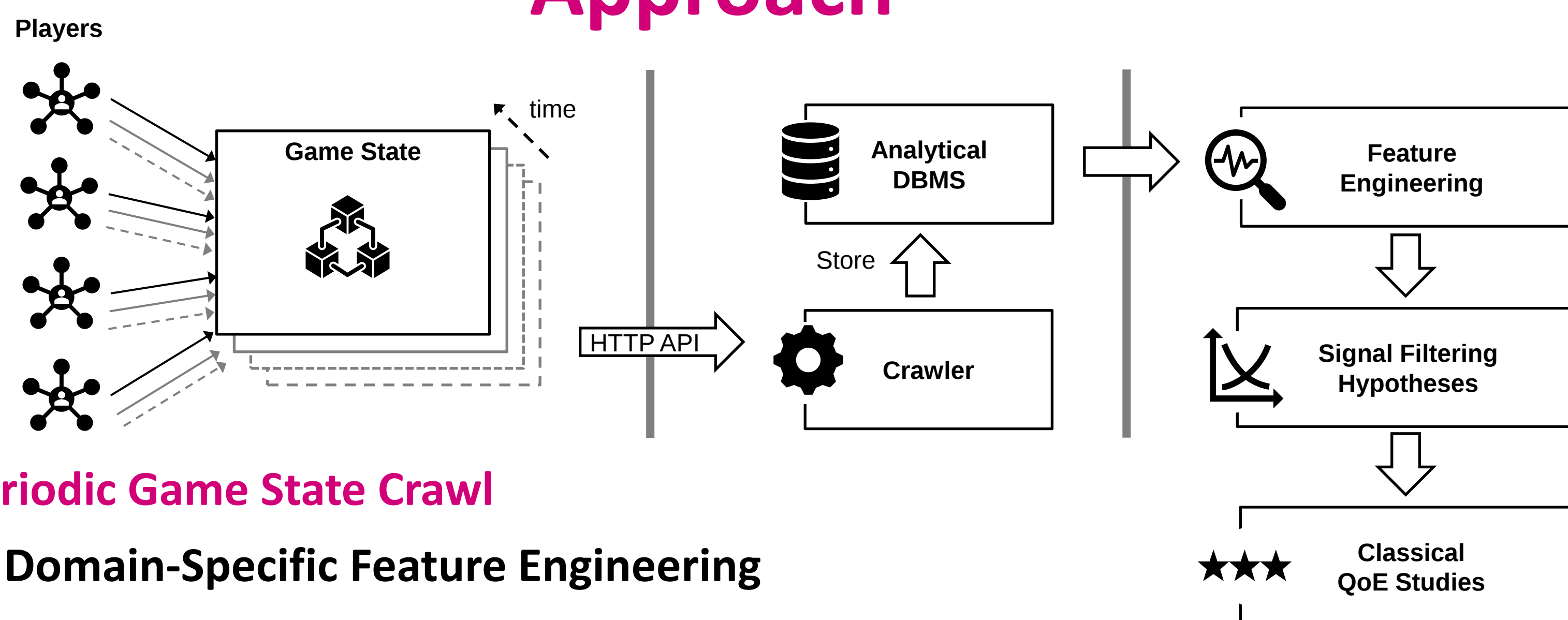
- **Classical QoE studies infeasible**
 - Common lab stimuli are short (90-120s, 10-15min)
 - Sufficient for *most* games
 - **Games can feature long-term game rounds**
 - Months up to years
 - To-be tested stimuli unknown
 - **Result: Large player population's experience remains unknown**
- Necessity for new methods & approaches, e.g., data-driven



Our Data-Driven approach

- Leverage whole player population for statistical analysis
- Derive suitable experience signals to enable QoE studies
- Apply classical QoE study methods for model development

Approach



Periodic Game State Crawl

- **Domain-Specific Feature Engineering**
- **Statistical Analysis of Significance**
 - Shaping Hypotheses for subsequent classical QoE studies

Subject

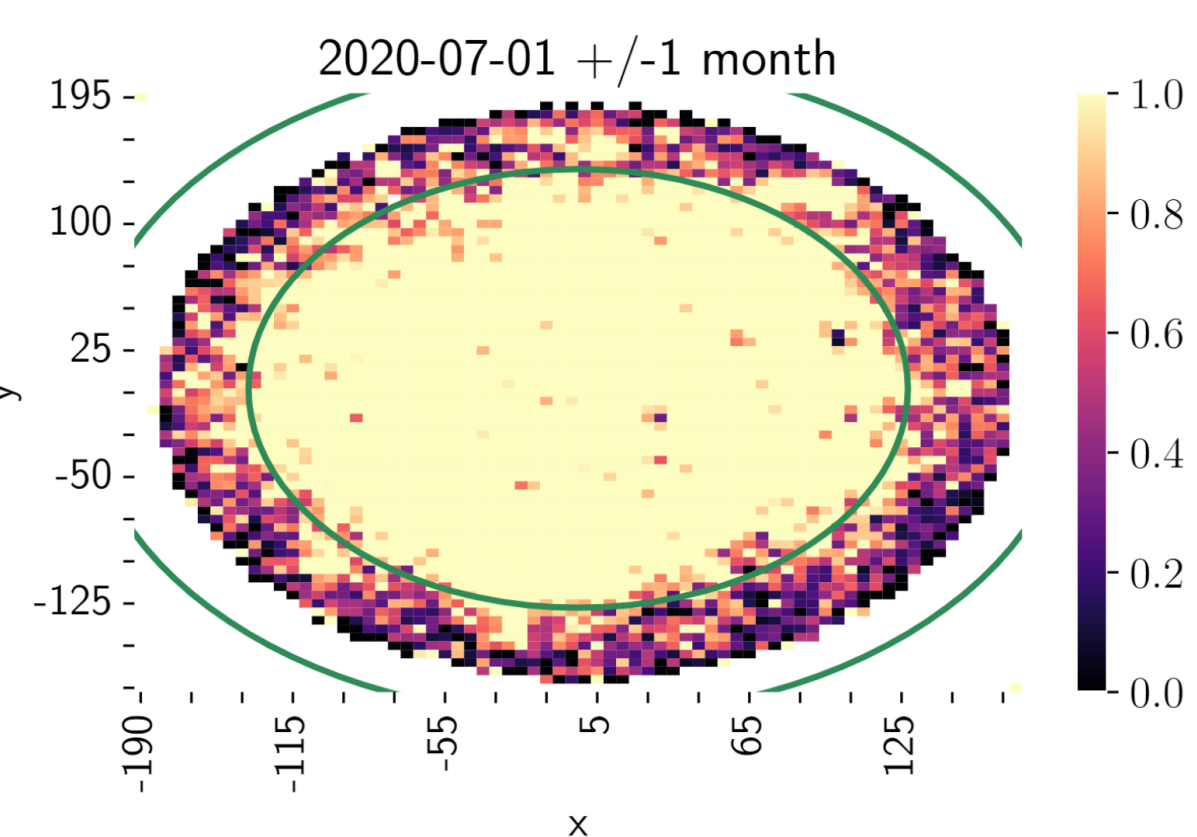
Tribal Wars (browser-based)



Long-Term Gaming

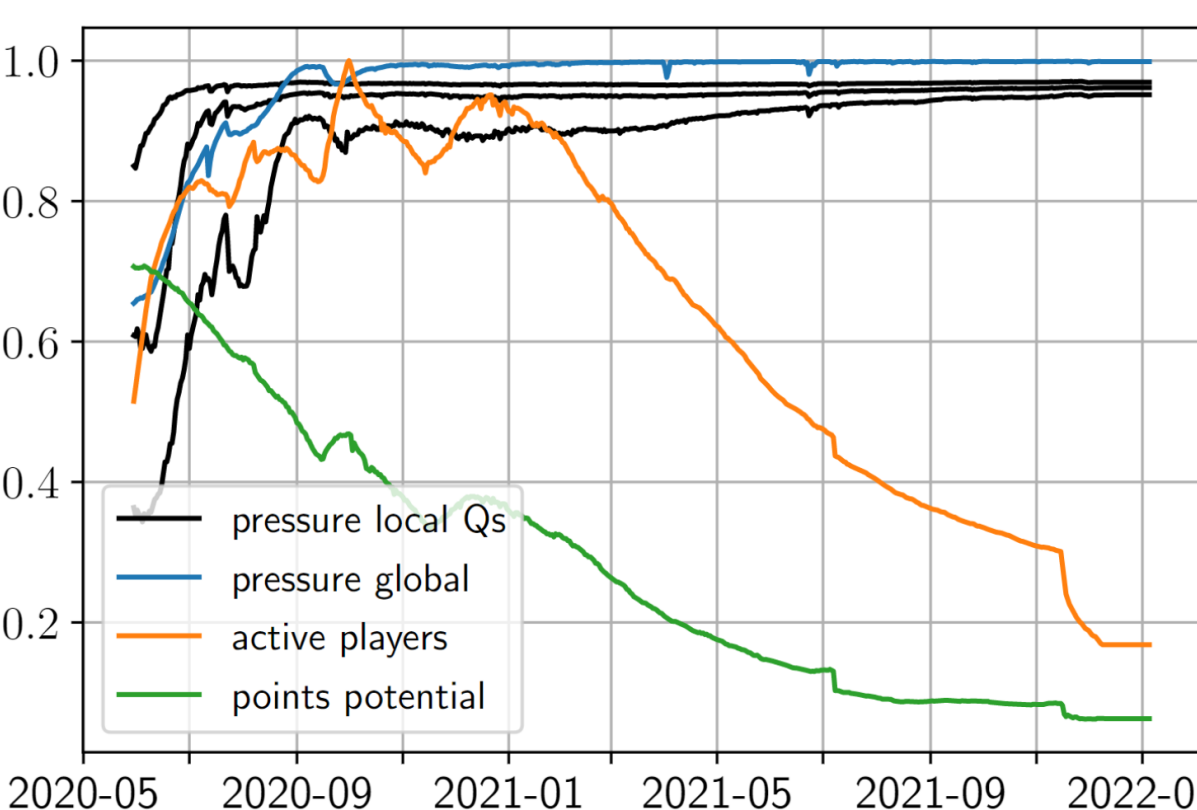
r"https://dsde.innogamescdn.com/asset/10f06311/graphic/start2/screenshots/tribalwars_(map)village).jpg"

Long-Term Gaming Dynamics



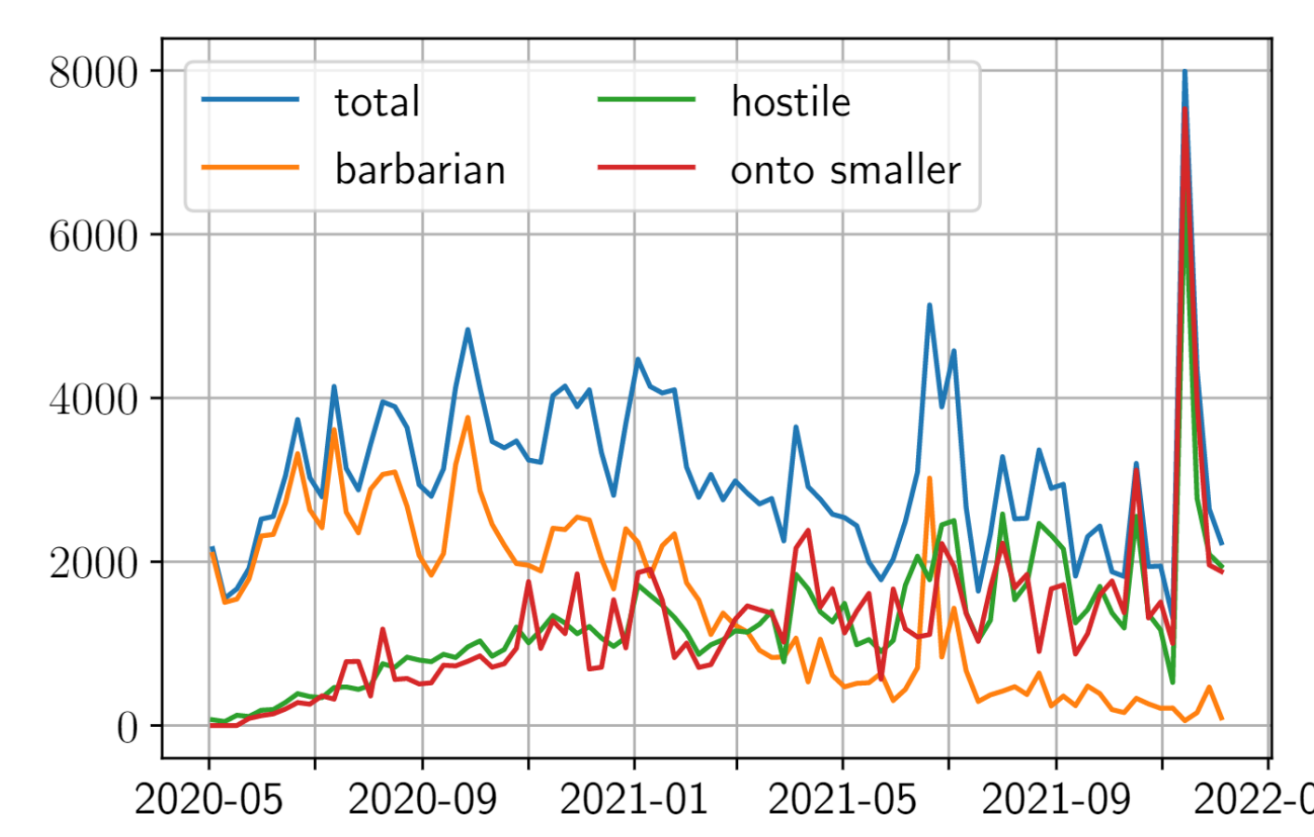
Increasing Expansion Pressure

- The game spawns limited player resources
- Leading to ever increasing scarce assets



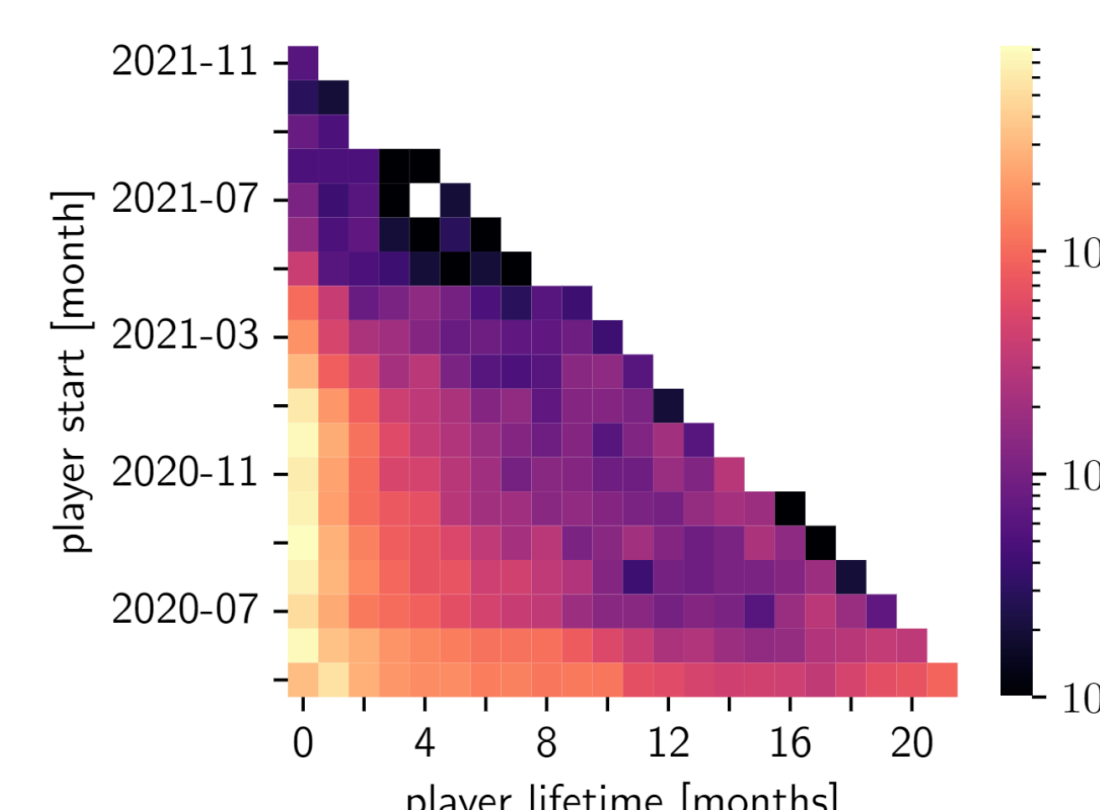
Observed Pressure over Time

- Overall pressure rapidly increases
- Remaining building capacity vanishes
- Amounts of players decreases



Environment is becoming more Hostile

- Earlier game – barbarian villages
- Hostile takeovers dominate conquers



User Lifetime correlated to Success

- Long-term commitment pays off
- Joining later becomes incredibly hard

User Experience Indicators

Analyze Partitioned Populations

- **Align and partition by relative game time**
- **Populations with rich features**
 - Infer significant differences
 - Feature Relations reveal success factors
- **Hypotheses to be tested subsequently**

metric	p-values < 0.05		avg relation non/churn
	first 4 weeks	overall	
player rank	$1.626 \cdot 10^{-7}$	0.004248	< 0.762
player villages	$2.104 \cdot 10^{-7}$	0.000003	> 3.568
player points	$2.866 \cdot 10^{-2}$	0.000018	> 3.629
has ally fraction	$4.209 \cdot 10^{-117}$	0.007655	> 1.574
village pressure global	$1.443 \cdot 10^{-11}$	0.230208	= 0.996
village pressure local	$1.783 \cdot 10^{-4}$	0.414349	= 1.004
villages gain	$1.569 \cdot 10^{-8}$	0.067301	>> 16.82
villages gain barbarian	$5.366 \cdot 10^{-8}$	0.219401	>> 16.92
kill all	$2.372 \cdot 10^{-12}$	0.073920	> 2.697
kill other	$4.408 \cdot 10^{-1}$	0.067183	>>> 343.6

Create Causality with Classical Methods

- **Enabling large scale population feature fingerprints**
 - Data-Driven Analysis of Influence Factors
- **Apply suitable methods as proof for hypotheses**
 - Lab-Studies
 - Questionnaires
 - Synthetic Control

Jens Helge Reelfs, Oliver Hohlfeld

Brandenburg University of Technology Cottbus-Senftenberg
Computer Networks and Communication Systems Group