

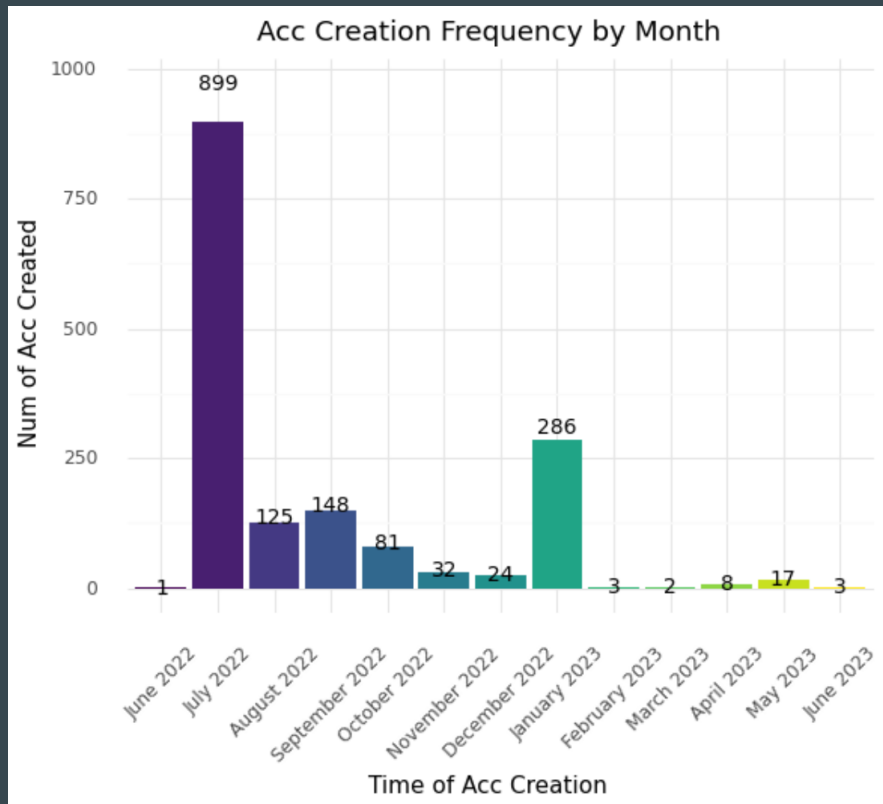
# Compiled Analytics Work

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July 19, 2023

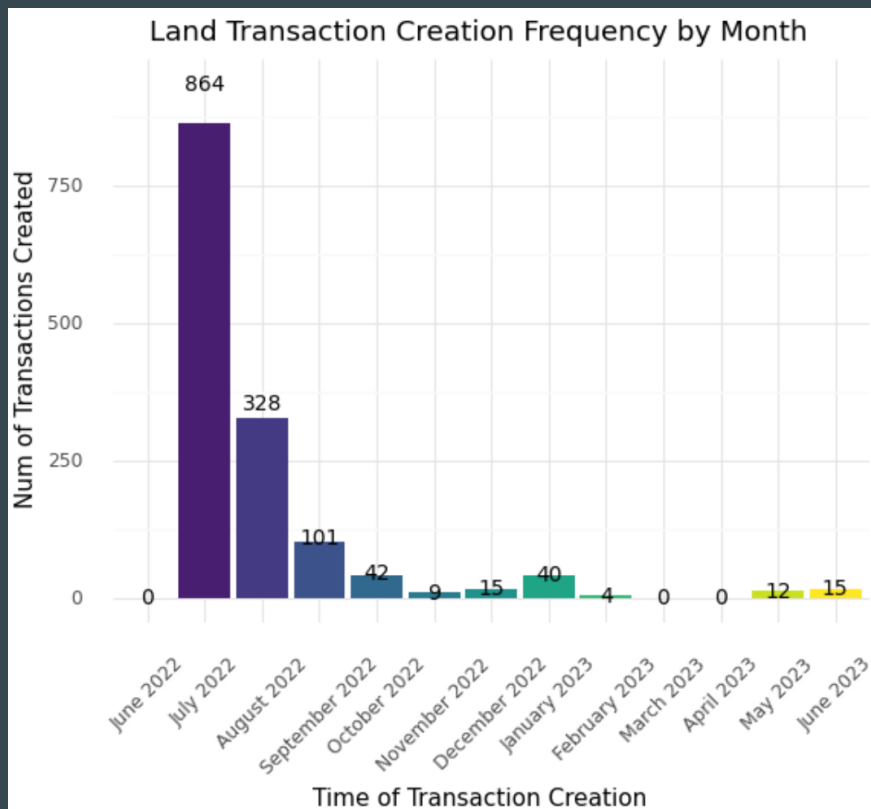
# Introductory Analytics

# Looking at Account Creation Data



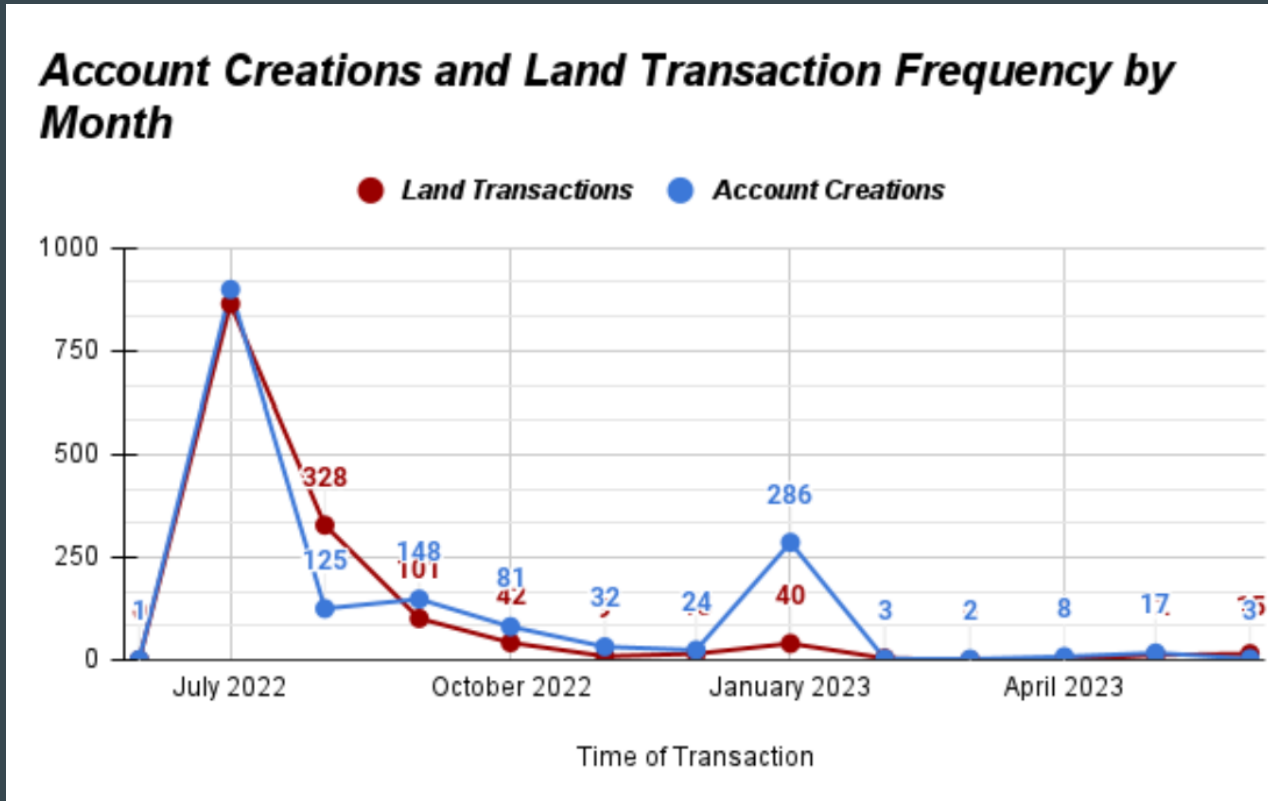
- Notable Spikes: July 2022, September 2022, January 2023
- Spikes in acc creation match with promotional events
- Number of new accounts created is decreasing
- Need for advertising to maintain general interest in game → spikes + consistent migration

# Looking at Land Transactions

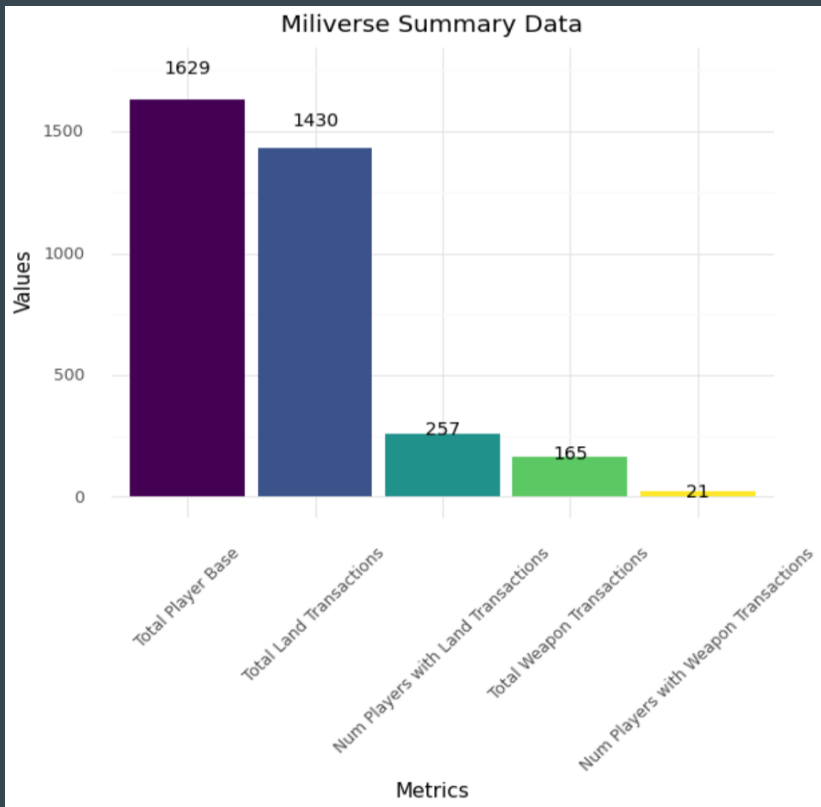


- Similar trend as the acc creation chart
- Expectation: number of transactions  $\geq$  number of users
  - Specifically looking at new users
- Accounts being made but users are not playing
- Need to look into means to increase user engagement
  - Gameplay aspects, login/ time based incentives, end goal

# Extra Visualization for Prev Info



# Takeaways from Data



- Miliverse has 1629 users
- 257 players responsible for total 1430 land-based transactions
- 21 players responsible for total 165 weapon-based transactions
- Supports the need to increase user engagement and retention

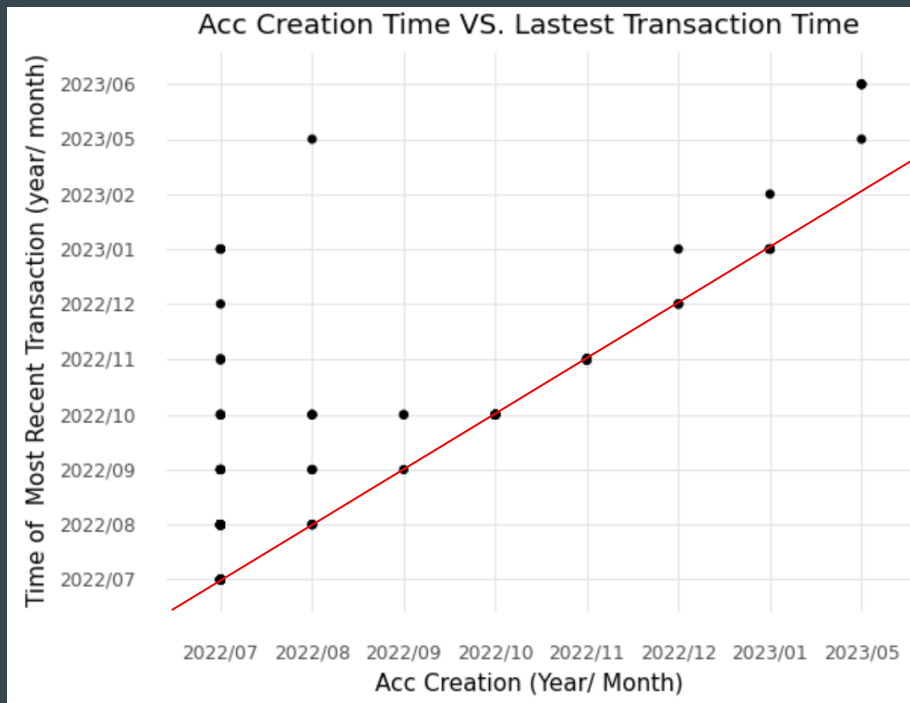
# Understanding User Trends

# Creating Master Data

- Consists of only users who have made transactions (257 users)
- Data Cleaning Done:
  - Transformation of Variables
  - Creating date/ time variables that can be used in algorithms
  - Merging, splicing, and subsetting previous datasets I made with Miliverse data
    - Original Miliverse Data → Land Transactions + Land Transaction Frequencies + Tiles of Land Owned + Weapon Transactions + Weapon Transaction Frequencies → Total Active Player Base, → Active Players Master Data
- Variables:
  - Username
  - Email
  - Time of Acc Creation: Normal Time Format (“YYYY/ MM”) and Float Format (YYYYMM.0)
  - Time of Latest Transaction: Normal Time Format (“YYYY/ MM”) and Float Format (YYYYMM.0)
  - Number of Tiles
  - Number of Milipoints
  - Number of Transactions

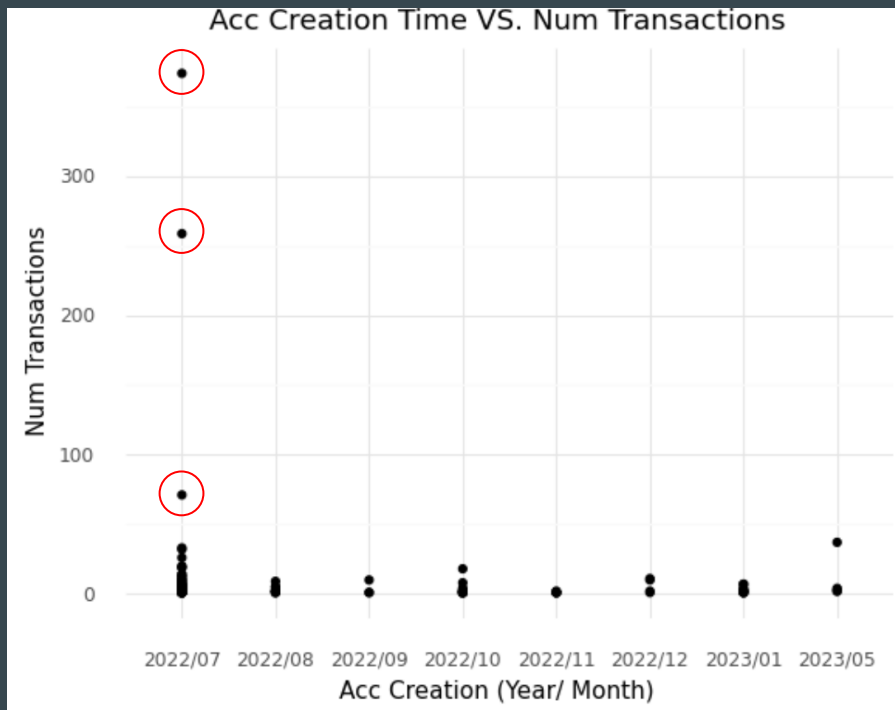


# Visualizing User Trends Based on Acc Creation



- Lets us see how active users are based on returning to the site (long term players)
- Red line represents a 1-to-1 relation of acc creation and transactions
- The higher the points are in relation to the red line the better
  - Users are engaging in the game even after the month of acc creation
- Earlier users were most active
- More recent users are only active for a short time after acc creation

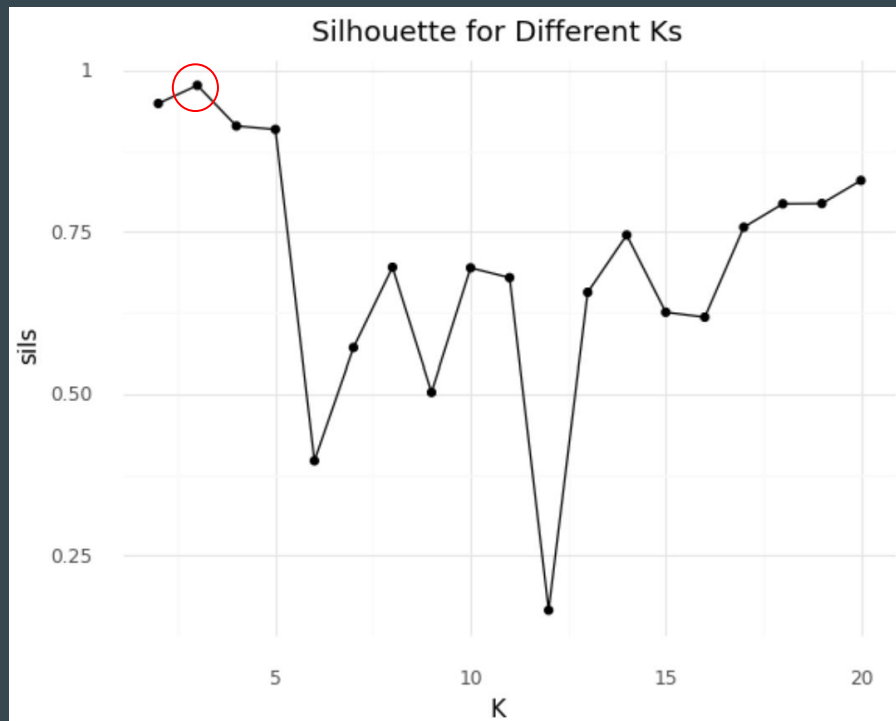
# Visualizing User Trends Based on Acc Creation



- Lets us see how active users are based on action engagement (participative players)
- Red circles represent outliers
  - Have an inordinate number of transactions → not normal users
- Earlier users were most active and interacted with gameplay frequently
- Aside from first month relative stagnant activity

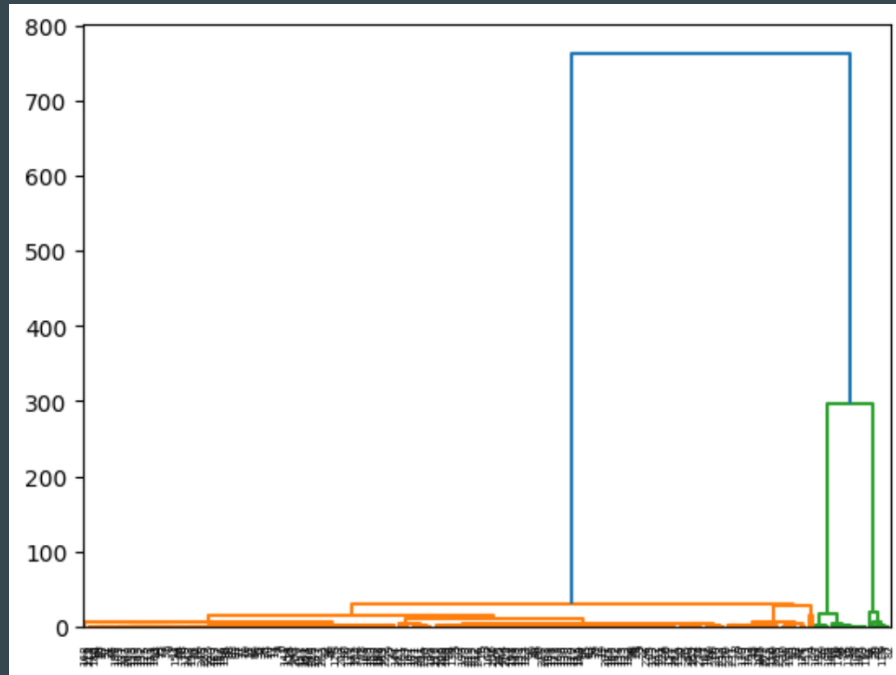
# Developing Models

# Gaussian Mixture Model



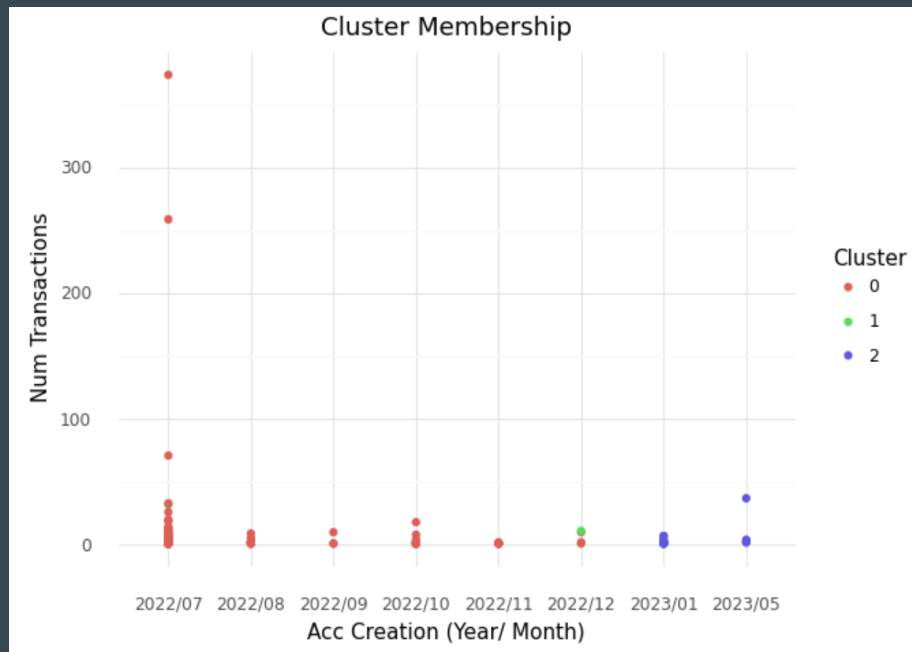
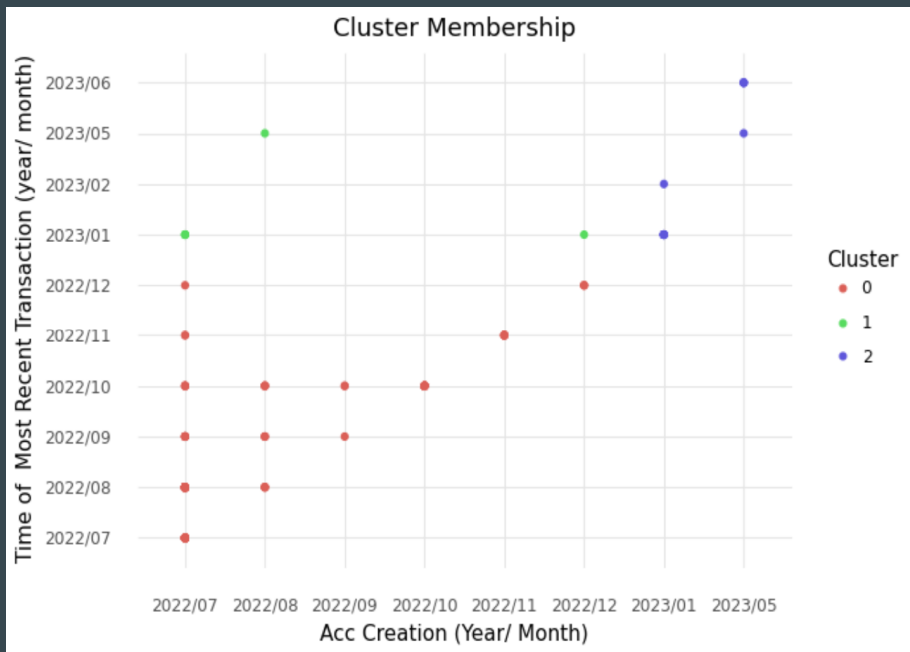
- Clustering algorithm
- Graph represents the strength of the model based on the number of clusters
  - Red circle represents optimal number of clusters (3)
- Silhouette score calculates how good the clusters are based on cohesion and separation
  - Silhouette Score of ~0.978

# Hierarchical Agglomerative Model



- Clustering algorithm
- Graph uses the cohesiveness and separations of the data to determine optimal number of clusters (3)
- Silhouette score calculates how good the clusters are based on cohesion and separation
  - Silhouette Score of ~0.978

# Applying Model – Looking at Trends Again



# Within-Cluster Findings

# Rudimentary Summary Statistics

## Cluster 0:

- 230 Users
- Acc Creation between July 2022 - December 2022
- Avg Num Tiles: ~1,690
- Avg Num Milipoints: ~7,130,000
- Avg Transactions: ~7
- Outliers: 006, EVA, Siho, solarceo, 도미니, 보리맘, 쇼박 --> have an inordinate amount of tiles and/ or milipoints

## Cluster 1:

- 7 Users
- Acc Creation between July 2022 - December 2022
- Avg Num Tiles: ~1,510
- Avg Num Milipoints: ~294,000,000
- Avg Transactions: ~10
- Outliers: carolha, demiha, ducky --> have an inordinate amount of milipoints/ tiles

## Cluster 2:

- 17 Users
- Acc Creation between January 2023 - May 2023
- Avg Num Tiles: ~160
- Avg Num Milipoints: ~51,000,000
- Avg Transactions: ~5
- Outliers:
  - deemax, Kain, kiltrek, OpElijah21 --> have 0 milipoints and only ~20 tiles
  - Paloaltodesigner and Tomo have an inordinately high number of milipoints and tiles



# True Summary Statistics

## Cluster 0:

- 223 Users
- Acc Creation between July 2022 - December 2022
- Avg Num Tiles: ~182
- Avg Num Milipoints: ~623,000
- Avg Transactions: ~4

## Cluster 1:

- 4 Users
- Acc Creation between July 2022 - December 2022
- Avg Num Tiles: ~12
- Avg Num Milipoints: ~2,550
- Avg Transactions: ~5

## Cluster 2:

- 11 Users
- Acc Creation between January 2023 - May 2023
- Avg Num Tiles: ~230
- Avg Num Milipoints: ~15,000,000
- Avg Transactions: ~7

Cluster	Members	Min Acc Creation (Month/ Year)	Max Acc Creation (Month/ Year)	Min Most Recent Transaction (Month/ Year)	Max Most Recent Transaction (Month/ Year)	Avg Num Tiles Held	Avg Milipoints Held	Avg Num Transactions
0	223	07/ 2022	12/ 2022	07/ 2022	12/ 2022	182	623000	4
1	4	07/ 2022	12/ 2022	01/ 2023	05/ 2023	12	2550	5
2	11	01/ 2023	05/ 2023	01/ 2023	06/ 2023	230	15000000	7

# Clustering Takeaways

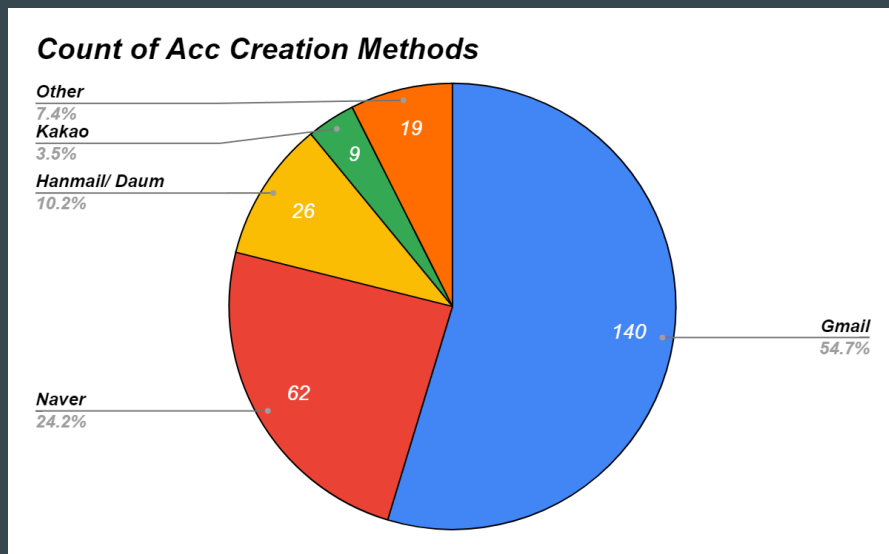
- Cluster 0:
  - We see the majority of Miliverse users
  - Considering that the game is not fully fleshed out in its functionality and gameplay:
    - These are positive numbers to have
    - The avg active player is contributing to the game via transactions
- Cluster 1:
  - The "inactive" active players, or those who did not have many milipoints to work with
  - Low transaction count + low tile count → never had that many milipoints
- Cluster 2:
  - We see a smaller part of the Miliverse player base → more wealthy in the game
  - These players are more active than those in cluster 0, and also have a lot of milipoints
  - Includes more recent players → appears to have engagement from this group
- What do we want to see:
  - We want the average player to be in cluster 0
    - Users have enough milipoints + Buy many tiles → Contribute to the game
  - We would want cluster 2 to consist of long term players who are contributing and active in the game to garner a lot of wealth/ assets
  - Ideally, the current cluster 1 should not exist, and as users receive milipoints I do not believe that the cluster will continue to exist
    - Cluster 1 would ideally turn into a “new player” cluster (lot of milipoints, but few transactions/ tiles)

**Applications to Miliverse/ DeOther**

# Miliverse Strategy (Product Development + Marketing)

- Increasing User Engagement through Product Development
  - Implement another element of gameplay to increase user engagement (intern ideas below)
    - Simulated fights that consider land power, weapon power, and experience level
      - Fight CPU (historic generals + armies) to receive milipoints, weapons, exp, etc.
      - Fight other players' armies to receive milipoints and exp
    - Promote historical aspect rather than fighting
- Marketing Efforts
  - Promotion through Events
  - Advertisements on Social Media → promotional bonus if acc created from social media campaign
  - Will be more difficult to promote since it isn't an app
    - Partnerships and game platform advertisement more uncommon for web-games

# Player Location Frequency for Marketing Purposes



- Shows us the most common emails used to register for Miliverse Accounts
- Gmail, Naver, Hanmail/ Daum, Kakao,
- Gmail users usually hint towards US based players, and looking at usernames this holds up
  - Gmail is also somewhat common in Korea because of Samsung phone use
- Since we don't currently have location data, we can make some assumptions from this

# Miliverse Strategy (In-Game Implementations)

- Miliverse Goal: Develop a player base that on average has a large number of milipoints and continues to receive them through login/ active rewards to continue participating in the aspects of the game.
- Generating Additional User Engagement
  - Keep the land and weapon pricing the same
  - New users start the game with 10 million milipoints
  - Implement login rewards of 10,000 milipoints per day
  - Keep the real money to milipoints conversion such that 10 or 50 cents is equal to 10,000 milipoints
  - Incentivise users to participate in gameplay aspects with receiving milipoints, weapons, and NFTs for achievements/ irl events

# Regarding DeOther

- DeOther faces similar problems to Miliverse
  - Need to follow similar metrics to gauge the performance of the game
  - Improving marketing and game development to increase user engagement
- The game needs to begin saving and collecting in-app data
  - Cannot make improvements without collecting data → making changes while blind
  - Minimum Data Collection
    - Username + Email (used to create account)
    - Account Activation Date + Last Visit Date
    - In-Game Currency Held
    - In-Game Currency Transactions
    - Number of Minigame Plays
  - Other Data to be Collected
    - Daily/ Monthly Active Users
    - Session Count + Length

# Other Analytics work to be Done

- Once DeOther is collecting data and/ or Miliverse has made its improvements:
  - Want to understand retention rate of users who go to events
  - At promotional events send out demographics based survey (also asks for email + username used to sign up for account)
    - Can see how many new accounts created
    - Can track metrics specific to them and see how effective promotional events are at gaining long-term users
  - Can see how players' perception of the game changes, and compare trends with existing players
    - See what features users like (in regards to minigames, transactions, etc.)



# Future for this Role

- Analytics is a continuous process
  - The work that I have done doesn't guarantee things will go according to plan
  - With each iteration or new thing added, this same kind of work needs to be done again
- After each update to the game, newer models will need to be used
  - Once more users migrate to the game, these same models can be applied to understand how the playerbase changed or how it didn't
    - It can also help with benchmarking the progress of the game against itself
- With more data the models become more accurate, but a strong understanding of data is needed to make the connections, understand the trends, and determine a plan of action

# Final Internship Remarks

**Thank You**