

Flu Fighters by Bravo7



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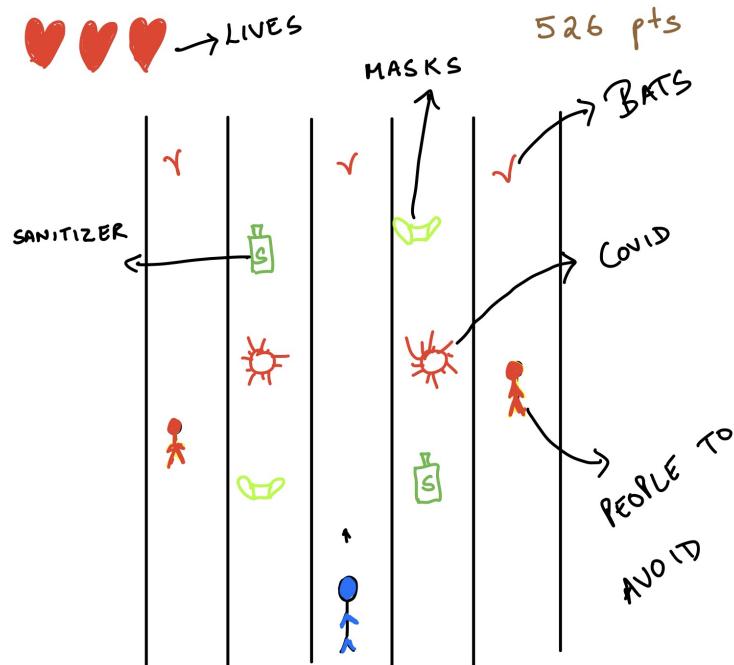
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<p>Gaurav Bharat Kataria</p>  A portrait of a young man with dark hair and a beard, wearing a dark grey suit jacket, a white shirt, and a black bow tie. He is smiling at the camera.	<p>gkataria@usc.edu</p>
<p>Radhika Manohar Bhat</p>  A photograph of a young woman with long dark hair, wearing a light blue jacket over a striped shirt and jeans. She is sitting on a red couch, holding a laptop, and making a peace sign with her hand.	<p>rbhat@usc.edu</p>
<p>Abha Hemant Pandit</p>  A portrait of a young woman with long dark hair, smiling. She is wearing a white blouse with a colorful floral pattern.	<p>abhahema@usc.edu</p>
<p>Jack Rasmussen (PM)</p>	<p>jtrasmus@usc.edu</p>

Initial Design:



Idea:

An endless runner concept where the objective of the game is to stay alive as long as possible while collecting points and avoiding different obstacles efficiently to have a high score. The player can jump and move sideways (left and right). The purpose of the game is to be fun and achieve a high score among friends. The player can switch between different modes to earn points faster. The theme of the game is to make the gloomy real world pandemic a bit more cheerful amidst the lockdowns and online classes. The game difficulty increases after the score crosses certain thresholds to spawn newer obstacles and power-ups as the player moves further in the game.

Inspiration:

Game	Description	Takeaways
Temple Run	Temple Run is a 3D endless running video game where the player controls an explorer who has obtained an ancient relic and is running	Endless gameplay of our game is based on the Temple Run and along with that the ability of the player to collect coins and increase the score

	from demonic monkeys who are chasing him.	is also provided endlessly. The speed increases as the game proceeds further similar to Temple Run.
Subway Surfer	Subway Surfers is an endless action video game developed where the player takes on the role of an average teen vandalizing a subway train, and is caught by the Inspector and his dog. The player must run away from the two, who are chasing him/her.	Endless gameplay of our game is based on the Subway Surfer where the obstacles have to be avoided by jumping and moving sideways.
Mario Kart	In the Mario Kart series, players compete in go-kart races, controlling one of a selection of characters, typically from the Mario franchise. Up to twelve characters can compete in each race; the exact number varies between games.	One of the features of the series is the use of various power-up items obtained by driving into item boxes laid out on the course. These boxes are similar to the mystery boxes employed in our game.

Game Overview:

- Genre: Endless Runner, Fast-Paced and Global crisis mission
- Goal: Dual-role player should survive for the longest time and achieve the highest score possible, avoiding obstacles like bats, viruses, infected people and collecting maximum rewards such as coins, masks, syringes etc.
- Mechanics
 - **How to control:** On Keyboard, using left and right keys to move while using up key for jumping. Space key for using any store bought utility power like a double-jump/weapon. On Mobile consoles, finger swipes - left and right for movement, and on-screen buttons for jump and using store bought powers. The player gains speed as the game progresses.
 - **End Condition:** The player ends the game when:
 1. They lose 3 lives by touching the virus carriers (Bats, viruses, infected people)
 2. Fall off the path tiles
 3. Quit the game
 - **Score:**

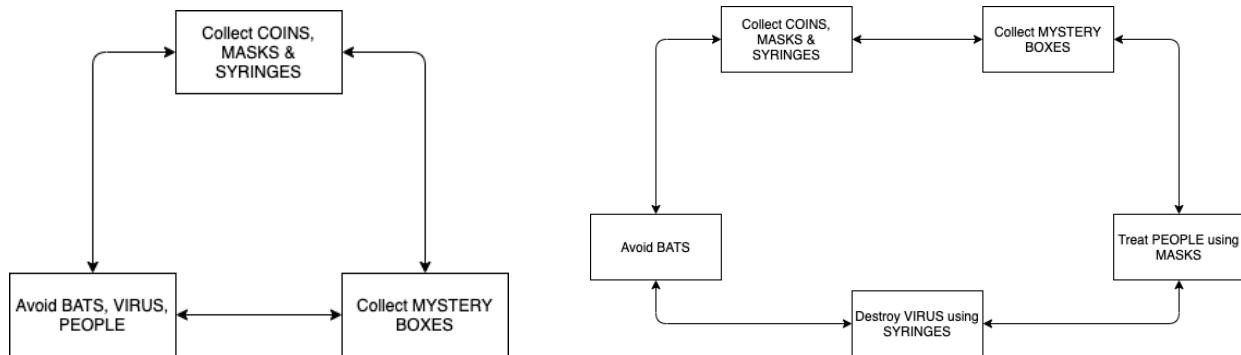
- Score is a function of coins collected, mystery power-ups collected and role switch mask/syringe combos.
- Coins earned during the game can be utilized to upgrade the player, buy limited time initial power-ups, immunity to certain obstacles.
- High scores unlock power-ups in store.

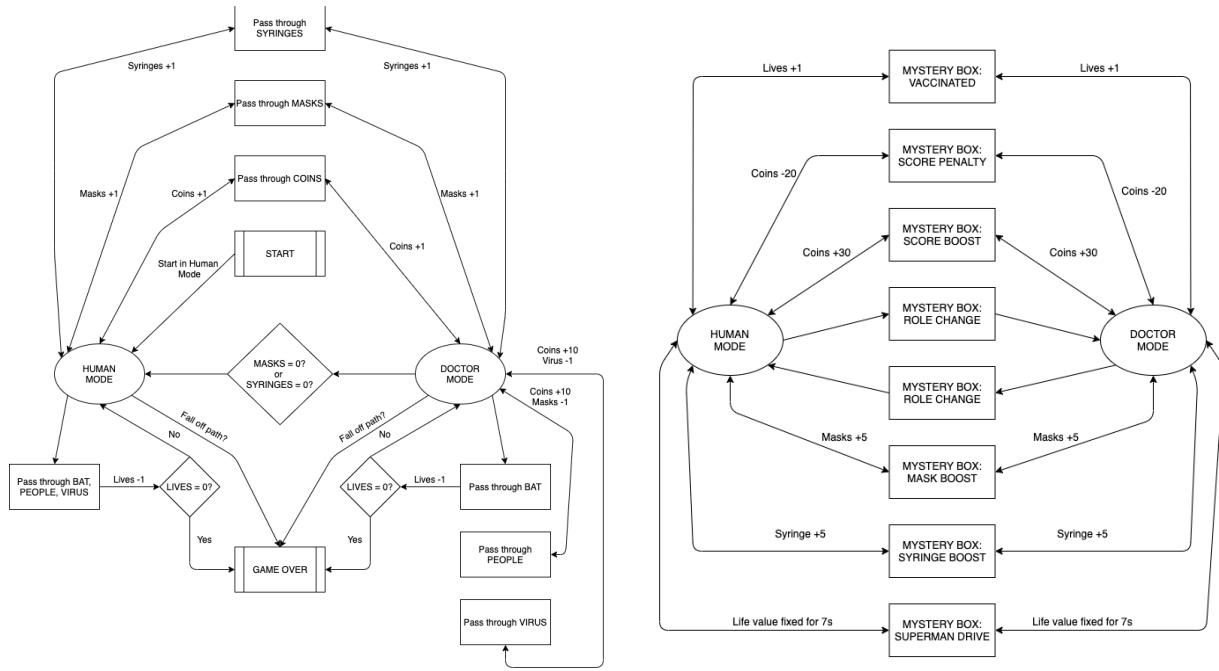
- **Features:**

- Audio-visual effects on coins collection, jump, hitting obstacles and collecting power-ups.
- Soothing background audio on all screens
- Pause, Resume & Quit functionality
- Sliders to control background music, SFX effect volume and movement sensitivity
- Leaderboard for user's high score maintenance
- Game tutorials for beginners to get started with

- **Target Demographics:** It will definitely entertain the young and old and hence, it is not necessarily age-restricting. The target audience are people who enjoy lively games and improving their reflexes. It's a casual fun based game which acts as a stress buster too. The game is targeted towards groups which like to brag their high scores and talents amongst their friends. A casual fun game with adaptive difficulty levels to keep the user engaged.

High-Level Design/Core Loop:

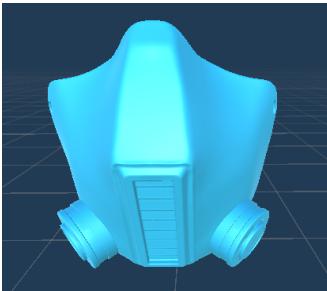


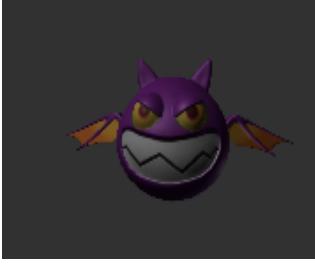


Explanation:

- The game starts in the human mode.
- **Human Mode:**
 - Hitting an obstacle (Bat, Person or Virus) in this mode results in the loss of a life.
- **Doctor Mode:**
 - Hitting a bat in this mode results in the loss of a life.
 - Passing through people results in a mask decrement and score boost of 10 coins.
 - Passing through the virus results in a syringe decrement and score boost of 10 coins.
 - If masks or syringes are zero the mode changes to human.
- In either mode passing through coins results in a score increment, passing through masks results in a mask increment and passing through syringes results in a syringe increment during human mode.
- In either mode if you fall off the path, the game is over.
- **Mystery boxes:**
 - Mystery boxes get you score penalties (-20 coins), score boosts (+30 coins), mask boosts (+5 masks) and syringe boosts (+5 syringes).
 - Mystery boxes could also result in a vaccination, i.e., an extra life.
 - The role change mystery box changes the mode of the player from doctor mode to human mode and vice-versa.
 - No jump power-down disables jump functionality for 7 seconds.
 - Finally, the superman drive mystery box gets you 7 seconds of immunity, i.e., the life count remains fixed even if you pass through lethal objects.
- If there are no more lives remaining the game is over.

Low-Level Design:

Asset	Description
Coin :- 	<ul style="list-style-type: none">• A player can collect coins and increase their score.• They can later use these coins in the purchase store to buy some amazing power ups.
Mask :- 	<ul style="list-style-type: none">• A player can collect masks which will help them in the doctor mode.• Once a player switches to doctor mode, then he/she can use the masks to give it to infected people and gain +10 score.• If the number of masks go down to zero while a player is in doctor mode then the player comes back to human mode.• $2 * \text{number of leftover masks}$ are added to the final score.
Syringe :- 	<ul style="list-style-type: none">• A player can collect syringes which will help them in the doctor mode.• Once a player switches to doctor mode, then he/she can use the syringes against viruses and gain +10 score.• If the number of syringes go down to zero while a player is in doctor mode then the player comes back to human mode.• $2 * \text{number of leftover syringes}$ are added to the final score.

Infected People :- 	<ul style="list-style-type: none"> • A player has to avoid the infected people when they are in human mode. • Colliding with infected people, in human mode, will decrement one life. • In Doctor mode, a player can collide with the infected people and decrement the number of masks by 1 which in turn will increment score by 10. • Colliding with infected people while in a combo state of doctor mode + superman drive will result in incrementing score by 10 without losing masks. • Players will not lose life while in superman drive.
Virus :- 	<ul style="list-style-type: none"> • A player has to avoid the virus when they are in human mode. • Colliding with a virus, in human mode, will decrement one life. • In Doctor mode, a player can collide with a virus and decrement the number of syringes by 1 which in turn will increment score by 10. • Colliding with virus while in a combo state of doctor mode + superman drive will result in incrementing score by 10 without losing syringes. • Players will not lose life while in superman drive.
Bats :- 	<ul style="list-style-type: none"> • A player has to avoid bats in human as well as doctor mode. • Colliding with a bat in human or doctor mode will decrement life by 1. • Players will not lose life while in superman drive.

Mystery box :-

The mystery box has positive and negative power ups:-

- score penalties (-20 coins)
- score boosts (+30 coins)
- Mask boosts (+5 masks)
- Syringe boosts (+5 syringes)
- Vaccination (+1 Life)
- Role Change (Human to Doctor mode and vice versa)
- Superman drive (7 seconds)
- No Jump (7 Seconds)
- Masks Penalty(-5 masks)
- Syringes Penalty(-5 masks)

Store bought power-ups will be added into the mystery box rewards if enabled.

Human :-

- This is the player in human mode. Player starts the game in human mode.
- It can also be customized using store bought accessories (Future scope).

Doctor :-

- This is the player in doctor mode.
- If a player in human mode has at least one syringe and one mask and receives a role change in mystery box, then the player changes to doctor mode.
- It can also be customized using store bought accessories(Future Scope).

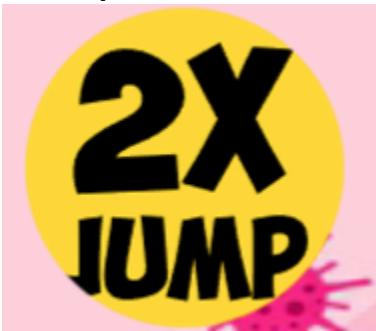
Tile/Path :-

- This is the path on which a player has to move in both modes.
- If the player falls off the path then the game ends.

Arch:-

- A player has to avoid arch in human as well as doctor mode.
- Colliding with an arch in human or doctor mode will decrement life by 1.
- Players will not lose life while in superman drive.

Purchase Store:

Power ups	Description
2x Jump:- 	<p>Detail:- A player can jump to twice the height which is normally defined.</p> <p>Cost:- 25 coins</p> <p>Unlocks at score:- 80</p>
Increased Superman Drive:- 	<p>Detail:- A player can have 20 seconds of Superman drive instead of the 7 seconds.</p> <p>Cost:- 40 coins</p> <p>Unlocks at score:- 200</p>
Extra Life:- 	<p>Detail:- A player can have an extra life i.e. total of 4 lives instead of 3.</p> <p>Cost:- 100 coins</p> <p>Unlocks at score:- 350</p>

5x coins:- 	Detail:- A player will be able to collect 5 times the coins. Cost:-250 coins Unlocks at score:- 550
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Leaderboard Logic:

The global leaderboard system was implemented by deploying a NodeJS server on Google cloud platform which acts as a proxy server to the 3rd Party Leaderboard server:
<http://dreamlo.com/lb/Gf9B1vbb1kGsPKcpH53qOwJ4QLSY7f606gYxdahmaN1w>

This server maintains the top 100 scores for distinct users and will bump out lower scores. Additionally, it also uses max logic to store just the highest score for every user.

Game & Experience Feedback

Feedback & Suggestions (Professor, TAs & PM):

Some of the feedback received from Professor and PM:

1. To add dimensions to the game, that is, relation between game objects that will make the game more interesting to play.
2. To reduce the complexity of the game at the initial stage so as to allow the users to be able to get a hang of the game for some time.
3. To add a store to the game so as to allow the user to purchase advantages to play inside the game.

Feedback & Suggestions (Classmates):

Some of the feedback we received from our Classmates are:

1. Most of our classmates found the music to be too distracting.

2. Some of our classmates found the game to be too difficult in the beginning
3. Some of our classmates found the instructions to be not enough to understand the game
4. Some of our classmates found the asset theme to be too visually dark.

Action on Feedback:

We took into account all the feedback that we received from our Professor, PM and our classmates and took the following actions:

1. We added more relationships between the game objects. Relationships exist between mystery boxes, the number of syringes you obtain, the number of masks you obtain and your switch to doctor mode.
2. We reduced the complexity of the game at the beginning. We do not spawn many obstacles in the beginning so as to give the players an idea of what is going to come gradually and allow them to get used to the sensitivity of the movement controls and the jump. We reduced the initial running speed and the gradual speed bumps of the player as well.
3. We added a store to our game so the player can buy multiple power ups from the coins they earn by playing the game.
4. We changed the music theme across our game. We made it more soothing and less distracting and instead of keeping the game music throughout the game we added different kinds of soothing music on different sections of the menu.
5. We added an instructions menu which explains the game in a very simple pictorial way.
6. We changed the theme of the assets. We changed the path from a normal road to a medieval style cobblestone, as well as added a transitional background that goes through the phases of the day, that is, morning, afternoon, evening and night.

Analytics:

Tracked aspects for Analytics:-

- Number of coins earned per game.
- Number of syringes and masks collected on average before switching mode ie; before switching from human to doctor mode.
- Number of syringes and masks collected vs points scored using them.
- Analysis of points earned/time spent in human mode vs doctor mode

- Player Retention tracking (D0 v D1, D0 v D7, D0 v D30)
- Analysis of player strategy by comparing average session length vs points scored in each game.
- Points scored in superman drive per game.
- Points earned vs Number of lives remaining (Points earned per life)
- How the user gets killed (falling off the road vs losing lives)
- Frequently bought items in the power-up aggregated weekly/monthly

Analytics insights gathered till Midterm:-

- Achieving superman drive from mystery box is difficult (less than 30% users get it, additionally, on an average the chance of getting superman drive is ~20%). The users also are able to score only 1 point per superman drive on average which is the same as the human mode and does not help users achieve higher scores.
- Decrease the difficulty of the game since the average session length per user is ~30 seconds which is less. Additionally, the number of points scored per session on average is ~30 which is less.
- Increase chances of getting into doctor mode to enable users to score more points. Currently, on average, each user scores just 1.5 points per role switch.
- Currently, the session length vs points scored translates to 1 point per second per user which is demotivating for a user to play the game.
- The points distribution for every final score is such that 8% of total points are scored in doctor mode and the rest in human mode.
- On an average, users score ~19 points per life. The distribution is skewed however when we try to understand the user mentality vs number of lives remaining, the distribution is:
 - ~18 points scored in a session by a user when only 1 life remaining
 - ~14 points scored in a session by a user when only 2 lives remaining
 - ~21 points scored in a session by a user when all lives are remaining
- While switching into super mode (doctor mode), users on an average have ~11 syringes and ~9 masks which allows them to score +200 points per switch. However, the utilization of these items is ~44% (~87 points).

- Users collect ~11 coins per session, thus contributing ~11 points out of 30 points from coins and ~19 points from mystery boxes/syringes/masks. We need to increase the mystery box/syringe/mask usage.
- Out of 446 games, the users scored 0 points in 131 games. This means either the instructions are not extensive enough to help users understand the game or the game difficulty is high.
- Out of 446 games, the users scored 100+ points only in 45 games. This means the difficulty curve as points increase is steep. This might demotivate the users from playing the game.
- The mystery box on an average gives a point boost of 2 points per game (from the +30/-20 point boost power-up). This can be increased to help the user score more points and reward them for longer game sessions.
- Players die from falling off the road quite often compared to losing lives.

Analytics insights gathered after Midterm till 3rd May:-

- The average score per user session increased from ~30 to ~108 points and the average session length increased from ~30 seconds to ~48 seconds. This shows the game is more adaptive and allows even users with short sessions to score higher points
- Getting superman drive from a mystery box has become adaptive (46% users compared to 30% previously). Additionally, on an average the chance of getting superman drive is ~32%, up from ~20%. Getting a superman drive also translates to 4x increase in points compared to the previous core logic.
- Each user scores ~17.3 points per role switch compared to ~1.5 points previously.
- The session length vs points scored translates to 2.3 point per second per user, up from 1 point per second per user before.
- The points distribution for every final score has increased to 17% of total points being scored in doctor mode compared to 8% before.
- Users score ~43 points per life compared to ~19 points before.

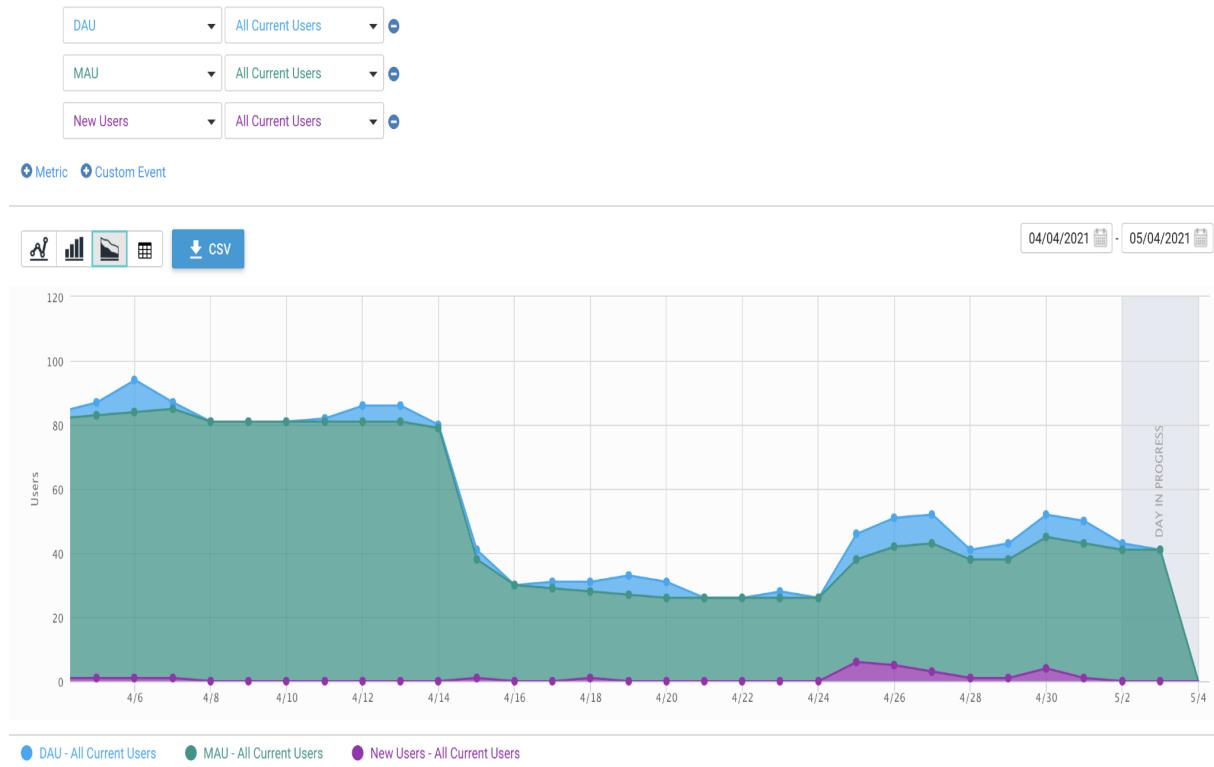
Further patterns and game improvements can be found by collecting more data! The above traits so far have definitely proved that our changes had a positive impact on game experience, game engagement. Additionally, the adaptive gameplay has led to longer game sessions and a number of games in a smaller time frame.

Analytics Data Link:

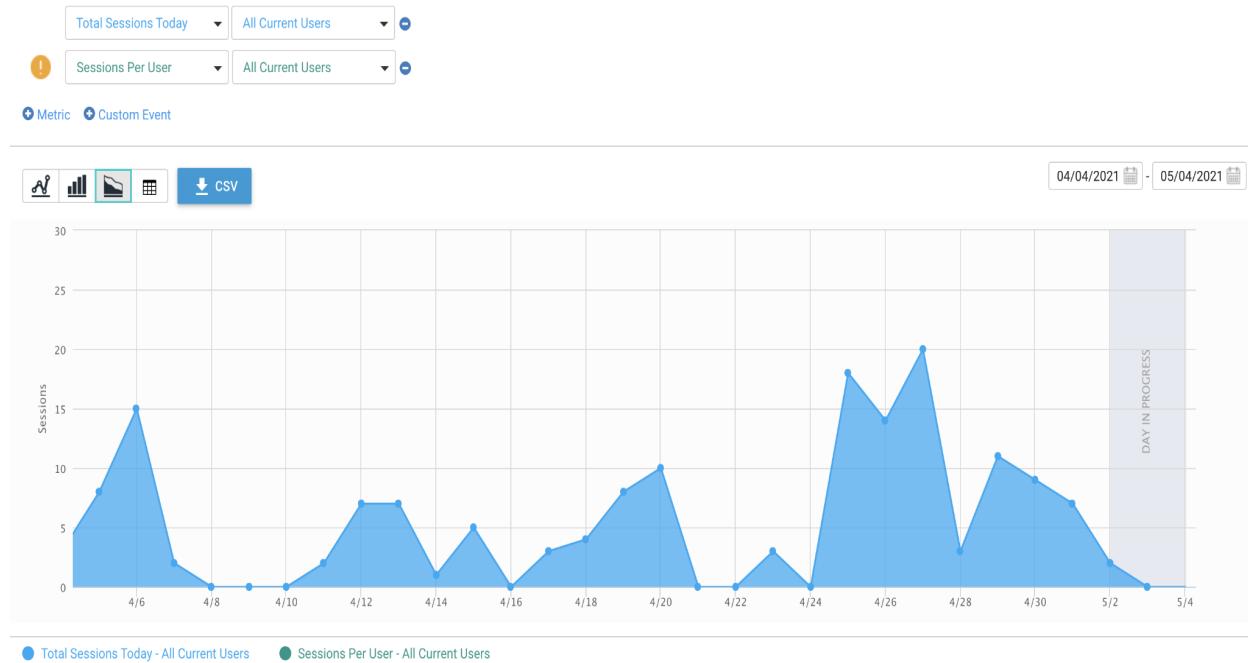
<https://drive.google.com/file/d/1tINsPD5y1SQx67yphJ7I4CtVdqjTHRH4/view> (Data till 30th March 2021)

https://drive.google.com/file/d/1JjGqrOAsJgP1NjU5wLI0-WNQ9k3caby_/view?usp=sharing (Data from 31st March 2021 onwards)

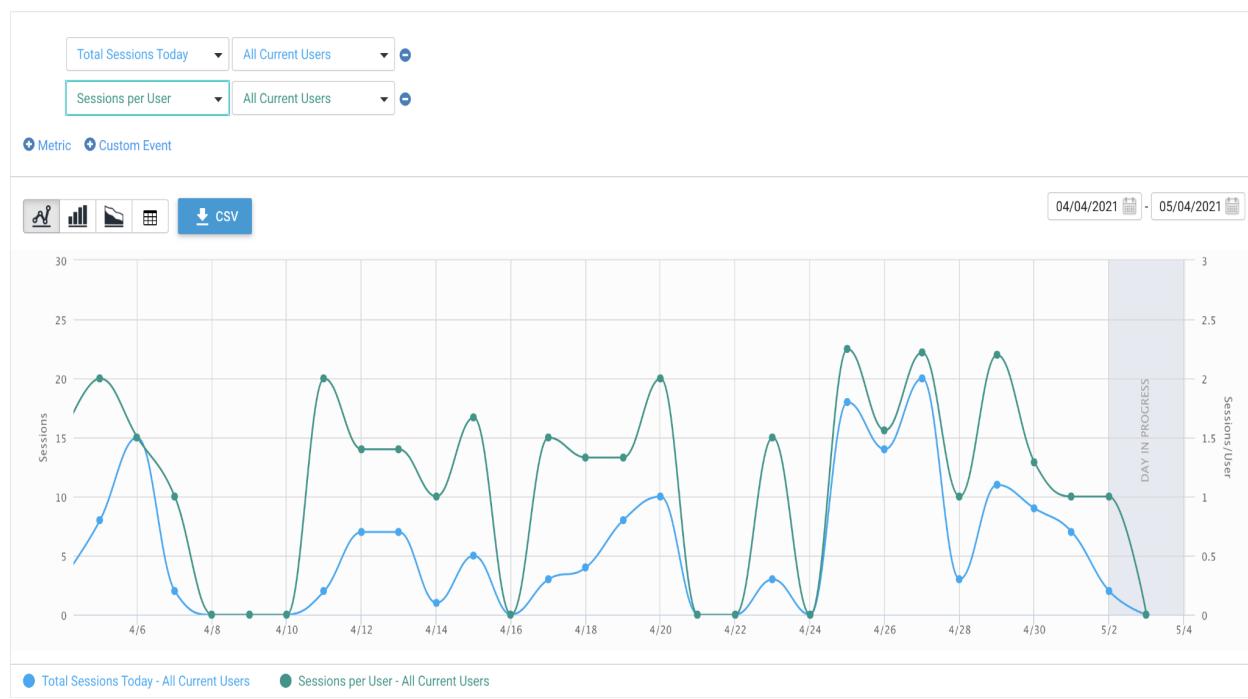
Analytics captured on Dashboard:



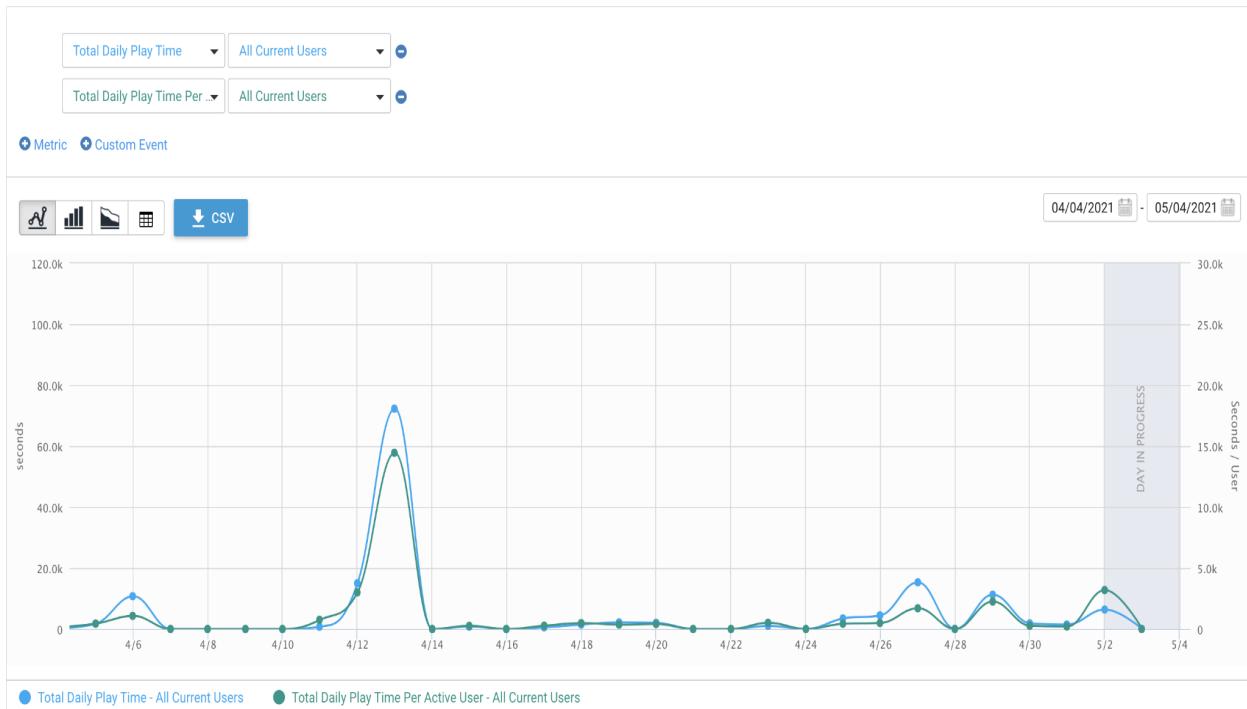
This graph shows the **Daily Active Users**, **Monthly Active Users**, and **New Users** Sessions.



This graph shows **Daily Active Users per Monthly Active Users**



This graph shows **Total Sessions and Average Number of Sessions per Daily Active Users**



This graph shows **Total Daily play time and Total Daily play time per active User**



This graph shows **Day 1, Day 7 and Day 30 Retention.**

Interactive Bubble Chart of impact of Doctor points in Total points

https://docs.google.com/spreadsheets/d/e/2PACX-1vSNDfp4-CjkKIAITHVshtuS8W9ZCjzatvFUatGD4AFA9ml59n5IPzxYW_VjX6wPyg/pubchart?oid=465896405&format=interactive

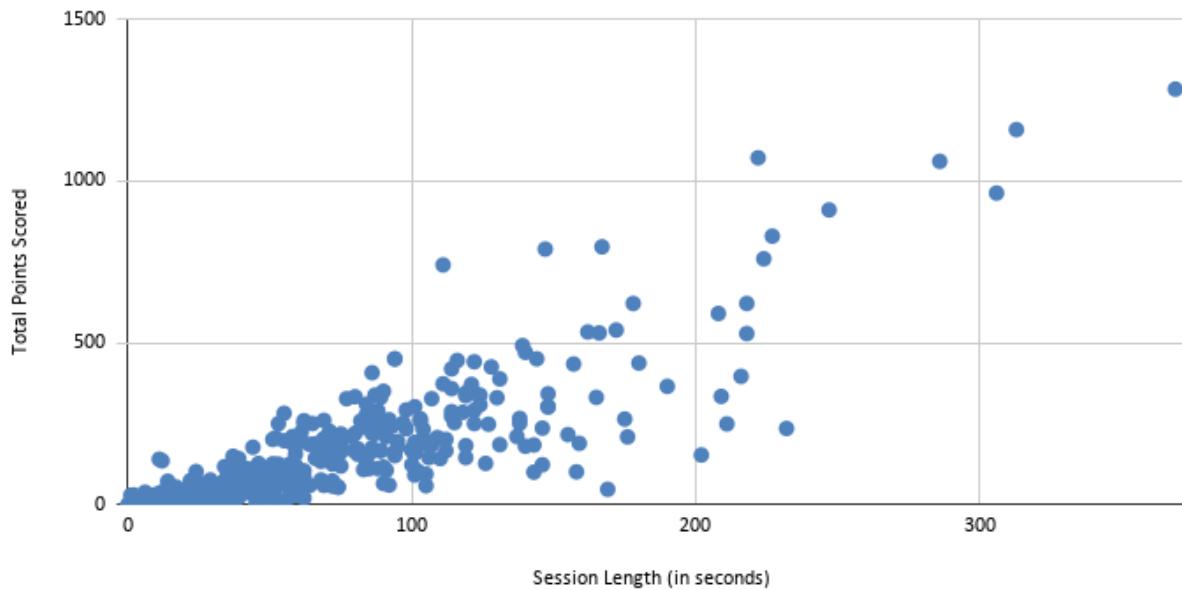
Interactive Bubble Chart of impact of Superman points in Total points

https://docs.google.com/spreadsheets/d/e/2PACX-1vSNDfp4-CjkKIAITHVshtuS8W9ZCjzatvFUatGD4AFA9ml59n5IPzxYW_VjX6wPyg/pubchart?oid=1528784679&format=interactive

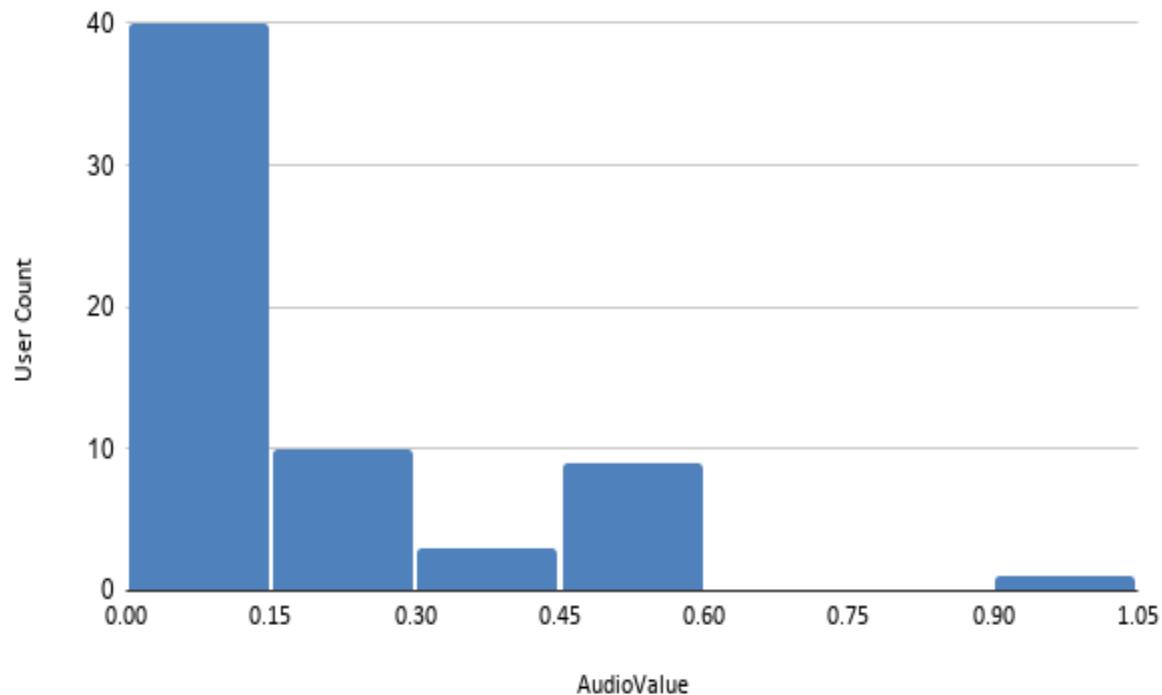
Interactive Scatter Chart of Points Scored vs Session Length

https://docs.google.com/spreadsheets/d/e/2PACX-1vSNDfp4-CjkKIAITHVshtuS8W9ZCjzatvFUatGD4AFA9ml59n5IPzxYW_VjX6wPyg/pubchart?oid=1943995482&format=interactive

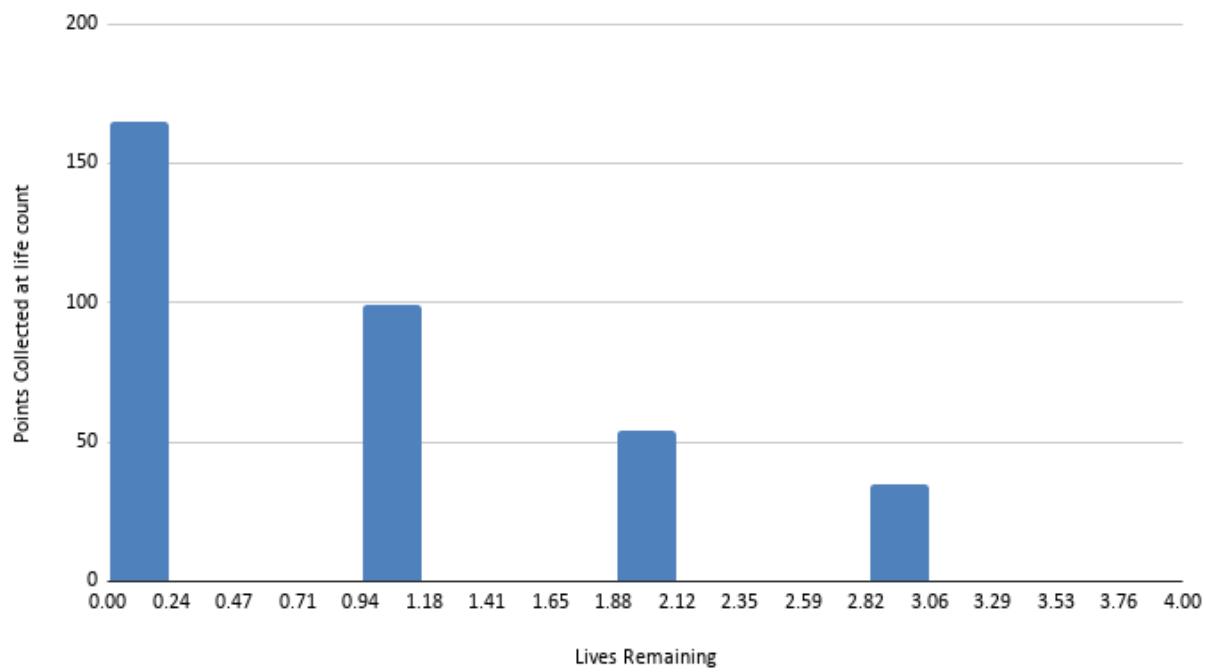
Points Scored vs Seconds Played



User Count vs Audio Value



Histogram of Points Earned vs Lives remaining



Game improvements based on Analytics Insights:-

- Decrease the game difficulty initially by reducing the player speed initially and also the speed jumps to reduce game difficulty and help the user get acclimated with the game controls.
- Improve the game instructions so users know the purpose of the game and the combos they can use to maximize their score.
- Change mystery box probabilities based on remaining syringes+masks to allow users to achieve many role switches and superman drives.
- Lives remaining is 1 then improve the chances of getting superman drive and +1 life to prolong the game sessions and allow users to score more points.
- Spawn more obstacles/ mystery boxes based on player performance to have adaptive difficulty scaling in the game.
- Change the points logic to account for remaining syringes and masks when player dies to achieve higher scores based on longer sessions (which translates into more syringes/masks collected)
- Added horizontal movement sensitivity slider to configure left and right movement for the player, which will help avoid deaths by falling off the road
- Increase chances of getting syringes and masks when in the doctor mode; Decrease chances of role switch.
- Increase mystery box chances if user has not collected the mystery box for a while

Technical Specifications:

Tasks	Tools
Game Development	Unity Visual Studio Code C#
Version Control	GitHub
Documentation	Google Docs & Google Slides
Target Platform	Android

Future Scope:

- Different levels Introducing levels in the game such that each level has different theme/gameplay.
- Introduce a wider variety of powerups to make the game more interesting.
- Extend support for IOS devices.
- Dynamically adapt to challenging obstacles as the game progresses.
- Additional store items for facilitating player customization
- Increase daily tasks and rewards to keep players hooked on to the game.

Mid-term deliverables

- **YouTube:** <https://www.youtube.com/watch?v=-zEDIK15Nhs>
- **Feedback Report:** forms.gle/FXdn3ZCr2DjEbeFs9

Final deliverables

- **Playable Prototype:** <https://adityakakad.github.io/Bravo7/>
- **YouTube :** <https://youtu.be/-5MLBuf4fNs>
- **Feedback Report:** <https://forms.gle/RxFWaa6cdCh1sSNu6>

GitHub Code (private until course conclusion) :

<https://github.com/AdityaKakad/Bravo7>

Gameplay Screenshots:



Main Menu



Human mode Gameplay



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Doctor mode Gameplay



Coins help you buy powers from store

Masks helps cure people in doctor mode

Syringes helps destroy viruses in doctor mode

Masks and syringes cannot be collected in doctor mode!

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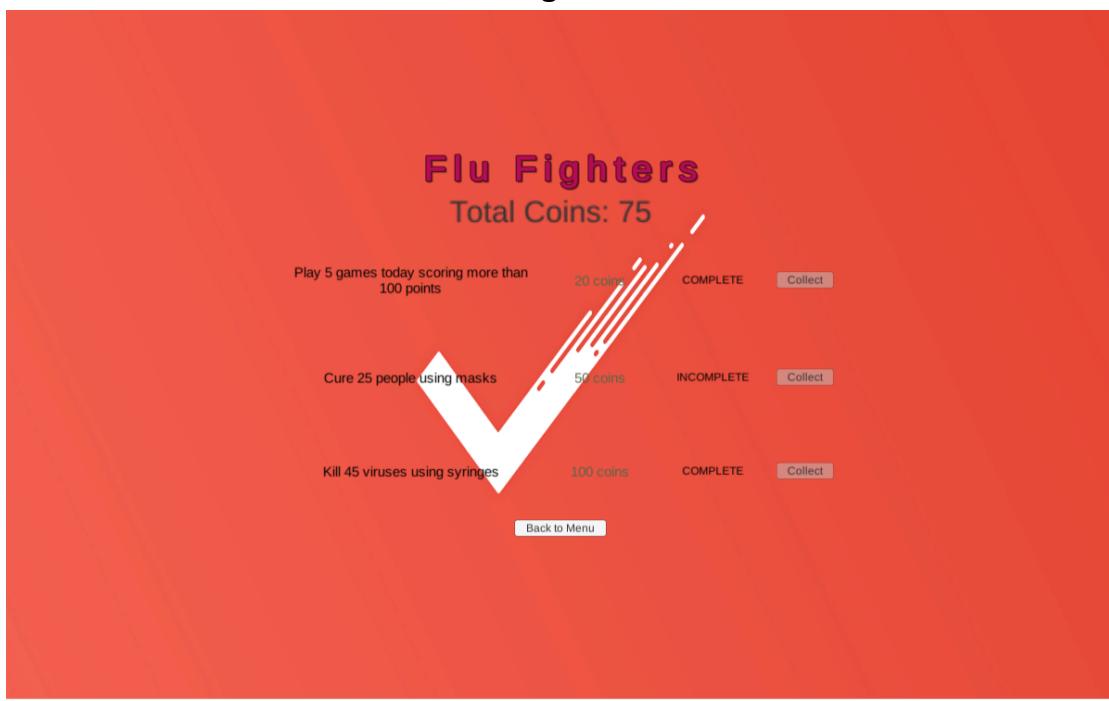
Instructions Menu



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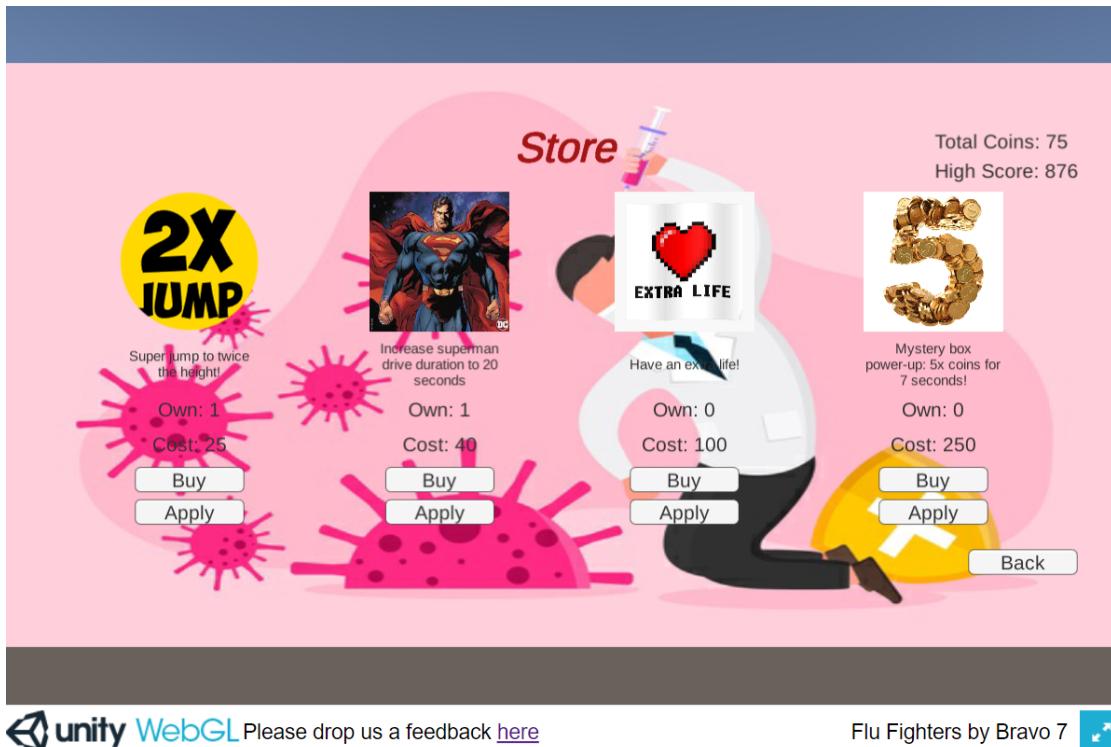
Settings Menu



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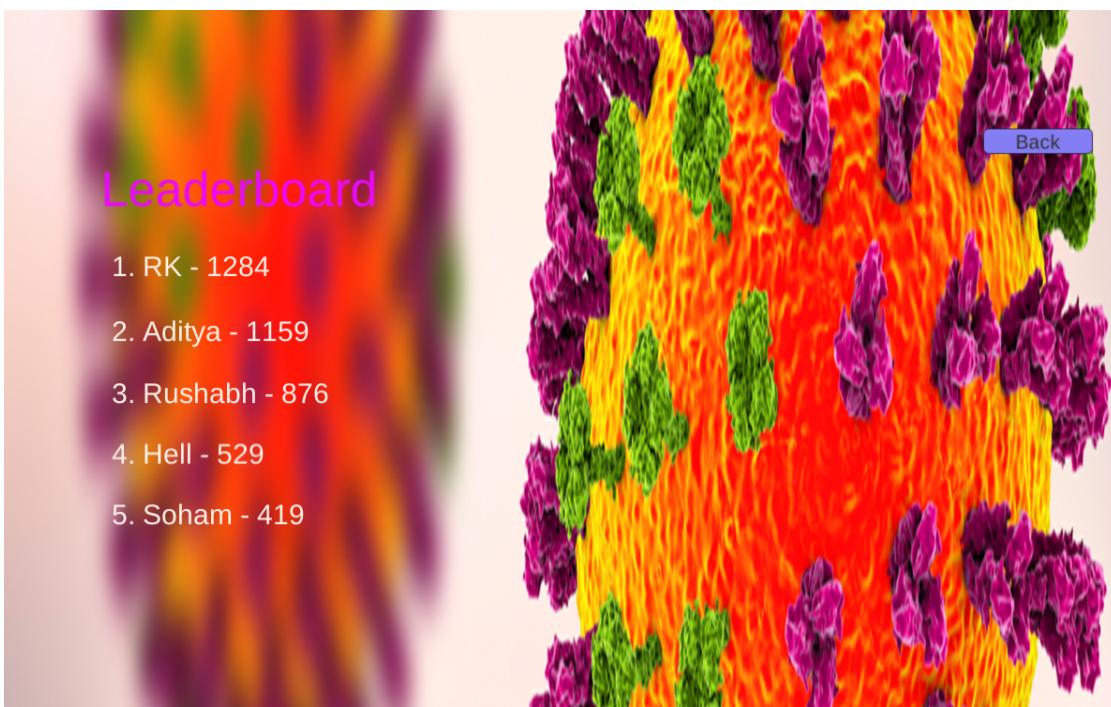
Daily Tasks



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Store Menu



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Leaderboard Menu

ROUGH POINTS during the semester

Points:

- Collecting masks is equivalent to gathering points.
- Touching other humans will make the player lose points.

Lives:

- The player has three lives.
- Lives can be revived through collecting vaccines.
- Hitting coronavirus particles/bats will result in losing a life point.

Obstacles:

- 1) Bats - These will appear as an aerial threat and hover over the lanes.
 - a) Character has to avoid bats by either jumping over them, moving to different lanes or killing them using a collected weapon.
- 2) Coronavirus - These particles will be sitting in specific lanes.
 - a) Avoid the virus at all costs!
 - b) Jump/ Change lanes to avoid them.
 - c) These cannot be killed.
- 3) People -
 - a) Social Distance from the people!
 - b) Everytime you come near one you lose points or life if you have no points.
 - c) People can be avoided only by changing lanes.

Powers:

- 1) Sanitizer - Sanitizer can help player be immune to bats for a short period of time
- 2) Vaccine - Increases the player's life by one.
- 3) Masks - Collecting masks will increase the score and help survive people in exchange of points.

Player mode -

1. Collects coins to add points
2. Collects masks
3. Collects syringes

Doctor mode -

1. No effect if running into coins, cannot collect masks/syringes
2. Changes to human when mask = 0 or syringes = 0
3. Gets +10 for giving masks to people and +10 for using syringes on virus

Obstacles -

1. Bats - Reduces life in both modes
2. People -
 - a. Human loses points + lose life
 - b. Doctor
 - i. if he can give a mask to them - gains points
 - ii. Else loses life
3. Virus -
 - a. Human loses points + lose life
 - b. Doctor -
 - i. If he has a syringe, he gains points
 - ii. Else loses life

Game ends at 0 lives

Future: Introduce the concept of Zombie mode (inverted human rules)

1. Collect obstacles
2. Avoid points/masks/syringes

Power up Spawners -

1. Coins
2. Masks
3. Syringes
4. Mystery boxes

Obstacle Spawners -

1. People
2. Bats
3. Virus

Idea suggestions -

1. Basic: Store - COMPLETE
2. Add audio toggle in settings menu - COMPLETE
3. Add daily login points logic to keep players engaged
4. Add store button at the start menu - COMPLETE
5. Logic to save high score to enable unlock of store items - COMPLETE
6. Add support for phone users to play (Radhika/Abha)
7. Increase mystery box being role change probability as masks and syringes accumulates - COMPLETE
8. Add assets to obstacles and power ups - COMPLETE
9. Leaderboard - COMPLETE

Team Analytics suggestions -

- Number of coins earned per game - COMPLETE

- Number of syringes and masks collected on average before switching modes - COMPLETE
- Number of syringes and masks collected vs points scored using them - COMPLETE
- Players points/Time spent partition (How many points earned/time spent in human mode vs doctor mode) - COMPLETE
- Player Retention tracking (D0 v D1, D0 v D7, D0 v D30) - COMPLETE
- Avg. Session length vs points scored - COMPLETE
- Frequently bought items in the power-up aggregated weekly/monthly - COMPLETE
- Points scored in superman drive per game - COMPLETE
- Points earned vs Number of lives remaining (Points earned per life) - COMPLETE
- How the user gets killed (falling off the road vs losing lives) - COMPLETE

Mystery Power-ups possible -

1. +5 masks - COMPLETE
2. +5 syringes - COMPLETE
3. +30 points - COMPLETE
4. -20 points - COMPLETE
5. Superman drive - COMPLETE
6. +1 life - COMPLETE
7. Role switch - COMPLETE
8. -5 syringes - COMPLETE
9. No jump - COMPLETE
10. -5 masks - COMPLETE

Prioritize:

- Extensive instructions - COMPLETE
- Better background - Aditya, Dhruvin
- Fix audio toggle - Rushabh - COMPLETE
- Store (4-5 things) - COMPLETE
- Leaderboard - Rushabh - COMPLETE
- Leftover masks and syringes add to the score - COMPLETE
- Fine tune gameplay - COMPLETE
- Add support for phone users to play - COMPLETE
- Superman drive should notify when time is over - COMPLETE

Store Ideas -

- Coins collected (Not the score) add to the bank which can be used to buy skins and power-ups. High-score unlocks items in the store.
- Three highest scorers of the day get 1 random power-up & +5 coins.
- The following seven get +5 coins.
- Five players with the highest number of games played will get +3 coins
- Logging into the game everyday gives more and more coins.

Cost of items in the store will depend on the average number of coins earned by a player in a day.

PM Suggestions -

1. Make less challenging initially
2. Music should start playing earlier
3. Game name
4. Different themes/modes for the game (Different items in the store)

PM Analytics -

1. Items players buy in the store

Fine-tune:

1. Reduce the audio volume - RK - COMPLETE
2. Visual hearts than text - SK - COMPLETE
3. Doctor mode prefab change - RK - COMPLETE
4. Initial speed slightly slower and smaller changes in speed - SK - COMPLETE
5. Change mystery box probabilities based on remaining syringes+masks - SK - COMPLETE
6. Life is 1 then increase chances of getting superman drive and +1 life - SK - COMPLETE
7. Fine tune obstacle spawning to 3 if player crosses 500 - RK - COMPLETE
8. Limit top speed - SK - COMPLETE
9. Increase +5 masks/syringes chances in mystery box if masks+syringes<10 - SK - COMPLETE

Store power-ups (Basic) to Add:

1. 2x jump - Add more time if multiple 2x jumps collected - COMPLETE
2. Longer superman drive duration - COMPLETE
3. Extra life - COMPLETE
4. Coin multiplier - COMPLETE

Instructions Slide flow (5 slide/page):

1. Controls (left, right, up, space)
2. Collectibles (coins, masks, syringes - what's it about)
3. Obstacles (virus, bat, people - what's it about)
4. Mystery box (all power-ups or just super ones)
5. Game purpose (Collect coins to buy from store, high score to unlock items and compete globally)
6. Cannot collect syringes/masks when in doctor mode

Analytics insights:

- Achieving superman drive from mystery box is difficult (less than 30% users get it, additionally, on an average the chance of getting superman drive is ~20%). The users also are able to score only 1 point per superman drive on average which is the same as the human mode and does not help users achieve higher scores.
- Decrease the difficulty of the game since the average session length per user is ~30 seconds which is less. Additionally, the number of points scored per session on average is ~30 which is less.
- Increase chances of getting super mode (doctor switch) to enable users to score more points. Currently, on average, each user scores just 1.5 points per role switch.
- Currently, the session length vs points scored translates to 1 point per second per user which is demotivating for a user to play the game.
- The points distribution for every final score is 8% of total points are scored in doctor mode and the rest in human mode.
- On an average, users score ~19 points per life. The distribution is skewed however when we try to understand the user mentality vs number of lives remaining. The distribution is:
 - ~18 points scored in a session by a user when only 1 life remaining
 - ~14 points scored in a session by a user when only 2 lives remaining
 - ~21 points scored in a session by a user when all lives are remaining
- While switching into super mode (doctor mode), users on an average have ~11 syringes and ~9 masks which allows them to score +200 points per switch. However, the utilization of these items is ~44% (~87 points).
- Users collect ~11 coins per session, thus contributing ~11 points out of 30 points from coins and ~19 points from mystery boxes/syringes/masks. We need to increase the mystery box/syringe/mask usage.
- Out of 446 games, the users scored 0 points in 131 games. This means either the instructions are not extensive enough to help users understand the game or the game difficulty is high.
- Out of 446 games, the users scored 100+ points only in 45 games. This means the difficulty curve as points increase is steep. This might demotivate the users from playing the game.
- The mystery box on an average gives a point boost of 2 points per game (from the +30/-20 point boost power-up). This can be increased to help the user score more points and reward them for longer game sessions.
- Players die from falling off the road quite often compared to losing lives.

Game improvements based on Analytics Insights:

- Decrease the game difficulty initially by reducing the player speed initially and also the speed jumps to reduce game difficulty and help the user get acclimated with the game controls. - COMPLETE
- Improve the game instructions so users know the purpose of the game and the combos they can use to maximize their score. - COMPLETE

- Change mystery box probabilities based on remaining syringes+masks to allow users to achieve many role switches and superman drives. - COMPLETE
- Lives remaining is 1 then improve the chances of getting superman drive and +1 life to prolong the game sessions and allow users to score more points. - COMPLETE
- Spawn more obstacles/ mystery boxes based on player performance to have adaptive difficulty scaling in the game. - COMPLETE
- Change the points logic to account for remaining syringes and masks when player dies to achieve higher scores based on longer sessions (which translates into more syringes/masks collected) - COMPLETE
- Added horizontal movement sensitivity slider to configure left and right movement for the player. This will help avoid deaths by falling off the road - COMPLETE
- Increase chances of getting syringes and masks when in the doctor mode; Decrease chances of role switch - COMPLETE
- Increase mystery box chances if user has not collected the mystery box for a while - COMPLETE

Based on the feedback from google form:

1. Add audio slider - COMPLETE
2. Add visual hearts and doctor mode prefab change - COMPLETE
3. Add Leaderboard to make it competitive - COMPLETE
4. Add store to add purpose to the game - COMPLETE
5. Add extensive instructions - COMPLETE
6. Add background prefabs to make it more appealing - COMPLETE
7. Added sensitivity slider to make player movement smooth and configurable. - COMPLETE

TODO till final:

- Formalize GDD - PARTIAL
- Create final video and 3-4 slide thing - COMPLETE
- Add new mystery box power-up (No jump) - Low Priority - COMPLETE
- Add daily login logic - +1 for every day login, +10 for 7 consecutive days - High Priority - COMPLETE
- Coin bonus logic based on moving high score above every 100 - +20 coins - Low Priority - COMPLETE
- Add 2 trackers for analytics - COMPLETE
- Reward system for different user behaviors - store buy pattern, leaderboard, login, game strategy - High Priority - COMPLETE
- Adaptive gameplay based on user playing pattern - High Priority - COMPLETE
- Change the audio track for the game. - High Priority - COMPLETE
- Consistent screen resolution across devices - Low Priority- COMPLETE

TODO for this week:

- (Backlog) Add Background image/color, add new material to tile, add prefab for dome - Aditya, Dhruvin, Soham - COMPLETE
- Change the audio track for the game - Rushabh - COMPLETE
- Add new mystery box power-up (No jump) - Soham - COMPLETE
- Add 5x multiplier store item - COMPLETE
- Add feature to update score from leaderboard server when name changes in settings - COMPLETE
- Coin bonus logic based on moving high score by more than 50 points - +20 coins - COMPLETE

FINALS WEEK

- Formalize GDD
 1. Update existing low-level design
 2. Add analytics insights/charts
 3. Add feedback comments
 4. Changes after midterm
- Create final video and 3-4 slide thing
 1. Video -
4-5 seconds each for Leaderboard, Settings, Daily Tasks
10-15 seconds for store
10-15 seconds for instructions
Gameplay features:
 1. Doctor mode color change and symbol
 2. SFX and changing backgrounds
 3. In-game menu
 4. Store bought power-up use
 5. Daily login reward/End game improvement reward
 6. Daily tasks completion

Based on feedback -

1. The game feels aimless and random - Soln: Adaptive gameplay based on player behavior (Markers) (Give 1-2 examples)
2. The music is too loud and weird - Soln: Made subtle changes to the game theme for better user experience. Added configurable traits to the game as well
3. The game feels difficult - Soln: The instructions have been made extensive to help users understand the rules before starting out. Additionally, the starting 5-10 seconds have been made easier to get the user accustomed to gameplay

Based on analytics -

1. Short game sessions lead to unused power-ups -
 - a. Changed the score logic to reward users for collecting power-ups
 - b. Adaptive gameplay ensures better avenues to utilize power-ups and combos to keep the user engaged

2. Users died from falling off the path more often than losing lives -
 - a. Different systems have different input sensitivity, added a slider to help user configure their experience
 - b. Reduced the initial game speed and speed bumps to help users perform better in game
3. Users not utilizing mystery-box powers to achieve higher scores in short spurts -
 - a. Improved mystery box spawn probabilities based on game session lengths, unused power-ups, and time since last mystery box collected

Major Improvements since Midterm -

Mid-term game focused more on getting complex assets ready.

The final game focused on our core loop ideas and gameplay combos.

- Adaptive gameplay based on user behavior (80/20 rule):
 - 80% of the gameplay remains the same for all users
 - 20% changes with user behavior and traits to give different rewards for different game strategies
(Example of 2 user behaviors and comparing how game play changes for them:
Longer sessions and stable score growth vs Shorter sessions and exponential score growth using mystery box)
- User Engagement and Competition traits:
 - Daily login rewards -
+1 coin for every day, +10 coins for 7 consecutive days
 - Daily task rewards -
Complete in-game daily tasks for earning coins
 - Player Improvement rewards -
Coin reward for improving high-score by more than 50 points
 - Power-up Store -
Buy and utilize cool power-ups to achieve higher scores and unlock even more store items!
 - Leaderboard -
Compete globally to rank in the Top 5 players of all time!
 - Visual and Audio cues instead of written ones -
Health change, role change, power-ups picked, SFX to add into the user experience and clean up screen
 - In game menu -
Pause/Continue game, Mute/Unmute audio
 - Extensive instructions, menu options and initial gameplay tweaks -
5 slide instruction deck, options to configure gameplay and 10 seconds free run to help user test out controls
 - Added transitional background -
Transitioning background to give a 24 hours day/night cycle vibe for the game

TODO:

- GDD - Aditya, Dhruvin, Radhika - COMPLETE
- Video/Slide - Soham, Rushabh, Abha - COMPLETE

GDD Workflow Update:

1. Low Level Design [Dhruvin]
2. Purchase store (Store Items) [Dhruvin]
3. Feedback and Suggestions (From Prof and PM) [Aditya]
4. Feedback and Suggestions (From Classmates) [Aditya]
5. Feedback and Action (What steps we took) [Aditya]
6. Analytics (Data tracked) [Radhika]
7. Technical Specifications
8. Future Scope [Radhika]