

TABLE OF CONTENTS

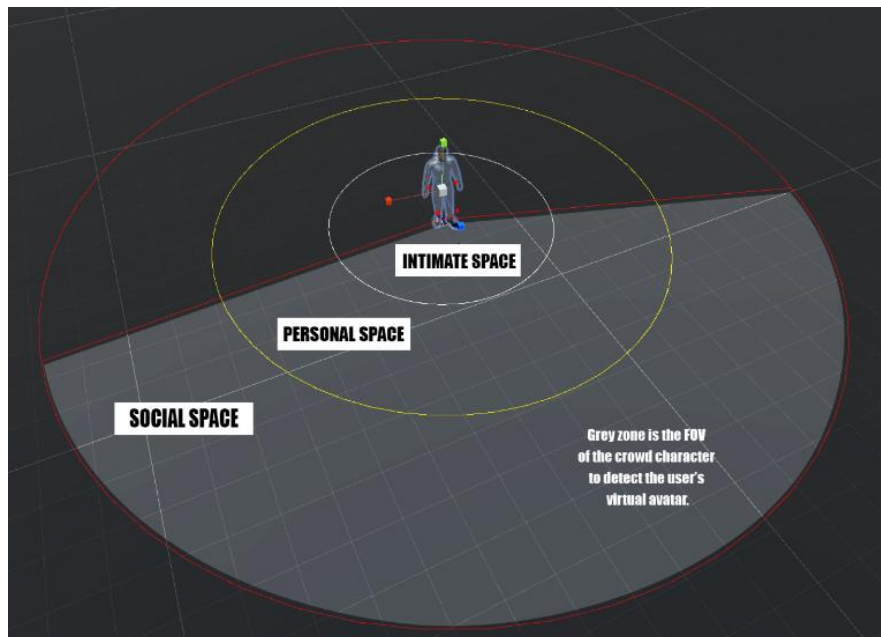
CREATIVE RESEARCH	2
MASTER’S THESIS (3).....	2
AGENT BASED MODELLING (3)	3
PERSONALITY BASED SCHELLING’S SEGREGATION MODEL (3)	5
RUN-HIDE-FIGHT SIMULATION (2)	6
NON-PLAYER CHARACTER INTELLIGENCE (2).....	7
PROCEDURAL DUNGEON RUNNER (2)	8
DIEGETIC VS. MINIMAP NAVIGATION IN VR (2).....	9
VASOO – VIRTUAL STADIUM EXPERIENCE (2)	10
MULTIPLAYER ADVENTURE-PUZZLE GAME (2)	11
TOPPLOTS (2)	12
SIDE QUESTS – OTHER MINI PROJECTS (4)	13
GAMES RESEARCH.....	16
PAPERS & PREPRINTS	16

CREATIVE RESEARCH

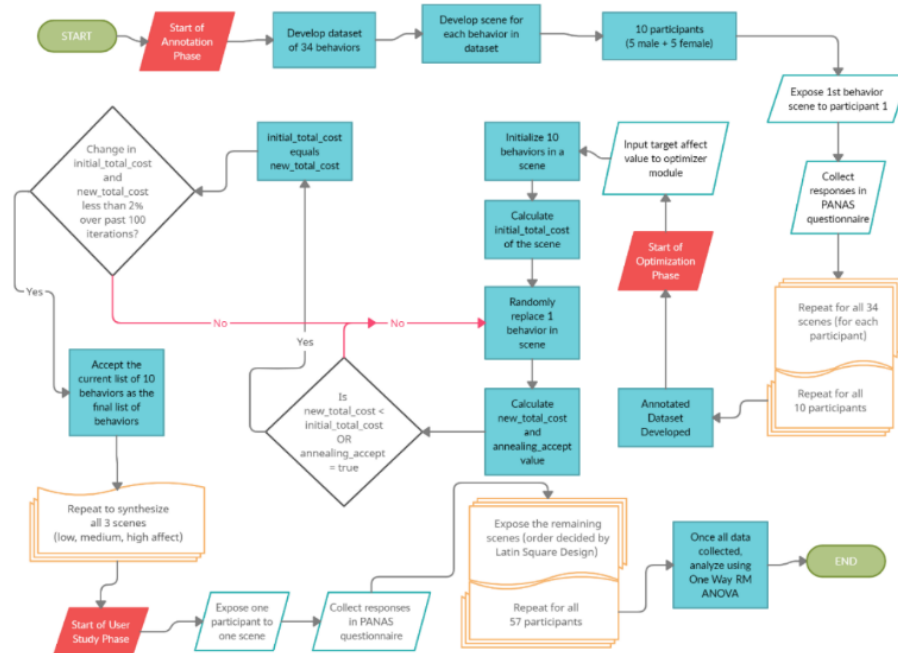
MASTER'S THESIS (3)



Multi-character setup through which the player walks through (virtual reality based first-person view)

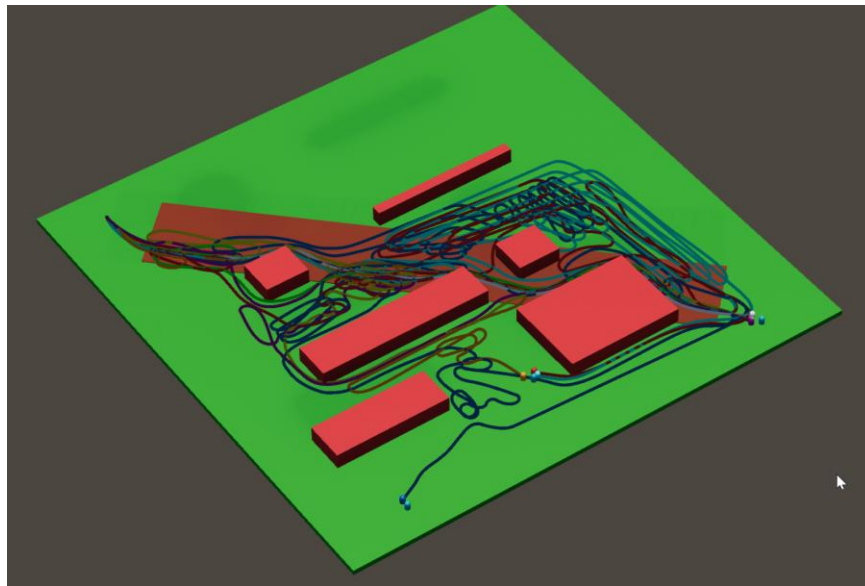


Proxemics setup for affect-displaying agent for my Master's Thesis (Optimizing Virtual Reality Multi-Character Experiences Using Affective Ratings)

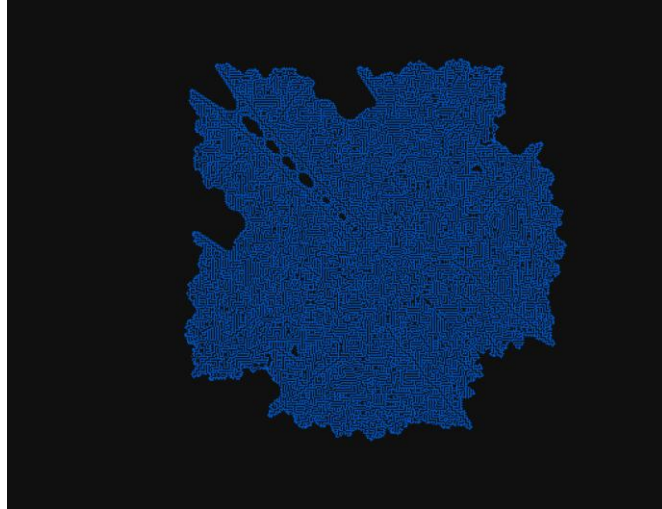


Complete Experimental Design for Master's Thesis

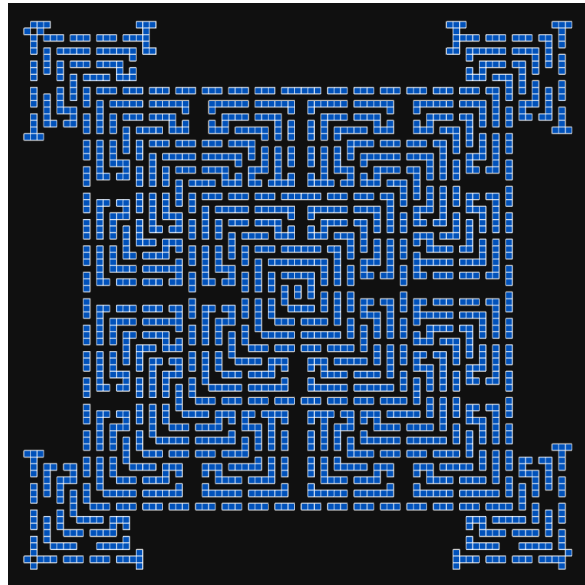
AGENT BASED MODELLING (3)



Custom personality-based agents (for MANTIS) with A* pathfinding controlled by an exploration factor (higher factor means more intent to explore the world before going to the destination)

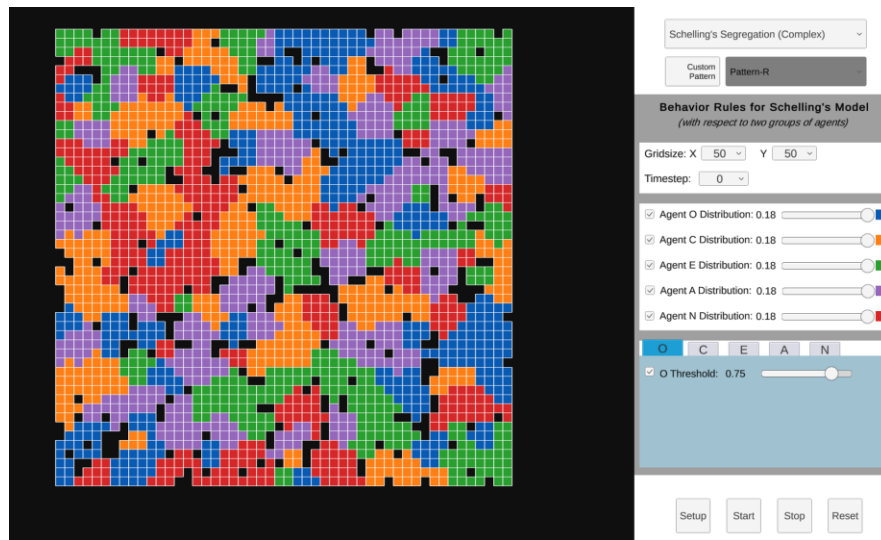


Modular Conway's Game of Life experiment, where rule values can be changed real time to study cellular automata behavior (organic expansion example)

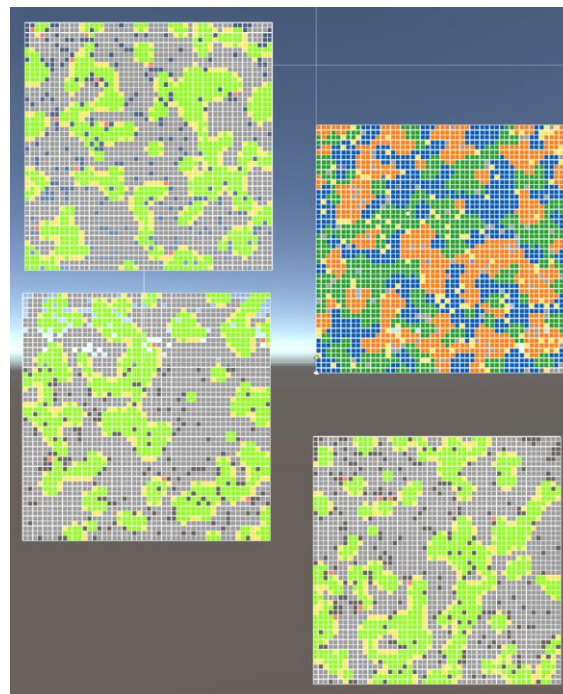


Second example of modular Conway's Game of Life experiment (rule variation created an outwards expansion from the corners with symmetry preserved)

PERSONALITY BASED SCHELLING'S SEGREGATION MODEL (3)

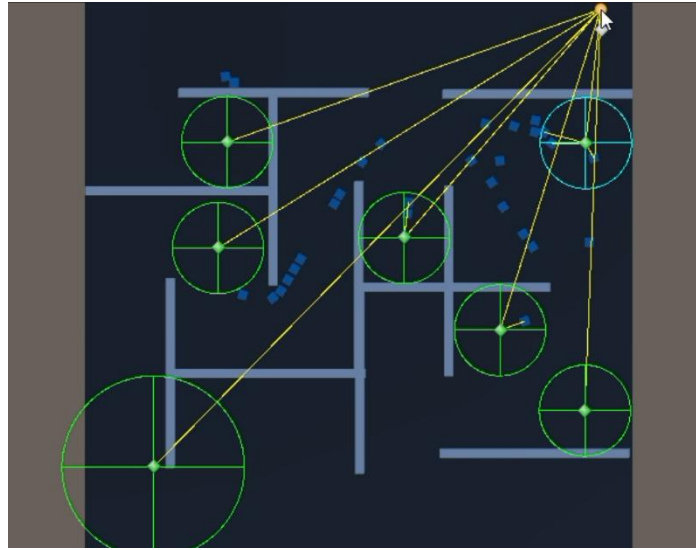


Simulation setup for a publication (part of my larger dissertation) that have 5 agent populations, each with their own distinct personality. Then based on a cosine similarity based Schelling's Model rules, they self-organize into clusters

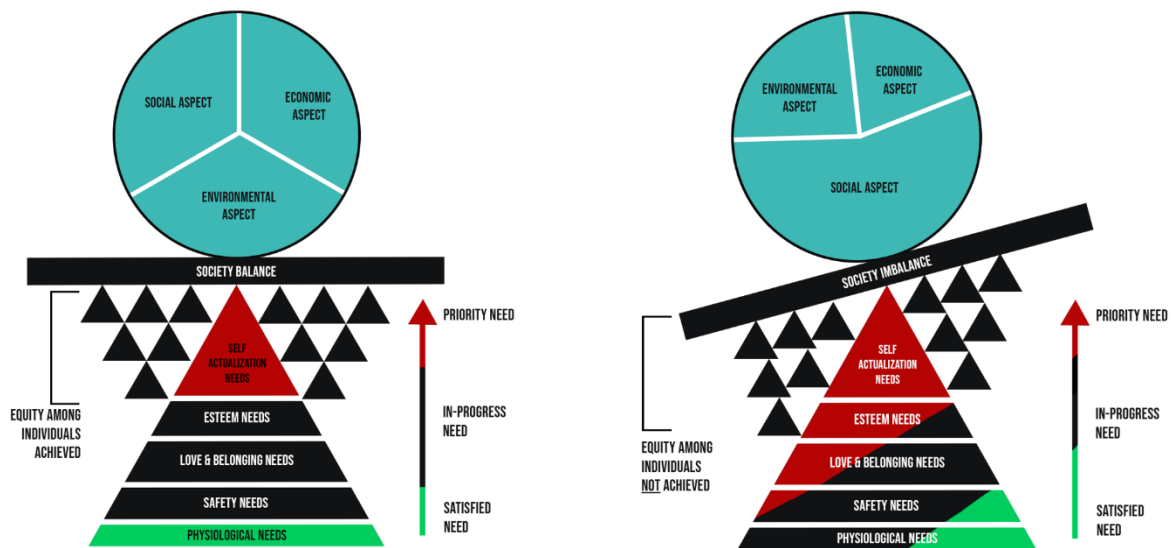


Behind the scenes of each population of a 3-agent population setup, where the Moran's I Spatial Distribution is calculated and verified for significance. Green signifies High Similarity – High Cluster setup – this was pivotal in providing significant evidence towards similarity-based Personality determination rather than Identicalness based Personality determination in agents

RUN-HIDE-FIGHT SIMULATION (2)

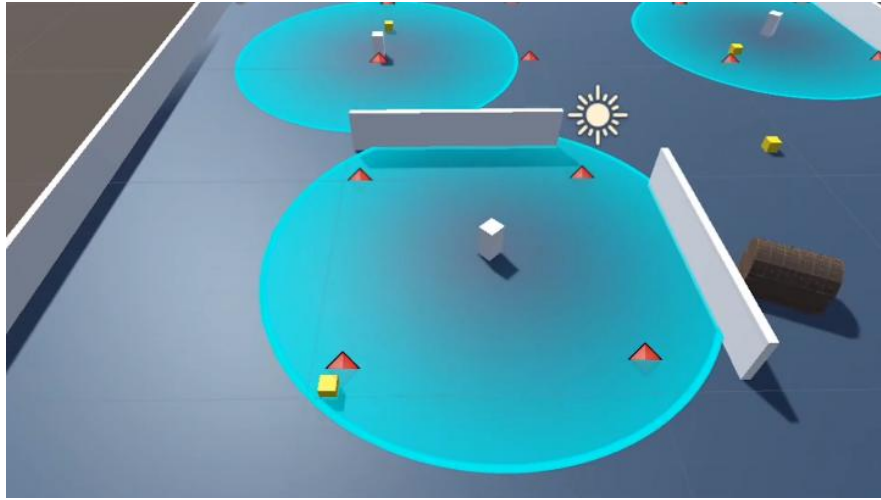


Multi agent simulation where each agent displays a run-hide-fight decision-making mechanic. The idea is that when a threat comes into a safezone, based on the characteristics of the blue colored agent, they can either choose to stay and hide, run away, or run towards threat and fight. The color of the agent denotes their state.

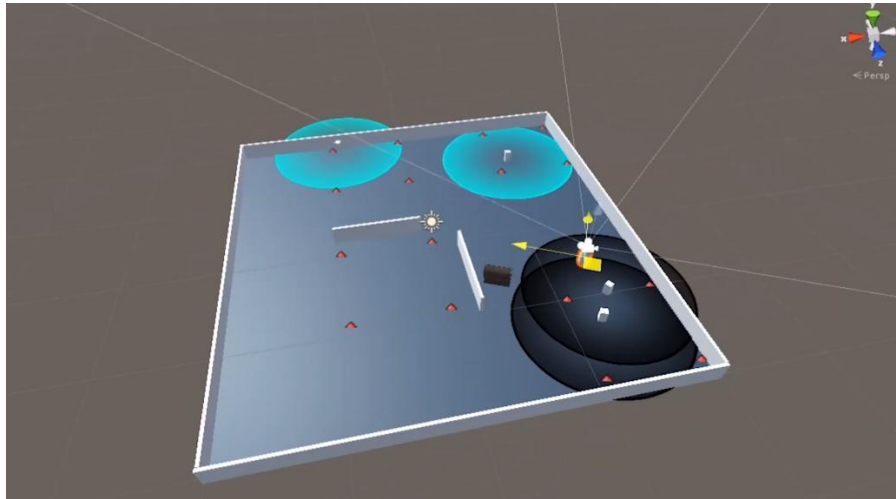


This is a conceptual behavioral diagram I created based on how the societal balance is being upheld by its constituent's needs being satisfied, which in turn upholds the three pillars of societal sustenance. If there is an imbalance in needs, then the balance is off, which means that society will focus unequally on one of the three pillars of sustenance.

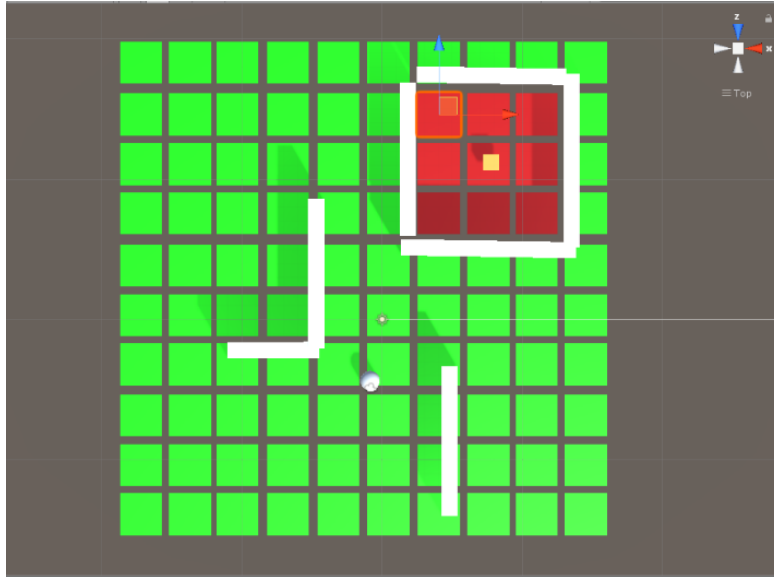
NON-PLAYER CHARACTER INTELLIGENCE (2)



Patrol agent logic for a “eliminate enemy robots” styled game, where the agents had a detection zone which triggered player-follow behavior (when player was in that zone).

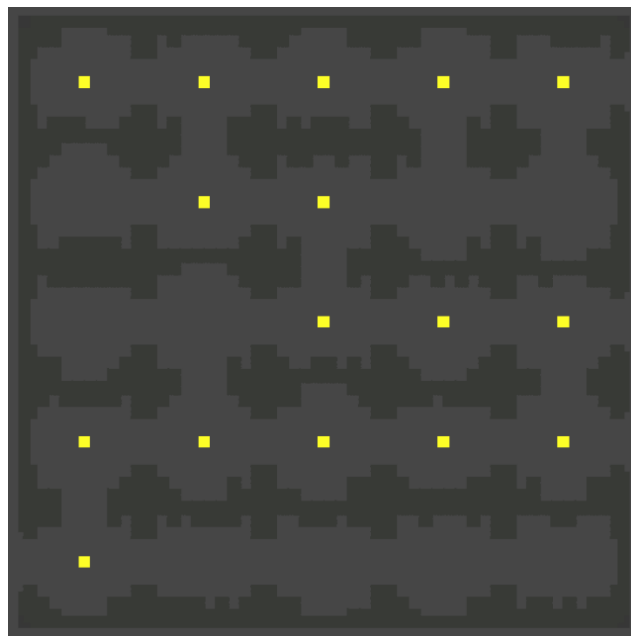


Once player is detected, the patrol agent follows until player can escape detection zone. After that patrol agent resumes its normal patrol (between the 4 red points)

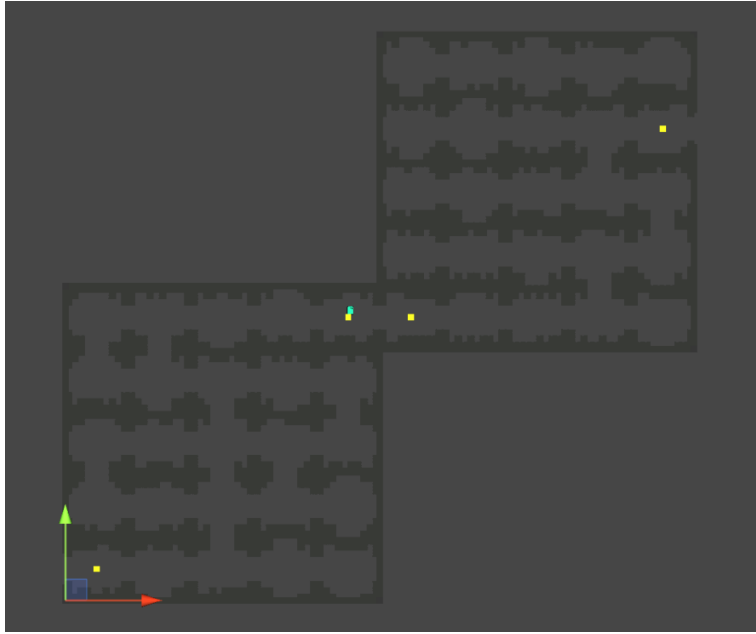


For the same publication, built a reverse-detection algorithm where we optimized the placement of objects based on its visibility factor from different grid cells (overlaid over a map). In the image above, the red tiles can “see” the yellow object (high visibility) but the green tiles cannot “see” it completely due to the walls (low or no visibility).

PROCEDURAL DUNGEON RUNNER (2)



Procedurally generated dungeon rooms with automatic entry and exit gates. Developed for a sidescroller game called “L!ve” where the “killzone” rises (to simulate rising water) and the player must always keep moving.

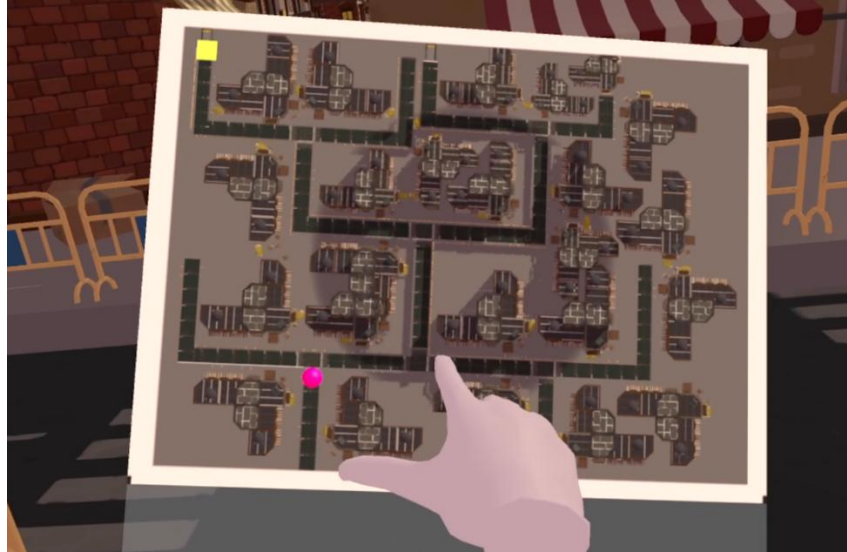


Chunks repeat procedurally in a FILO stack setup (at any point, only 3 chunks are active). This simulates the “pooling” feature of engines for high performance and fast loading.

DIEGETIC VS. MINIMAP NAVIGATION IN VR (2)



Developed a virtual reality simulation that focused on comparing the enjoyment levels, ease of use, and usability of diegetic (in-world user-interfaces) navigational aids compared to traditional minimaps. In this image, the player can only open the gate if their “card” credentials match that gate’s lock combination.



The minimap provides a top-down view of the entire map (player in pink and destination in yellow). The map is a simple texture on a plane object and has no signs of being an in-world object (non-diegetic).

VASOO – VIRTUAL STADIUM EXPERIENCE (2)

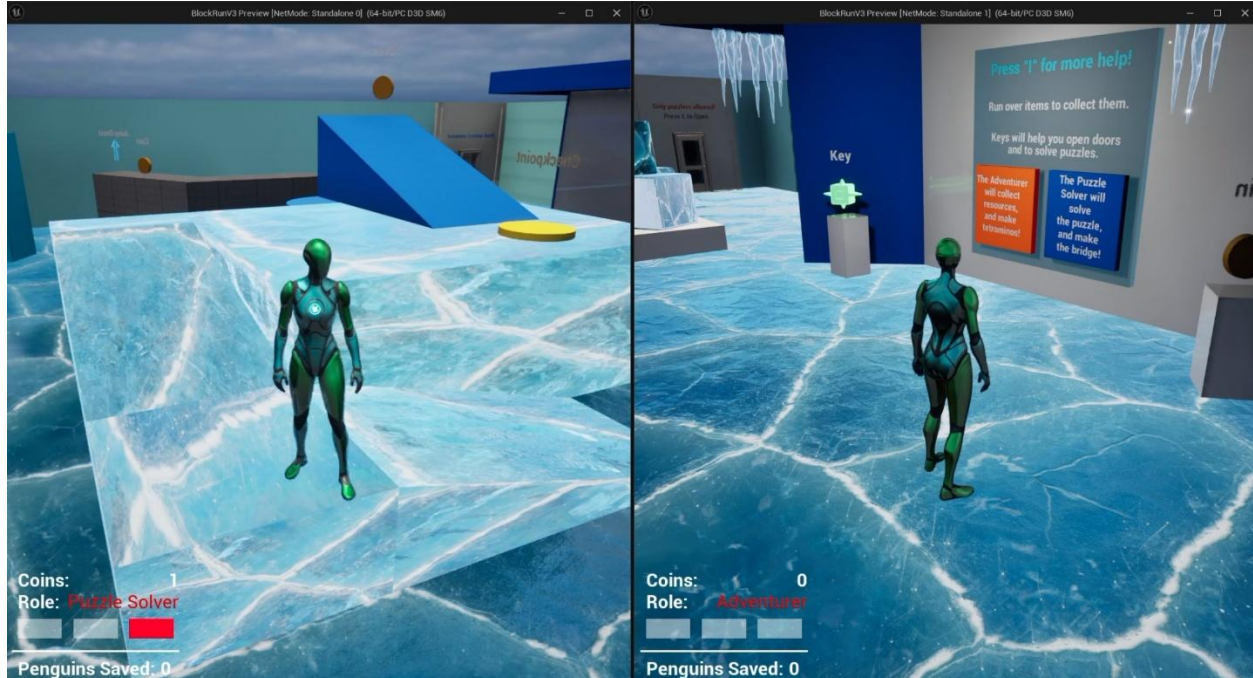


An interior (penthouse) view of the level that players could use to socialize, play minigames, communicate via an emote system, and watch gameday streams

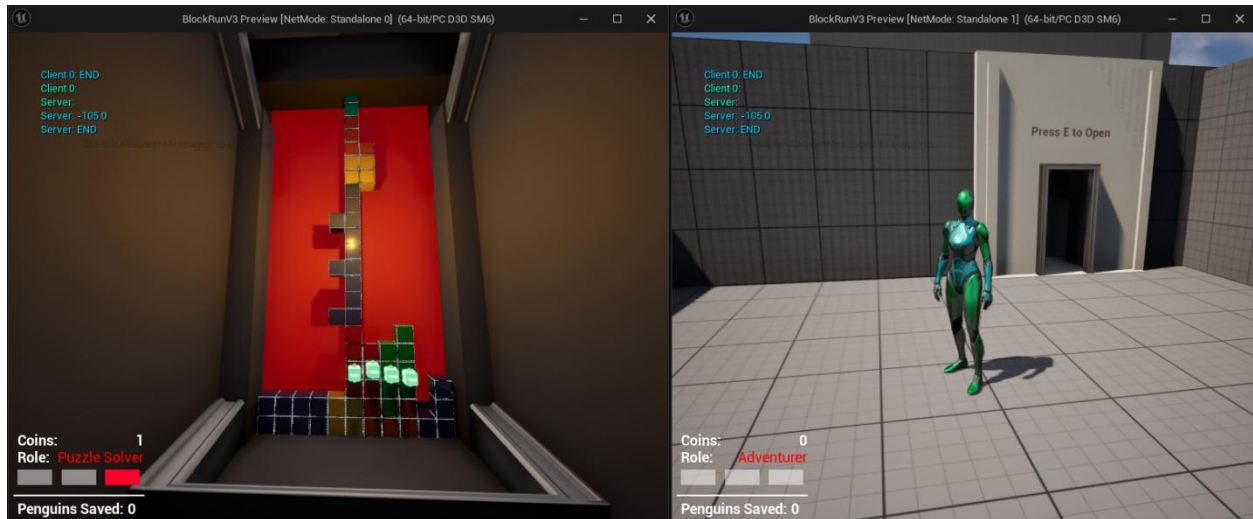


An external shot of the stadium – players would be able to virtually come down to the field and take part in activities, while watching the sports feed.

MULTIPLAYER ADVENTURE-PUZZLE GAME (2)



Adventure game where the point is to collect coins and keys to open a map area to start a minigame where you have to play tetris in a smart way to form a bridge, so that you can help the penguins cross the lave lake its over. Two player session with Puzzle Solver and Adventurer.



Animations and actor objects are synced across the network. Here the Adventurer sees the Puzzle solver go in and start the tetris minigame with the default tetrominos. At this point the Adventurer can go to the Tetromino Creation Room and create shapes to send to the Puzzle Solver.

TOPPLOTS (2)

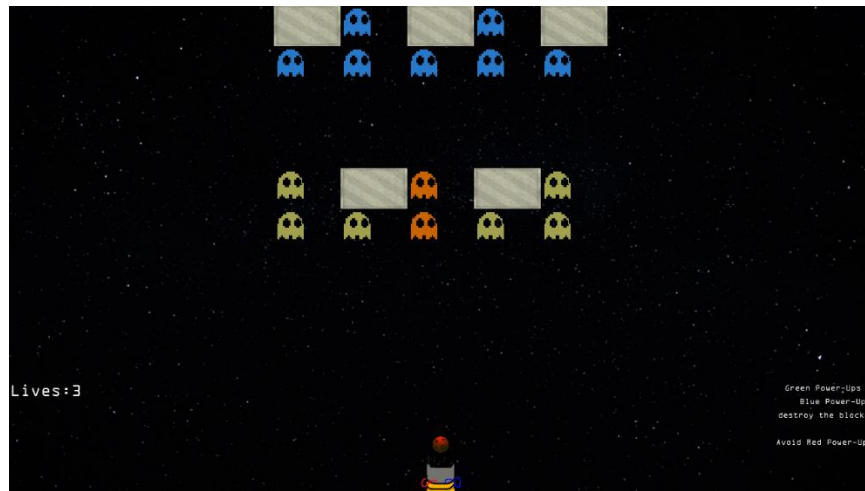


Level design for a virtual reality-based game, where the objective was to topple different towers made of physics-based game objects. The theme was that the player was in a child's imagination where everyday surroundings became more fantasy based as they progressed through the levels.

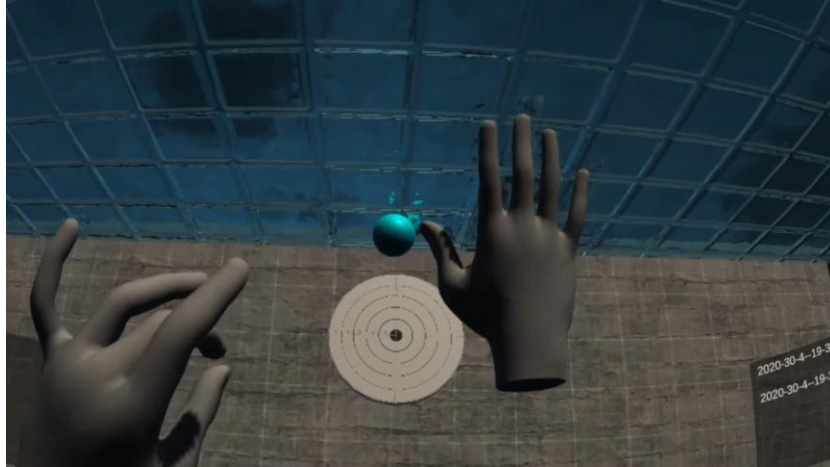


One of the aforementioned lower fantasy levels. The theme was that they would go deeper underground (so from their bedroom to the basement to the subway pictured here to the mole people to the magma chambers and ending up at the center of the Earth)

SIDE QUESTS – OTHER MINI PROJECTS (4)



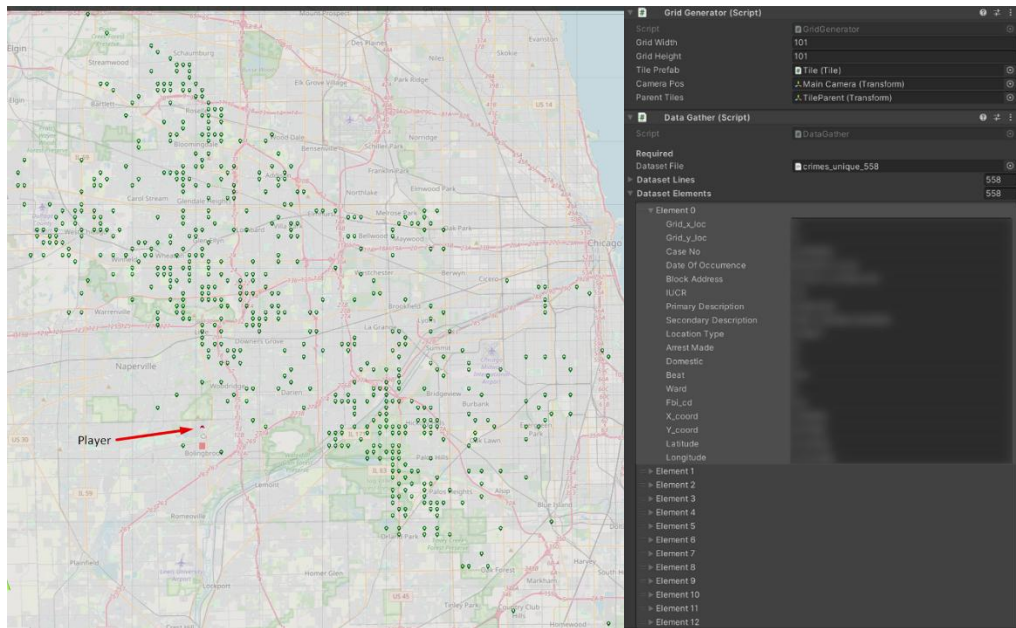
Developed a “Breakout” game clone in OpenGL



Another one of my early VR prototypes, this time focusing on hand-tracking. Players were able to record their poses for different in-game actions (spawn physics objects, force push, and interact and move objects). Developed it into a darts minigame.



Procedural furniture generator based on just cubes and capsules.



Detective Game that translated real world CSV data, parsed it pre-runtime into location objects for use during runtime, and put them onto accurate map locations (Chicago Crime Data was used here). Each crime hotspot would have a musical note and the player had to find the correct notes based on these musical cues to develop a “melody of the crime” to match the culprit.

GAMES RESEARCH

PAPERS & PREPRINTS

1. Synthesizing Affective Virtual Reality Multicharacter Experiences – **Publication**
2. Blockrun – An Adventure in Multiplayer Puzzle Solving – Preprint
3. Traits Extension to Schelling’s Segregation Model – **Publication** (In Press)
4. Agent Based Modeling of Personality Influences in a High Stress Scenario – Preprint
5. Developing Agent Based Model Simulations As Inquiry-Based Learning Tools – **Publication**
6. Does An Interactive Diegetic Navigation Aid in Virtual Reality Have an Effect on Enjoyment Levels? – Preprint
7. Virtual reality game level layout design for real environment constraints – **Publication**
8. Procedurally Generated Infinite Dungeon Sidescroller – Structured Notes
9. Procedurally Generated Furniture Objects – Structured Notes
10. Interactive Crime Data Visualization Platform and Game – Preprint
11. Exploration for a Framework to Preserve Implicit Knowledge for Game Development Organizations – Preprint
12. Walking in a Crowd Full of Virtual Characters: Effects of Virtual Character Appearance on Human Movement Behavior – **Publication**
13. Embodiment for the Difference: A VR Experience of Bipolar Disorder - **Publication**