

Phil Kirwin

Honors Thesis Weekly Journal

2/4/2019

Accomplished this week:

- Came up with prospective ideas for the game.
- Considered potential game mechanics to complement these.

Insights:

- A good starting point for this project is to consider problems that I am personally interested in.
  - This made it much easier for me to think of how a game might solve the problem.
  - Additionally, having a decent knowledge of the problem helps in the attempt to translate the problem into game mechanics.
- I think a game that solves a social issue is probably something I'm more comfortable making, as technical problems may require more expertise to engineer a gamified solution.

Concerns:

- Scope – Making a game is hard, so I'll have to make sure that the scope of this project does not go beyond what I can do in three months.
- Misrepresentation – The game I make will have to properly represent a problem that I will not be the foremost expert in solving.

## Game ideas

- Food distribution
  - A continuation of a game I made for Ethics of Food.
  - A representation of the challenge of distribution in a food system.
  - Can propose solutions by allowing the player to adjust the system to improve it.
  - May be too abstract to take into the real world.
- Physical Disabilities
  - A game to help people better empathize with people with physical disabilities.
  - I have experience with such individuals.
  - Very positive message; easy to grasp
  - Sensitive issue
  - Easily misrepresented
- How do we learn language?
  - A game where a person learns and must use a made-up language.
  - Can be used to provide insight to machine learning algorithms to help them learn abstract concepts in a similar manner to humans.
  - Very technical. I am inexperienced with machine learning.
- Gamify SETI
  - A game whose goal is to increase participation in SETI or other similar tools.
  - Users use both active and inactive computer time to contribute to SETI.
  - Likely requires permission to develop for.
  - May require deep technical knowledge to properly implement game mechanics.

2/11/19

Accomplished this week:

- Gave some thought to how to gamify the two prospective game concepts after narrowing down the list last week.
  - Food distribution could be a tower defense game
    - This was my original idea for the game
    - It adds a time element to the game that is important to the underlying issue.
  - Physical disability game could be based on my experiences and lessons learned from working with disabled people.
    - This likely minimizes the chance of the game misrepresenting someone's perspective.
    - Still does good by encouraging people to work with disabled people as well.
    - Still too abstract of a concept.
- I believe that since the food system game is more fleshed out, it is the better choice of the two moving forward.

Next Steps:

- Come up with survey questions.
- Begin work on designing game mechanics.

In meeting:

- Tower defense
  - Make map model a city
  - Have people move on a fixed path and disappear over time.
    - Disappearing counts as "taking damage".
  - Towers can be farms, grocery stores, etc.
- "Classic Style"
  - Offer choice of path
    - Tedious, but short
    - Long, constant motion
    - Time limit to make this choice have consequences.

2/18/18

Accomplished this week:

- Made a list of potential survey questions

Potential Survey Questions (To follow Agree/Disagree format):

- I understood the message of this game.
- I learned something new by playing this.
- I felt bad when I lost/I feared losing.
- I thought this game was fun.
- I would play more of this.
- I felt responsible for helping the characters.
- I thought the game became more stressful over time.
- I like the general pace of this game.
- I would tell my friends to play this.
- I think I can teach others what I learned from this experience.
- I think this game is too hard/easy
- I think the story of this game was too confusing.
- I agree with what this game is saying/suggesting.
- I felt fine losing a few characters as long as I won the level.
- I felt like I was always in control of the situation.

Written Questions:

- What was the message here?
- Any feedback?

In meeting:

- Marked good questions for the draft of the survey.
- Add a multiple-choice question for what the potential message could be, rather than asking "I did/did not understand".
- Discussed strategy for laying out the survey.

2/25/19

Accomplished this week:

- Created a prospective survey for IRB approval.
- Began to look at the Unity Tower Defense tutorial and consider how this could be converted into my vision for this game.

Insights:

- IRB approval should be relatively painless, as the survey is quite simple.
- I tried to format the survey in a way that the “easier” opinion questions appeared first, followed by the more philosophical questions.
- I thought it would be important to add a question to distinguish between the games that were being surveyed.
- The Unity tutorial seems easier than I remember it being, since I have a bit more experience with the platform that I did a year ago.

Concerns:

- I hope approval comes through quickly.
- I am still unsure of the best way to distribute the survey and the game to people.
- The Unity tutorial is still quite complex, and hopefully is flexible enough to handle the changes I would like to implement.

3/4/19

Accomplished this week:

- Began to work with the Unity TD tutorial.
- Thought of specific ideas for mechanical updates.
- Reconsidered timeline for the project.

Mechanical Updates:

- Have “health” diminish over time for agents.
  - When it hits 0, the player’s “base” loses health.
- Add a new stat, “Nutrition” to agents.
  - Can be either a flag or a similar construct to the health bar.
  - When the bar is filled/flag is set, the agent is removed as if it were destroyed in the current version.
- Attacking vs. flying agents
  - Some agents could be treated as a food delivery system to the towers.
  - I like the idea of adding a breadth of agents to the game
- Setting up a stage.
  - Stages can include a closed loop with several spawn points for agents.
  - Each map can have varying amounts of “real estate” upon which a player can build, which can add challenge.

New Timeline

- Spring break should be reserved for the TD game, since it is a bit more involved.
- Have TD done/mostly done by the 25<sup>th</sup> of March.
- This leaves about a month for the action game and a few weeks to distribute the survey.

In Meeting

- 3 Axes to classify features:
  - Ease of implementation
  - Enhancing gameplay
  - Relevance to message

Schedule

- 3/11 – Journal review, Look at TD tutorial, list/ assessment of game mechanics
- 3/18 – Spring break
- 3/25 – Prototype demo including selected mechanics
- 4/1, 4/8 –
- 4/15 – Prototype of action style
- 4/22 – Playtesting event? + collect survey feedback
- 4/29 – Honors presentations

3/11/19

Accomplished this week:

- Began work on producing a level map.
- Digitalized my journal.
- Organized prospective features based on 3 Axels.

Prospective features:

- Health diminish over time, damage player “base” at 0.
  - Ease of Implementation: relatively high
  - Enhancing gameplay: high
  - Relevance to message: high
  - Verdict: This is likely the best starting point for a mechanic to add.
- Nutrition stat: When full, the agent is considered “destroyed”
  - Ease of Implementation: average
  - Enhancing gameplay: high
  - Relevance to message: high
  - Verdict: This mechanic goes in tandem with the previous, and thus is also very important to implement.
- Variety of agents
  - Ease of Implementation: varies, safe to assume low
  - Enhancing gameplay: high
  - Relevance to message: average
  - Verdict: A nice mechanical feature if I can justify it under the message. I just have to be careful not to make agents too complex to implement.
- Closed loop maps with several spawn points
  - Ease of Implementation: average to low
  - Enhancing gameplay: somewhat high
  - Relevance to message: high
  - Verdict: This mechanic will make the game model the situation quite well, but may make the game confusing and will require serious manipulation of spawning and despawning nodes.
- Maps restricting “real estate”
  - Ease of Implementation: high
  - Enhancing gameplay: somewhat high
  - Relevance to message: high
  - Verdict: This is a feature that will define the difficulty of each level, and as such is easy to implement. This also can be very effective in demonstrating a major challenge in food distribution that is real estate and location.

3/25/19

Accomplished this week:

- Began to work within my own level.
- Began to brainstorm solutions for looping maps.

Insights:

- I realized that the “Nutrition” stat idea didn’t need to be a separate stat, but rather I could reverse the logic for the health bar to make it appear to be filling rather than emptying.
- The existing levels in this toolkit are a good starting point for my own levels, as I can manipulate, add, and remove the existing objects as needed to get the final layout that I require for a level idea.

Concerns:

- I feel a bit behind on the work for this project due to extenuating circumstances during spring break.
- Adding my own towers and agents to a level does not appear to work properly.
- Looping does not completely work as an agent needs to stop at the end of the map to properly cause damage to the player.



4/1/19

Accomplished this week:

- Got looping agents to work properly.
- Added the Unity project to GitHub.

Insights:

- On the existing level, I can make it so every other agent, every third agent, etc. reaches the end instead of looping by adding more elements to the linked nodes of each navigation node.
- I want to expand this in a larger level based on city streets as I feel that while this method of looping is still formulaic, it at least feels random enough to feel like people are just wandering randomly.

Concerns:

- I still need to figure out how to fix the Navmesh to make collision work on a new level.
- The look and feel of the game is still pretty far off from what I want it to be.

In meeting:

- Levels can be designed as static images, first, placed as a texture on the ground, and built on top of.
- My agents do not spawn correctly. Investigate this issue.

4/8/19

Accomplished this week:

- Added new 3D models for agents and for towers.
- Gave some thought to how the game relates to the original problem.

How does this game relate to the real issue?

- Food systems
  - The goal of a functional food system is to provide the local people with proper nutrition.
  - The challenge often becomes how to optimally place grocery stores or any other place providing nutritious meals given limited resources.
  - Towers in this game represent such food providers, while the player acts as a city planner attempting to optimally create a functioning food system.
  - Agents represent hungry people needing to be fed.
  - Towers attempt to distribute food to agents, and when their hunger reaches 0, they will be removed from the game area, returning home.
  - Agents will wander the game area until they are fed or until they reach the exit. This represents the food system failing, and agents that are not fed in time will move on, looking for food elsewhere.

In meeting:

- How does this get conveyed to the player?
  - The game needs to be more verbose about what is happening and why.
- More and better models need to be added to the remaining towers and agents.

4/15/19

Accomplished this week:

- Added descriptions to towers to explain what they represent and what they do.
- Added new models to towers and agents.
- Added a second level, attempting to model a city in the sense that it is laid out like a grid where agents move somewhat randomly.

Insights:

- The new additions to the game are definitely an improvement on the look and feel.
- I am happy about the new level as it is an idea that I have wanted to implement for a while now and works as I hoped it would.

Concerns:

- There are still many small features that need to be implemented.

In meeting:

To do:

- Reverse Health Bar
- Descriptions for towers
- Wave number updating correctly
- Edit Icons
- Main menu
  - Wording/titles
  - Load correct levels
- Make camera work properly
- Change ghost model for towers
- New sound effects
  - New background music
- New Towers
  - Similar to existing ones, but play with stats
- Animations on agents? [low priority]
- Taxonomy of towers: Normal grocery store, Small health food store, Mom & Pop store, Big supermarket
- Make towers have a cost to operate [low priority]
- Use consistent models for agents
- Configure waves in each level.

4/24/19

Accomplished this week:

- Completed several items on my to do list, such as:
  - Reversing the health bar.
  - Fixing the issue with wave numbers not displaying correctly.
  - Fixing the text on the main menu.
  - Making the camera center correctly on Level 2.
  - Adding background music.

Insights:

- Making a list of small enhancements that need to be added has been incredibly helpful in helping me to focus on one task at a time.
- I feel like the game is really starting to come together.

Concerns:

- I hope that the game is complete to a degree that I am satisfied with by the thesis exhibition next week.

4/29/19

Accomplished this week:

- Completed the remaining major tasks on my to do list, such as:
  - Adding a Mom & Pop store and redoing the Supermarket.
  - Added new sprites to represent the towers and currency.
  - Added sound effects to the towers feeding people.
  - Added new models for the new towers and updated the models of agents.
  - Configured waves for each level using these agents.
  - Build the game into an executable to be shown at the thesis exhibition.

Insights:

- I feel that the game is ready to show off to people.
- I'm overall very happy with the changes made. Overall, they really help the game's look and feel to fit more closely to what I had envisioned.

Concerns:

- I hope that I can explain the project well at the thesis exhibition.
- I hope that the game is not too difficult for people to understand or beat.

In meeting:

- Try to fix the animation that plays when an agent is fed so that it isn't just an explosion.

Thoughts on exhibition:

- Overall, I feel it went quite well.
- Many of the people that I spoke to seemed to think that the game was an interesting concept and liked that they could try playing it then and there.
- Several did comment on the explosions, meaning that this is a very necessary fix now.

5/6/19

Accomplished this week:

- Fixed animation of agent removal to not be a fiery explosion.
- Attempted to fix the inconsistent currency symbol issue where the tower placement UI still uses the old currency sprite.
- Began to work on my abstract for final submission.

Insights:

- It's hard to believe that this project is already over.
- Overall, I feel that it was a success.

5/17/19

In Meeting:

- Discussed how I would be graded.

5/21/19

Accomplished this week:

- Rebuilt project to an executable, now including the new explosion animation.
- Completed abstract.
- Updated ReadMe on GitHub to include the abstract, instructions on how to start the game, and how to play.
- Updated my electronic journal to match my handwritten one.

Self-Evaluation:

- Process
  - Meetings: 9/10
    - I would say that overall, I was very good about meetings. I always tried to have something new to show, though there were one or two meetings where this was not quite substantial. I only missed one meeting this semester, though this was at an odd time and I was able to reschedule for the next day.
  - Journal: 20/20
    - I believe that this journal is exactly what I set out to do with the journal this semester. That is, I kept up with it each week, summarized what I did, and tried to include my thoughts on the project at each entry.
  - Commits: 10/10
    - I pushed my commits to GitHub on a weekly basis shortly before each meeting so that everything would be up to date when the meeting occurred. I also was careful to ensure that my commit messages adequately summarized what changes had been made.
  - Survey: 6/10
    - I think that the survey was well-designed, and the feedback was useful in that it showed that the respondents thought that the game was fun, though it wasn't incredibly verbose both in how to play or clear in its message. However, the downfall of the survey ended up being that we never organized a play testing event and thus I was only able to get a sample size of 3.
- Product
  - Idea & Design: 20/20
    - I think that the overall premise of the game was quite good in that I believe a tower defense game is a rather good parallel to how a food system should be designed. I think that a lot of work went into planning how the mechanics will model this problem while still being fun, and thus I feel that the mechanics of the game were designed well. The tower types,

how they differed, how agents moved throughout the level, and having health bars on agents represent them becoming full are just a few examples of this. Last, I think that the aesthetic design was also very good in that we decided that towers should be represented by buildings and agents should be people. Models were found accordingly. Additionally, I think the game sounds also turned out to be very fitting and overall added a lot to the game.

- Implementation: 17/20

- I think that overall, these designs were implemented quite well. The game runs well and looks good, having had no major visual or mechanical bugs appear in any of the play testing done by me or others. The outside assets used were all of a high quality and helped to vastly improve the game's look and feel. I think the feedback that I did obtain says a lot about the implementation, both good and bad. Overall, the survey takers felt that the game was very fun and would recommend it to others, but the message of the game was not entirely clear. I think therefore that the game could have certainly been implemented better, especially by adding more instructions in game on how to play and what your goal is.

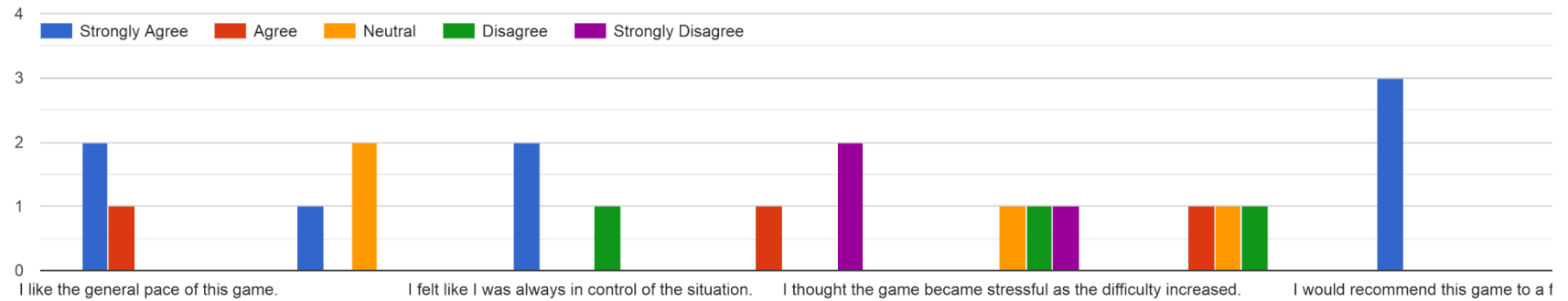
- Documentation: 10/10

- The abstract that I wrote covers the whole process of making this game across the whole semester, from finding a problem to model to the results of the survey. My README in GitHub includes this abstract as well as instructions on how to start the game, how to play it, and how to open it in Unity.



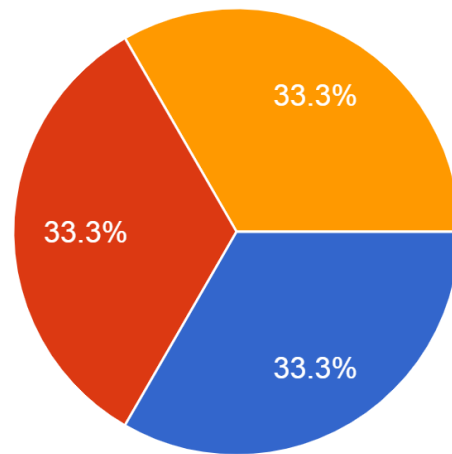
## Survey Responses:

Do you agree with the following statements?



## Which of the following do you think is the core message of this game?

3 responses



- There is no such thing as a perfect food system.
- It is vital that we work to create as effective a food system as possible.
- Food systems get harder to control the higher a population gets.