Snakes on a Plane

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Summary of Proposed Project

Our project is Snake_IRL, a variation of the classic Snake game where users traverse the real world in a manner similar to orienteering, traveling to points of interest while trying not to cross their recent path. This application has two main experiences, desktop, as well as mobile. On the desktop experience, users can choose which points of interest they want to visit, suggest new locations as points of interest using Google Maps, or create missions with many points of interest and share them with other users. These points of interest and missions can be voted on by other users, allowing for the best missions and locations in an area to rise to the top. After a certain threshold, points of interest can be permanently added to the map. On the mobile experience, users can log into their account and access various missions to complete in the real world. These can either be sourced from the previously mentioned user-submitted missions, created on their own by the user, or randomly selected from the most popular nearby points of interest. As the user is navigating, they will generate a trail behind them, like in the classic Snake game. As the user navigates to points of interest, their trail increases in length. If a user navigates through this trail, they'll lose one of 3 starting lives. After losing 3 lives, the game ends, and the user's score is given. If the user manages to hit all points along a mission, they win, and are given a certain number of medals based on difficulty and remaining lives. This difficulty score is calculated based on the overall number of spots in the mission, as well as how spread out those spots are. Additionally, there would be an "unlimited snake" option, where users go to constantly generated random points of interest until they run out of lives. The score for this option would be generated just based on total length traveled, and users would be rewarded more medals for going further distances. As users gain medals, they can compete on local, regional, and global scales, competing to see who can get the most medals weekly, monthly, and all-time!

Explanation of Problem Space

In the age of technology, it seems like exercise and going outside are no longer activities that appeal to the short attention spans of many modern people. People are much more content to sit around on their phones all day than see the sights just outside their door. This is such a shame, as there is a whole world out there to explore! Whether it's the natural beauty of a local park, a unique monument in a cityscape, or a unique local restaurant, there are places to appreciate all around us. And while the pandemic has put a halt to many activities, the great outdoors is still a relatively safe space to explore.

Likewise, as the pandemic draws to a close, many businesses will need people exploring in order to recover from the harsh economic conditions of the past year. If we can somehow draw people to explore their local small business scene, that would do wonders for the local economy and open up a new venue for attention.

From a technical perspective, there's also a large market for information about our world. As data becomes more and more important over time, all bits of relevant information about the planet will prove valuable. However, it's notoriously difficult to get reliable, curated data about our world. Even massive products like Google Maps rely on individual users suggesting improvements solely out of a desire to improve the accuracy of their local maps.

Our problem space is the union of these domains. We wish to create a product that will encourage people to exercise. We wish to motivate modern society to explore the world around them. We wish to create a product that will allow small businesses, museums, libraries, etc. draw attention to themselves. And we wish to create a product that will help gather and organize more relevant information about the world around us.

Solution to Problem Space

So, how does one unify these disparate problem spaces? Our solution is simple: create a game! Snake_IRL is our plan to create a piece of software that will encourage players to exercise and explore, learn about their local businesses, and catalog the world around them.

On the exercise and exploration front, we recognize that people are so glued to their phones that if we want people to get outside, we should use their phones to draw people out into the real world. By forcing people to get outside and actually travel to destinations to play the game, Snake_IRL would provide people with the motivation they need to leave the house for once, go for a walk, and explore the world.

On the small business front, Snake_IRL draws people to specific locations. Small businesses can add their properties to the database of local points of interest, and if players consider their location to be important enough to include in a mission, they could introduce many Snake_IRL players to their location. We can also expand this to offer paid promotions for business locations.

On the data front, Snake_IRL encourages players to catalog the world around them. As players can suggest their own points of interest and include points of interest they enjoy in their missions, we can build a more extensive database of interesting real-world locations than we could by just relying on Google Maps or other existing data sources.

Competitors in this Space

Our primary competitors in this space are the games created by Niantic Labs: Pokémon Go and Ingress. Both of these games are augmented reality games with elements of digital geocaching. Pokémon Go is a game designed around a core gameplay loop of catching Pokémon which randomly spawn in the overworld of the game -- a 1:1 recreation of the real world. In the overworld there are two types of digital geocache which a player can find: PokéStops and Gyms. At the former players can travel to this location in the real world to collect items and lure Pokémon to the location. The latter functions as the former but with the added functionality of player vs environment combat encounters. Pokémon Go is essentially a reskin of Ingress, boasting a larger playerbase but an incredibly similar core gameplay loop; the primary difference between Pokémon Go and Ingress is that Ingress lacks the second type of digital geocache location gyms. Another competitor in the space is Six to Start's augmented reality exercise app "Zombies, Run!" which pits the user against a hoard of zombies in a race around the player's real life location. The app is marketed as an exercise motivational aid as well as game. The core gameplay loop of this app is to start a race then maintain pace vs a zombie hoard after you, the game places digital obstacles in your way in the real world which the user must navigate around. The final competitor we encountered during the research phase was a game titled "Landlord Stock Market Games AR" a game in which users become (fake) digital real estate brokers in the area that they live. Here users can travel to real real estate locations (that aren't actively on the market) in order to get access to selling those properties.

Description of Stakeholders

The stakeholders for our project include not only users, but local businesses, advertisers, health authorities, as well as map companies.

Users can derive entertainment from the project in the same way that people derive entertainment from doing activities such as geocaching and other orienteering games. This can provide users with not only entertainment, but also health benefits, as they exercise while playing the game.

This will likely benefit another one of our stakeholders, health authorities. Health authorities want people to be healthier, which our app will help with by having users get outside and exercise. This will make health authorities gain value as their job is helped out by the app.

As users navigate around the world, they will not only exercise and get healthier, they'll also run past local businesses, who will likely benefit from people stopping by and taking a look around. These local businesses will generate value by increasing the number of people going to their stores. Additionally, local businesses will be able to promote their locations on the app in order to increase the prominence of their locations within the application. Additionally, advertisers will be able to advertise within the application, allowing for revenue generation, and value for advertisers. These advertisements can come in many forms, including promotional events where certain companies can sponsor an event in-game.

Finally, map companies will be offered use of our user-generated data to populate maps with points of interest that are generated by users, as this could help out a lot in less well-documented areas to help flesh out maps. These maps can add these temporary points-of-interest and then can adjust them on their own end to add stuff such as times, online menus for restaurants, etc.

Interesting Technologies We're Considering

- Google Maps API for rendering the map and creating an initial point of interest database
- Geolocation libraries to better track user location
- For the purposes of storing points of interest, we can use a concept known as "S2 cells" to efficiently store real-world location data.
- For user interface components, we're planning on using Material, as it's built to work well with Angular

Functional and Non-Functional Requirements

Functional:

- The application should allow users to build and share missions and points of interests, for use by either one or all users.

- The application should allow users to sign-in to have their missions and points of interest stored.

- The application should allow users to access missions and points of interest on mobile, in order to allow the user to access their snake missions on-the-go

Non-Functional:

- The system will be delivered as a self-contained web application using the MEAN stack.

- Software requirements:

  - Frontend user interface: HTML 5, CSS 3, Angular.js 1.8+, Bootstrap

  - Backend server technologies: Node.js 12.18+, Express.js 4.17+

  - Database technology: MongoDB 4.4+

  - Operating Systems, Windows 10, macOS 10.x, Ubuntu Linux 18.04+, iOS 13+, Android 10+

  - Source Code Version Control: Git(Hub)

- The application will have a responsive user interface using HTML 5, CSS 3, and Bootstrap. The Angular Javascript framework will be used to manipulate various elements within the interface in response to user interaction

- The application files will be documented to ensure code maintainability, as well as a README file being created in order to document various things about the app.

- Game actions will be using the in-house REST API.

Estimation of Project Schedule

February:

- Finalize initial project proposal

- Build basic static frontend site and finalize front end styling

March:

- Implement core gameplay mechanics

  - User device tracking

  - Mission creation

  - Trophy collection

- Begin to implement user session management

April:

- Finalize user session management and profile creation

- Develop user created mission studio

- Implement user customizations

 - Skins

  - Tails

May:

- Finalization of release build

Site Map of Basic Structure

● Play - start on map screen showing nearby area; this map will be used to highlight points of interest and draw your snake once you start the game. This is the default Mobile view.

○ Mission selection menu

○ Tap a point of interest to get more info about it and maybe upvote/downvote it

○ Leaderboard

● Create - Start on a top-down map view showing nearby area as well, but with a wider field of view than "play" and more visual clues about the relevance of locations. This is the default desktop view.

○ Mission builder interface

○ Point of interest submission interface

○ Leaderboard as well
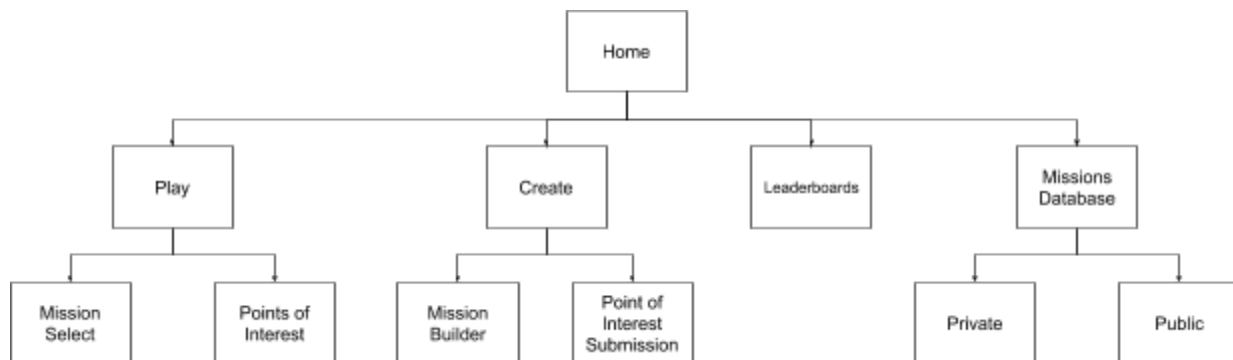
Wireframes

Mission select view:
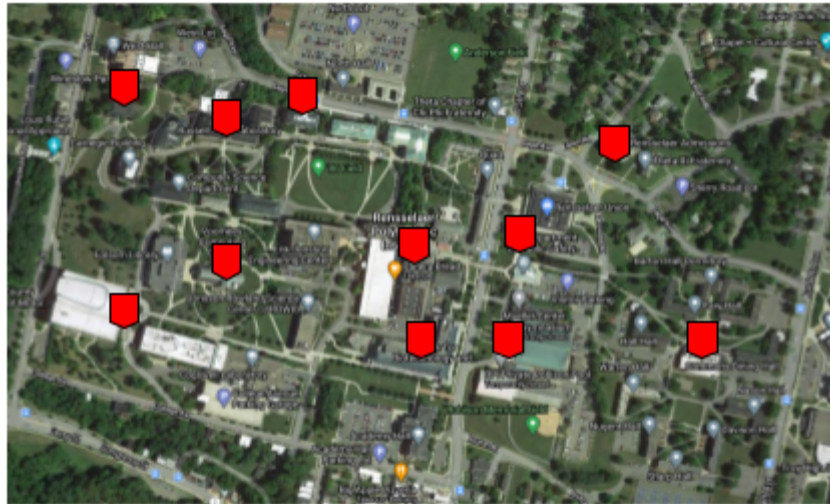
RPI Runabout

Go around RPI

Shirley's Temple

RPI administrative facilities

Trojan Horse Race

Locations in downtown Troy. Stay safe!

Hudson Parks

Explore nature in the Hudson Valley!

Create!

[Location] Mission

Name:

Dairy Queen

Position:

(15*N, 30*E)

Map