IOWA STATE UNIVERSITY
College of Engineering

User Needs & Requirements

Project Team 10

Visualizing Probabilistic Whereabouts of Moving Objects

Project Overview

For our project we are going to design & create a web-based application for visualizing the probabilistic whereabouts of moving objects.

- Given a dataset of positions varied with time, use a set of tools to express the probability of the object existing at a given location in between any two samples (Generalize to chains of samples).
- Provide users with an interface that enables the user to enter queries and visualize results.

User Overview

1. **Zoologist**
   - A biologist who specializes in the study of animals, their behavior, evolution, and habitats.
   - They conduct research, observe animal populations, and analyze data.
2. **Chemist**
   - A scientist who investigates the properties of substances at the atomic and molecular levels.
   - They conduct experiments and analyze data to understand processes.
3. **Researcher**
   - Someone who systematically investigates topics to discover new knowledge or solve existing problems.
   - They use experimental methodologies and analysis to advance human understanding.

User Needs

Shared User Needs

- All users are seeking to understand probabilistic whereabouts of moving objects (i.e. animals, particles, general inquiry) from a collected dataset.
- All users are wanting an intuitive understanding of such queries; taking the form of a visual representation.

Unique User Needs

- Users have datasets of differing dimensions (i.e. 2D vs 3D space)
- Users want the visualisation to cater to their work (i.e. Map Overlays)

Functional Requirements

Several Functional Requirements:

- Allow user to create an login to personal account.
- Load datasets and set an active dataset.
- Select user type.
- Select algorithm based on user type.
- Select query type based on user type and selected algorithm
- Complete query for given query type through manual configuration or visualization window interaction.
- Submit query for processing and visualize the results

Other Requirements

Other Requirements :

Experiential

- User preferences stored and recalled.
- Visualization window navigation (i.e. Panning, Zoom, Rotating, ect.)
- Notifications and updates conveying information about current states and statuses.

Aesthetic

- Utilitarian aesthetic.
- Visualization color customization - where applicable.

Non-Functional

- Web-application accessible from a domain outside the host domain.

Engineering Standards

Some Standards Used:

Oracle Java Coding Conventions

- Used for server side
- Used to be understandable/code all similar in writing

Vue.js Style Guide

- Use for frontend user side
- will keep front end code will be the same

Engineering and Management of Websites for Systems, Software, and Services Information

- Use will be for user side GUI to maintain a similar look and operation

Sources

https://v2.vuejs.org/v2/style-guide/?redirect=true
https://www.oracle.com/java/technologies/javase/codeconventions-introduction.html
https://ieeexplore.ieee.org/document/10186263