**EE/CprE/SE 491 WEEKLY REPORT 3**
*Feb 14 - Feb 20*

---

**Group number:** 10
**Project title:** "Visualizing Probabilistic Whereabouts of Moving Objects"
**Client &/Advisor:** Goce Trajcevski

**Team Members/Role:**
Nathan Thoms - Frontend
Mara Prochaska - Backend
Eric Jorgensen - Documentation
Ryan Cook - Backend / Frontend Switch

---

**Report Summary**

During this week, we began to identify user needs for the application we will be creating to visualize moving objects. Last week, we determined that we plan to identify a few specific use cases such as GPS, chemistry, and astronomy, along with creating a generic location visualization screen as well. These screens will be relevant to our user profiles and are the categories we plan to use when identifying our user needs. We also began to discuss requirements that will be linked to these

**Accomplishments**

This week we investigated current web development technologies and assessed what tools make the most sense for our team's skill sets, project scope and timeline. Although there are many possible ways of reaching our end deliverable we have decided to use Node.js for our web development environment. Node.js relies on the javascript programming language for both front and back-end development. This made sense due to javascript being a loosely typed language that has a shallower learning curve for those with less programming experience and allows for an individual to only know a single language to move between frontend and backend development if necessary - which may prove useful given our small development team.

We have also looked at popular tools and technologies for frameworks that sit on top of the Node.js environment. For the backend the express.js framework is the most popular for Node web applications; it will be responsible for defining routes and handling http requests. Additionally, the backend will be using a mysql database for storing relevant user information. The front-end still needs to be ironed out but we are looking at using react.js to build out the user interface. Barring that, react.js is compatible with several visualization tools we hope to use within the front-end, such as D3 and a geo mapping API. In general react provides a set of tools to aid in component-based software architectures - ideally making unit testing easier.

**Pending Issues**

Class has not been moving along in content quickly enough to keep up with what our team has been discussing during meetings with our advisor. Otherwise, we have no pending issues and are on track with our goals.

**Individual Contributions**

| Team Member | Individual Contribution | Hours this Week | Hours Cumulative |
|---|---|---|---|
| Nathan Thoms | Researched web-development frameworks. | 5.5 | 14 |
| Mara Prochaska | Began team website work and brainstorming users/requirements | 4.5 | 9 |
| Eric Jorgensen | Looked into materials on connected topics. Began user needs/reqs | 2.5 | 8 |
| Ryan Cook | Looked over material, looked into possible software | 3.5 | 8 |

**Upcoming Plans**

Within the next week we plan on having developed a set of high-level diagrams explaining user interactions with our application. We are planning on supporting in-depth functionality for two to three user types, as well as a platform for general inquiry to demonstrate broader application use cases. With a detailed set of diagrams, we will be able to identify overlapping functionalities between user groups, and identify necessary unique functions. This will enable us to better plan our design and stay organized.

Another upcoming plan is to have researched tool compatibility, or at least begun to. We are interested in establishing a set of frameworks that will keep us organized as well as show compatibility with visualization tools (i.e. does a react framework work with the D3 visualization tool set and geo-mapping library, are you able to overlay D3 plots overtop a given geo-mapping library).

**Action Items**

| Team Member | Individual Goals | Estimated Hours |
|---|---|---|
| Nathan Thoms | Generate user interaction diagrams to capture required application functionalities. | 5.5-6 |
| Mara Prochaska | Update team website and assist with generating requirements documentation | 6 |
| Eric Jorgensen | Document user needs and requirements | 5 |
| Ryan Cook | Research/experiement with software tools for backend and frontend | 6 |

**Advisor Meeting Summary**

During our advisor meeting, we began discussing the tools and requirements that the application will have. We determined that the application will require a server with a database on the backend and a web-based application on the frontend. The application will have several output types for specific uses such as chemistry, GPS, and generic. The database will store user login information and data that has been input into the application. User accounts are necessary to determine who has input data and to allow users to communicate and share data sets.

**Weekly Readings and Materials**

1. Uncertain Range Queries and Necklaces
   (Goce Trajcevski, et. all)
2. Towards Fusing Uncertain Location Data From Heterogenous Sources
   (Bing Zhang, Goce Trajcevski, Liu Liu)
3. Maximum Entropy Bridgelets for Trajectory Completion
   (John Krumm)