Constrained Re-Planning in Spatial Crowdsourcing, PIRM II

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Project Recap - I

Project Goal:

Create a spatial crowdsourcing algorithm that runs on a mobile and web application that match workers with tasks from consumers.

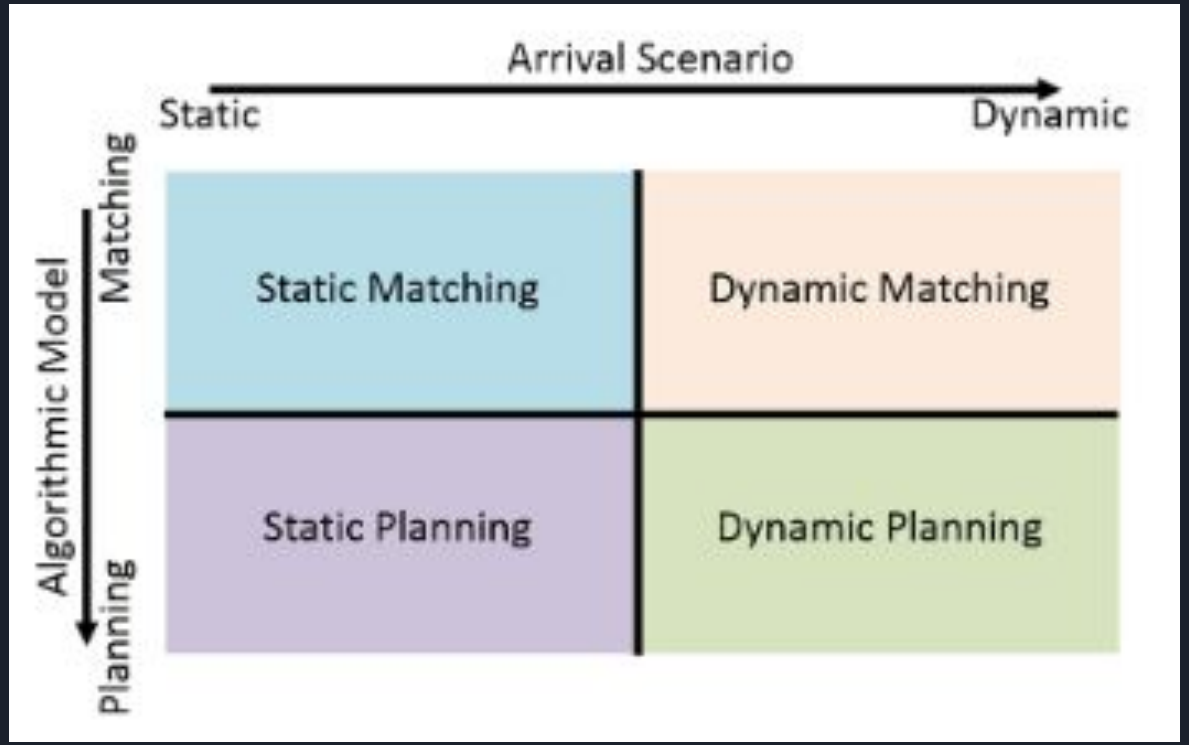
Project Recap - II

4 types of spatial algorithms

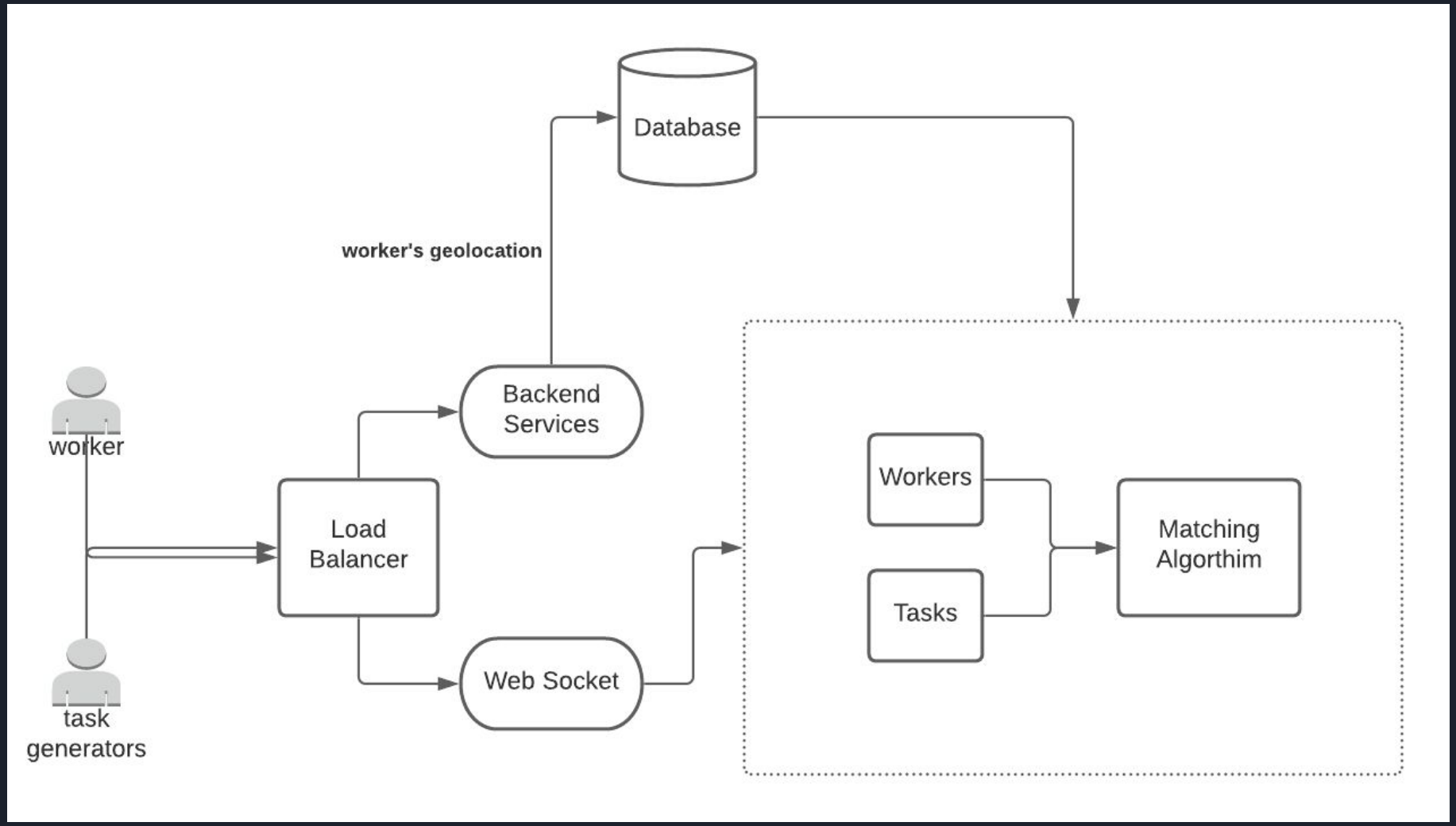
- Static Matching
- Static Planning
- Dynamic Matching
- Dynamic Planning

Current Implementation plan

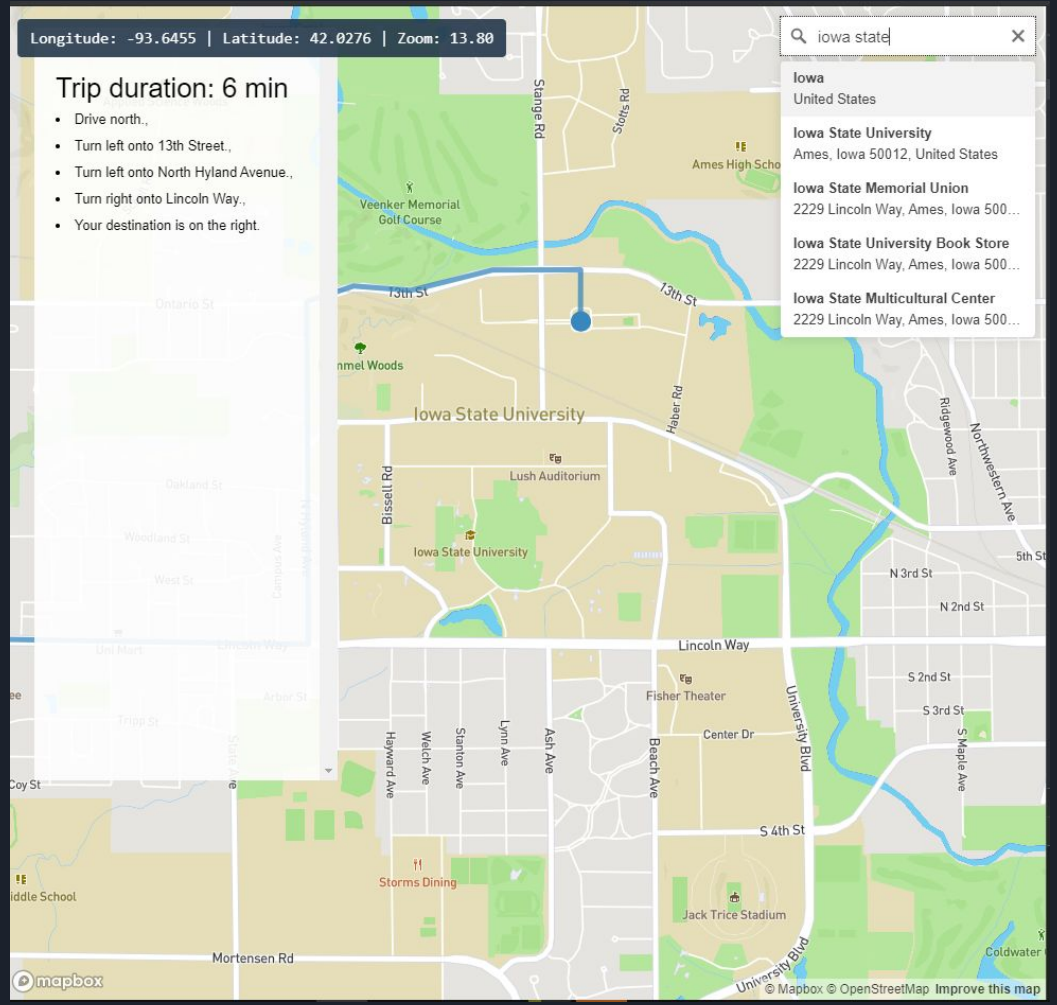
- Initial: Static Matching
- Final: Dynamic Planning

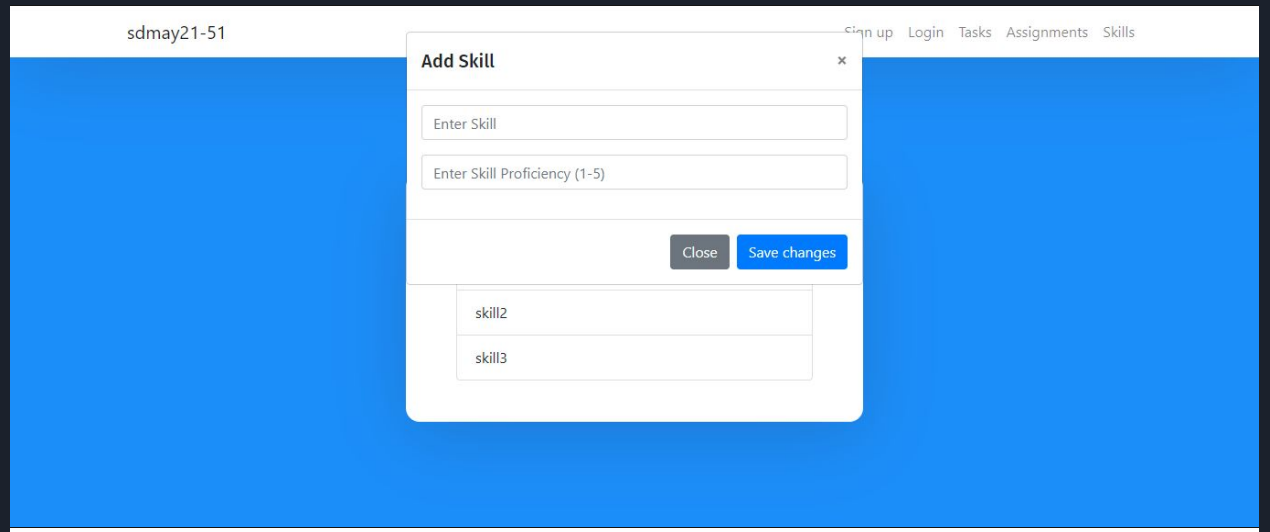


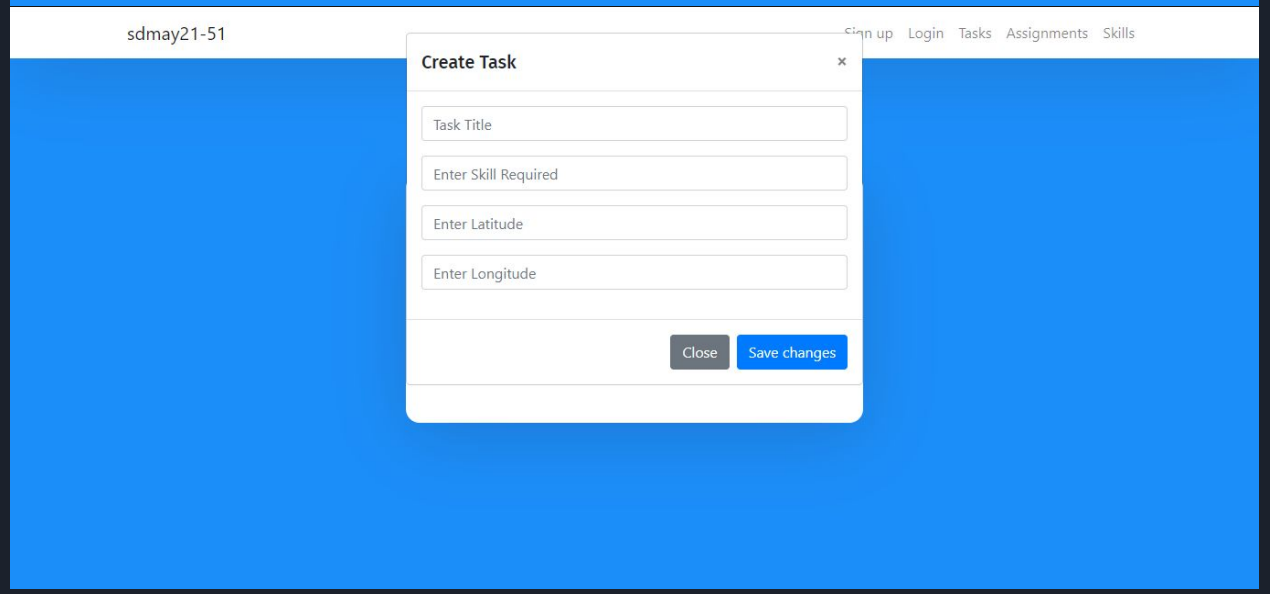
System Design - Component Diagram



Current Screenshots of Desktop App







Engineering Standards

- IEEE/ISO/IEC 29119-2-2013 - ISO/IEC/IEEE International Standard - Software and systems engineering —Software testing —Part 2:Test processes

- IEEE/ISO/IEC 29119-3-2013 - ISO/IEC/IEEE International Standard - Software and systems engineering — Software testing —Part 3: Test documentation

- 29119-4-2015 - ISO/IEC/IEEE International Standard - Software and system Engineering -- Software testing --Part 4: Test techniques

Engineering Constraints

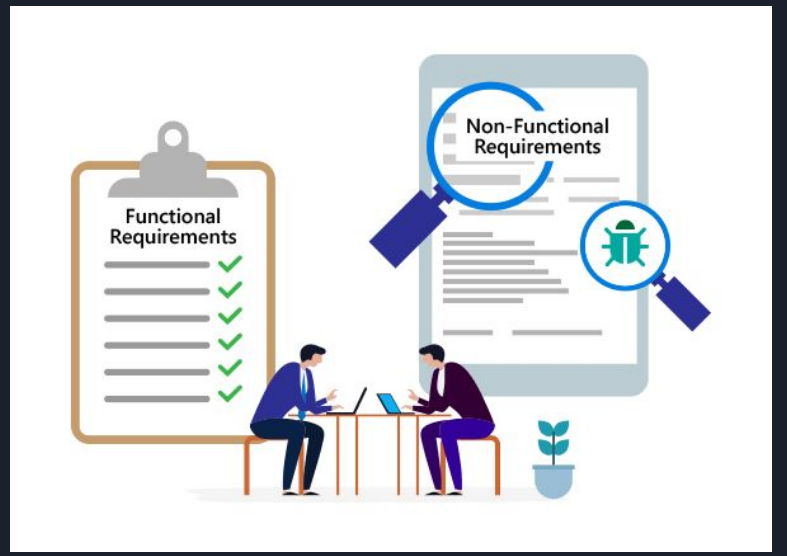
- Must run as a mobile and desktop app
- Server needs to be able to handle algorithm processing
- Application requires internet connection
- Free Mapbox API
  - 50,000 monthly map loads
  - 100,000 monthly direction requests
  - 100,000 monthly geocoding requests
- Project must work without a budget
- Project must be completed within the semester

Functional Requirements

- Allow employers and workers to be able to create accounts (stored in DB)
- Take input of workers: skills, location, and reputation
- Take input of tasks: location(s) and skills required
- Optimize a schedule based on task and worker input
- Alert workers of incoming tasks
- Re-optimize schedule in the event of new constraints
- User interface for visualization of work schedule

Non-Functional Requirements

- Reliability - few bugs or issues that impede user experience
- Performance - algorithm is polynomial time and app is optimized for web/mobile
- Scalability - able to be used by a large number of users simultaneously
- Maintainability - readable code with documentation
- Usability - intuitive/easy to use
- Modularity - be able to switch between components (like algorithm used)

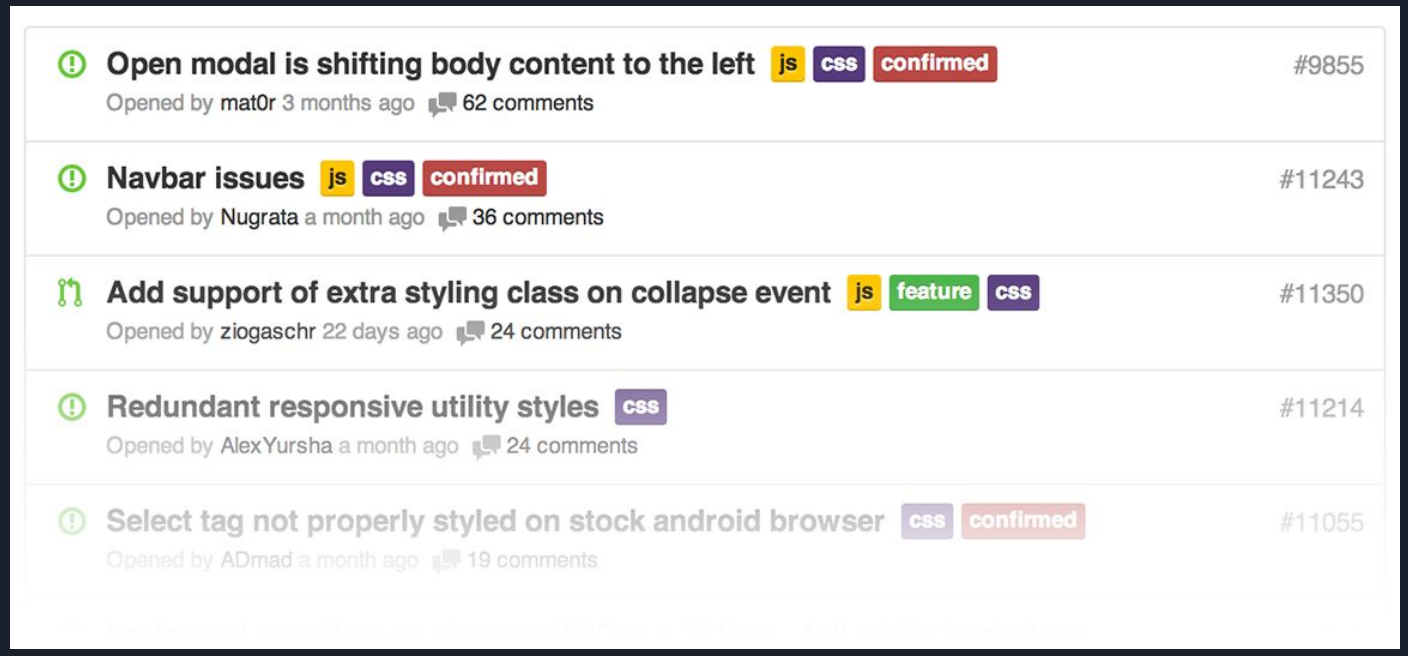


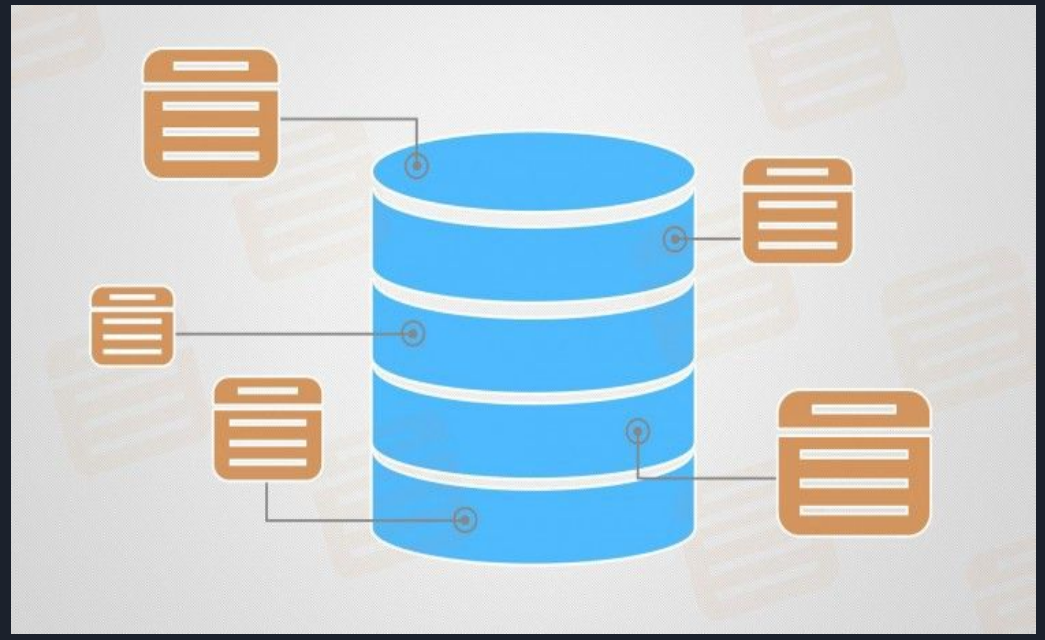
Technical Challenges

- Implementing spatial crowdsourcing algorithm
- Establishing a server
- Frontend-backend communication/familiarizing ourselves with Apollo Graphql
- Familiarization with Mapbox API
- Working without in-person team interaction for much of the project
- Makes sure there is not memory bloat in the client

Immediate Next Steps

- Expand frontend-backend communication
- Work on implementing alternate spatial crowdsourcing algorithms
- Run our backend on a server and set up CI/CD.





Thank you!

Any questions, concerns, or comments are greatly appreciated!
Looking forward to feedback!