Team Details

a. **Team name:** Algorithm Avengers
b. **Team leader name:** Supriya Jaiswal
c. **Problem Statement:** Community Mapping

VaranasiHydrotrack: Community Water Quality Mapping:

Problem Definition:

- Communities lack accessible tools to monitor, visualize, and share water quality data, making it difficult to identify and address water pollution issues effectively.

Brief about the idea:

Solution:

- A comprehensive web-based platform that enables:
- Real-time water quality data collection and visualization.
- Community-driven pollution reporting.
- Interactive mapping of water quality metrics.
- Data-driven insights for environmental decision-making.

Impact:

- Empowers citizens to actively participate in water quality monitoring.
- Facilitates data-driven environmental policy decisions.
- Creates a transparent, community-led approach to water management.
- Supports the UN's Sustainable Development Goal 6: Clean Water and Sanitation.

Target Users:

- Local community members.
- Environmental scientists and researchers.
- Policy makers and government officials.
- Environmental protection agencies.

Opportunities:

A. Differentiation from Existing Solutions

- Real-time, community-driven data collection
- Integration of multiple data types (pH, turbidity, contaminants)
- Open-source approach for maximum accessibility
- Combination of scientific data with citizen science

B. Problem-Solving Approach

- Democratizes water quality monitoring
- Bridges the gap between communities and environmental agencies
- Creates a historical database for trend analysis
- Enables predictive modeling of water quality issues

C. Unique Selling Propositions

- **User-Centric Design:** Intuitive interface for all skill levels
- **Data Visualization:** Advanced charting for easy interpretation
- **Geocoding Integration:** Precise location mapping
- **Community Engagement:** Fosters collective environmental responsibility

Core Features:

Data Collection & Input:

- 📝 User-friendly water quality data submission form
- 📸 Photo upload capability for visual documentation
- 📍 Precise location tagging using Nominatim API
- 📊 Multiple parameter input (pH, turbidity, contaminants)

Visualization & Analysis:

- 🗺️ Interactive OpenStreetMap integration
- 📈 Dynamic charts using Chart.js
- 🔍 Data filtering and search capabilities
- 📊 Trend analysis and historical data comparison

Community Engagement:

- ⚠️ Pollution incident reporting system
- 💬 Comment and discussion features
- 📤 Data export functionality
- 📱 Mobile-responsive design

Technical Capabilities:

- 🔄 Real-time data updates
- 💾 MongoDB spatial indexing for efficient queries
- 🔒 Secure data storage and handling
- 🔌 API integration for extended functionality

Process flow diagram or Use-case diagram:

Use Case:

• The User submits reports and views environmental data on interactive maps, engaging with geocoded locations and visualizing trends in heatmaps or graphs.

• Authorities monitor the reports and environmental data to respond to issues.

• The System interacts with Third-Party APIs to fetch real-time data, geocode locations, and present data through visual tools like Leaflet.js for maps and Chart.js for graphs.

• Offline support ensures Users can contribute even without an internet connection.

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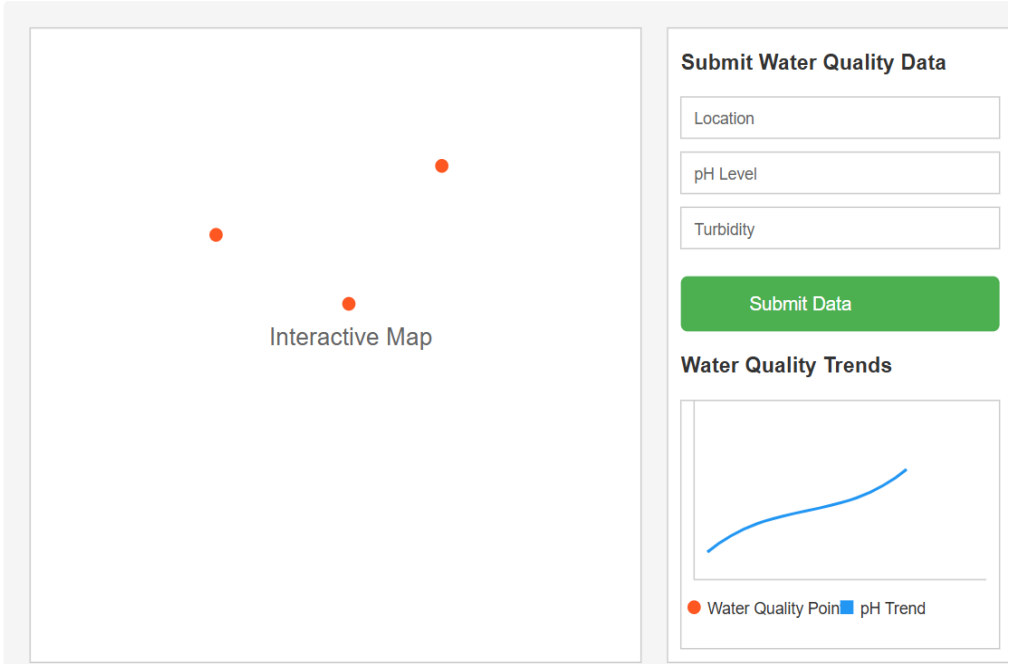
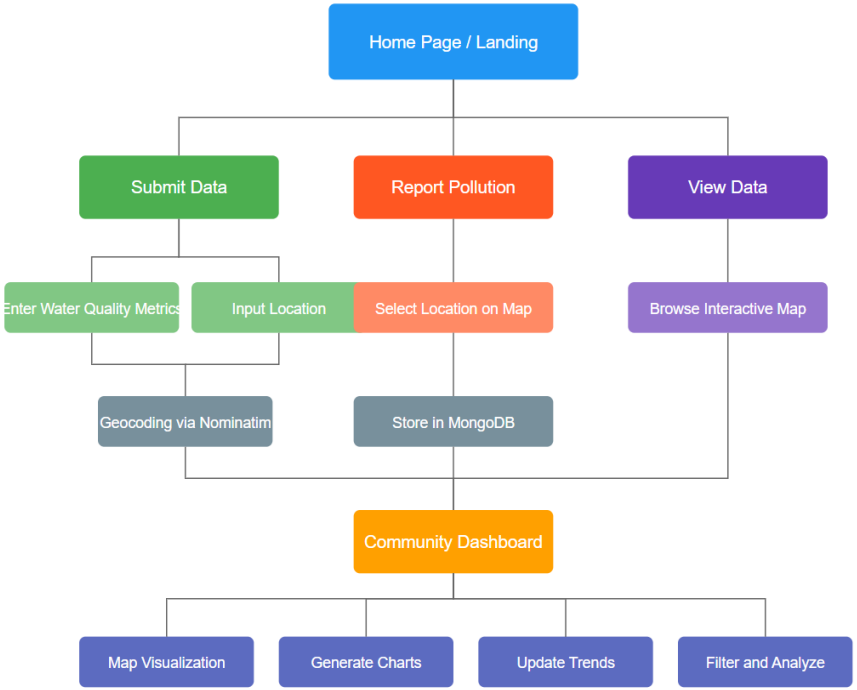
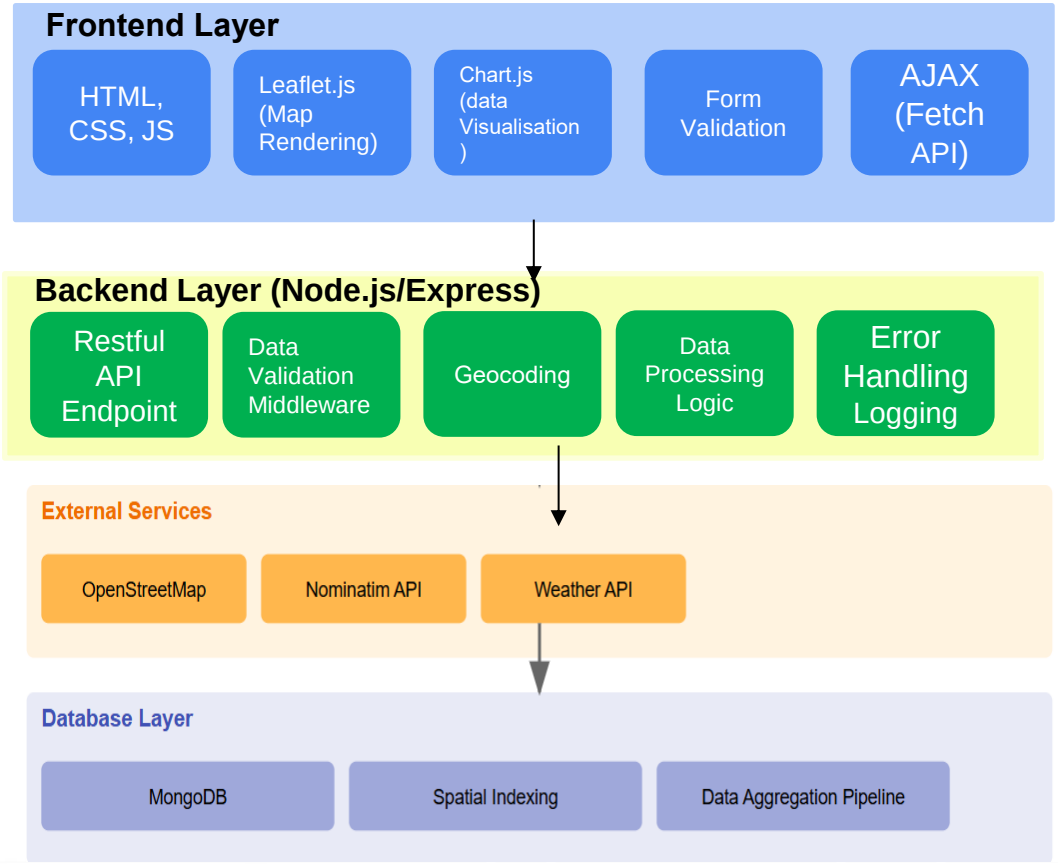




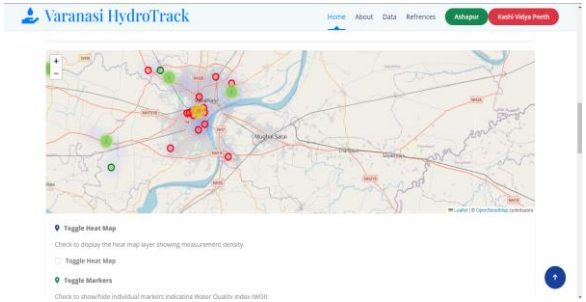
Architecture diagram of the proposed solution:

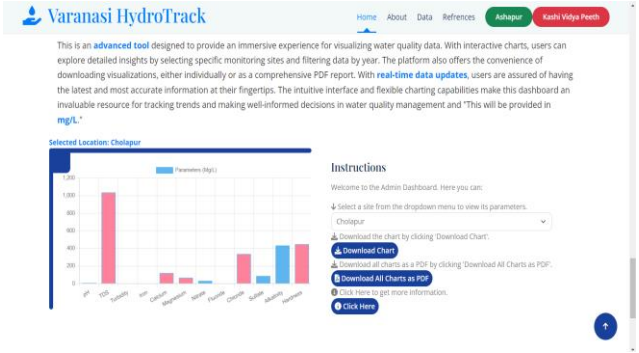


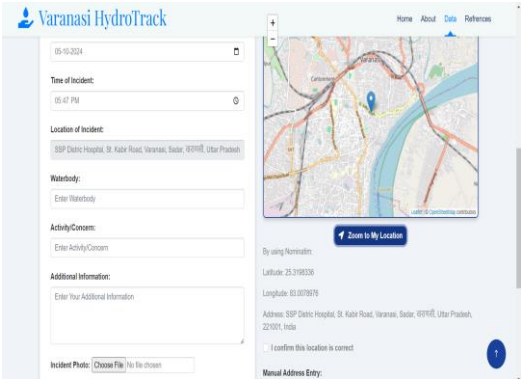
Technologies to be used in the solution:

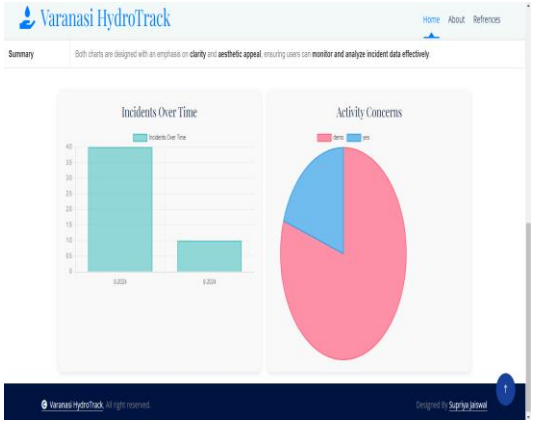
- **Frontend:** HTML, CSS, JavaScript
- **Chart.js:** (for Data Visualization)
- **Backend:** Node.js, Express.js
- **Database:** MongoDB (for storing location-based data)
- **APIs:** Nominatim API (for geocoding), OpenStreetMap API (for mapping), and government APIs for real-time data

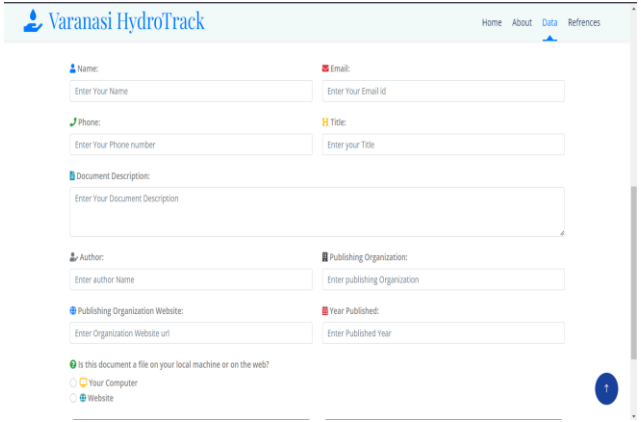
Snapshots of the prototype:

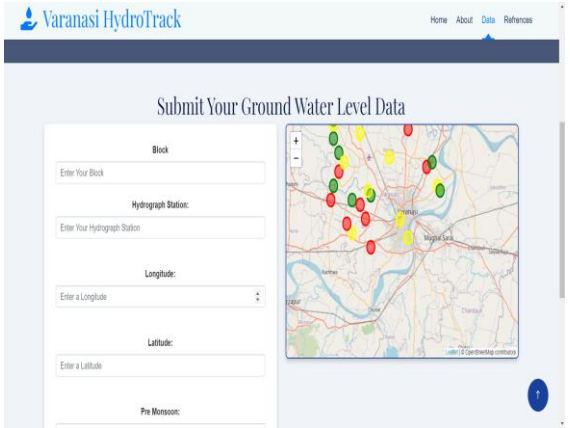












Prototype Performance report/Benchmarking:

The performance of the prototype is measured in key areas:

Loading Time: Maps and data load in less than 3 seconds for up to 500 data points.

Real-Time Updates: Environmental data updates every 10 seconds (like live air/water quality).

Data Submission: User-reported issues appear on the map within 5 seconds after submission.

Mobile Performance: Works well on both desktop and mobile, with offline access so users can submit data even without internet.

Backend and Database: Backend handles 500 requests at a time without slowing down, and database queries (finding nearby pollution spots) take less than 1 second.

Provide links to your:

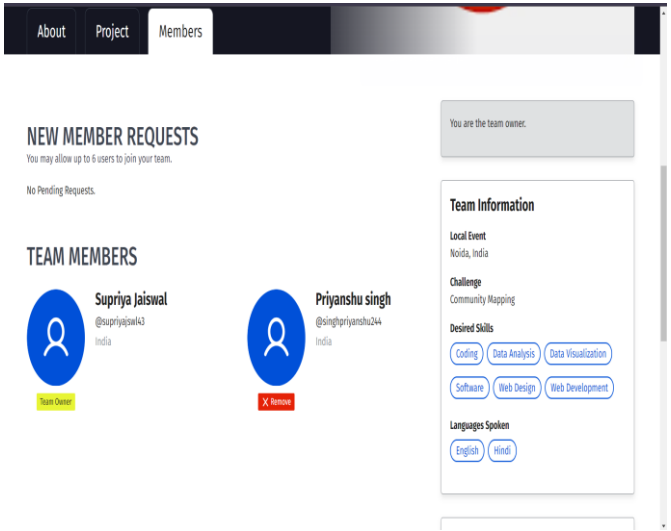
1. GitHub Public Repository:
   https://github.com/SupriyaJaiswal43/Communitywatermapping
2. Demo Video Link (3 Minutes):
   https://youtube.com/watch?v=uPHUIZpWQ_0&feature=shared
3. Final Product Link:

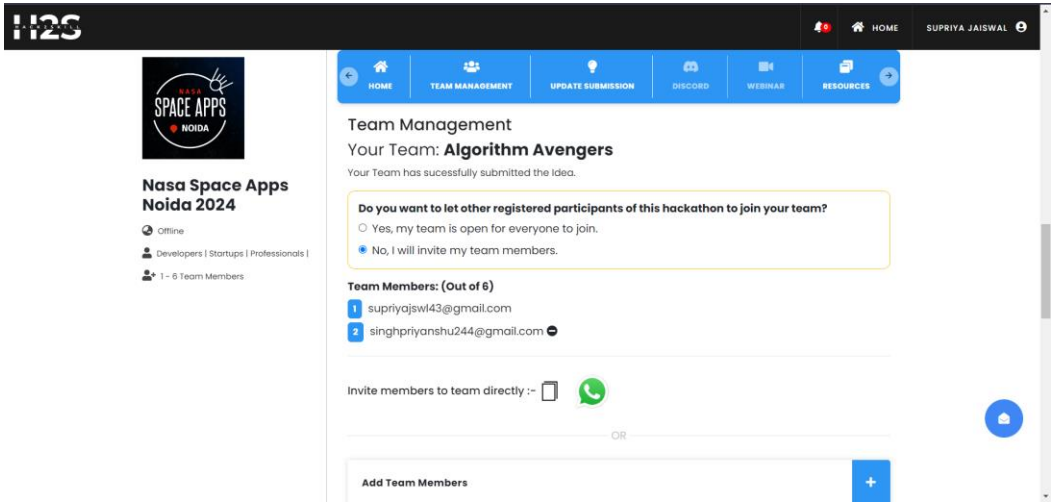
https://supriyajaiswal43.github.io/Communitywatermapping/

I have linked the static version in the final product link. Clicking on this link will display the static version of the project.

Proof of Registration on https://www.spaceappschallenge.org/nasa-space-apps-2024/2024-local-events/noida

1. Add screenshots of your registered profile on the above mentioned link.
2. Screenshots to be added for all of the team members.





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