**SIH 2023 Proposal**

**AquaAir- AQI & WQI Monitoring and Prediction**

The quality of the air and water in today's world is declining at an alarming rate, thus it is especially important for a large country like ours that we continuously monitor the AQI and WQI and educate the public about it in order to help them lead healthier lives.

**Approach:**

Our strategy entails constant observation of the water and air quality in a particular area that is entered by the user on our website. The user must select the button for viewing the AQI or WQI of entered location.

When viewing the AQI, the viewer will first see the air quality index for the specified location, and then pie charts, bar graphs, and line graphs will be used to compare the concentrations of various components to the permissible threshold. On the basis of historical data, our website will also forecast the location's air quality in the near future. For the purpose of showing the AQI, the website retrieves real-time data from the Open Weather API.

The user will have to manually enter the concentrations of various chemicals, such as sulfur, the pH of the water, etc., when analyzing the WQI by obtaining information from the internet. Our website will determine whether the water sample at the entered location is potable or not by comparing the entered concentrations with the desired ones. The desired values are retrieved from a csv file.

**Tech Stack:**

HTML, JavaScript and tailwind CSS for front-end development.

Django for backend development.

For AQI we have used xgboost time series prediction

For WQI we have used binary classification of logistic regression and then we used random forest classifier (ensemble method) algorithm for better prediction accuracy.

Both ML models have nearly 80% accuracy.

**Future Developments:**

In the future, we hope to improve the response time of our website as well as the user interface so that the general public, who may not be familiar with technical words, can grasp the AQI. We also want to increase prediction accuracy so that we can deliver more dependable information to our users. Finally, based on the results of that place, we intend to provide users with measures and actions on how to enhance the AQI and WQI of their surroundings.

**Dependencies:**

We presently require the user to manually enter the values for the WQI, but if we obtain real-time information about the water quality from the government, we may switch to a model more akin to AQI. Both our ML models depend on an outsourced API, data collection directly from the weather/water department of the Government would enable more reliable results.