



IOT enabled Water Quality Monitoring System

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Motivation

- Marinating clean and safe water sources is crucial for public health and environment sustainability
- Traditional water quality monitoring might be time consuming
- The goal was to develop affordable , scalable and real time water quality monitoring system that enables rapid response to anomalies

IMPLEMENTATION

The proposed System Works as follows:

- IoT servers are integrated to measure the ph , turbidity, TDS , conductivity and the DO levels
- Data then transferred to the cloud database thinkspeak from where we use it for visualization and training
- We have a IQR based anomaly detection at first which tells us what parameters have gone beyond the threshold
- A machine learning model is trained on a labelled dataset on historical sensor data
- An application will be developed to display the sensor data and generate alerts

THEORY

- The system utilizes IoT sensors to measure key water quality parameters, including Ph , turbidity , TDS , conductivity and dissolved Oxygen
- Data collected from the sensors is transmitted to think speak , for real time visualization
- Machine Learning uses XgBoost to analyse the sensor data and detect anomalies
- The model is trained on a labelled dataset of a normal and anomalous water conditions to understand complex patterns

RESULT AND CONCLUSION

The system successfully demonstrated real time water quality monitoring using IoT and machine learning

From the sensors we are able to get all the required data from the water to be able to make a deep analysis

From using the raw data and some feature extraction from the correlation matrix we are able to create a XgBoost model that cab help with anomaly detection with a labelled dataset and basic IQR methods for simple threshold analysis

Future for us includes expanding there dataset to improve the models accuracy and integrating a real time alert system and exploring predictive modelling
Also includes calculating the water index quality of the system being tracked

ANALYSIS

- The data is used to train the XgBoost model to identify deviation from the normal quality parameters
- We use an IQR method to detect the anomalies for initial alert but a XgBoost model then gives the final tell if its an anomaly or not
- Model performance then evaluated using a confusion matrix with a focus of recall and precision