Predicting Aquatic Environment For Fish Species Survival

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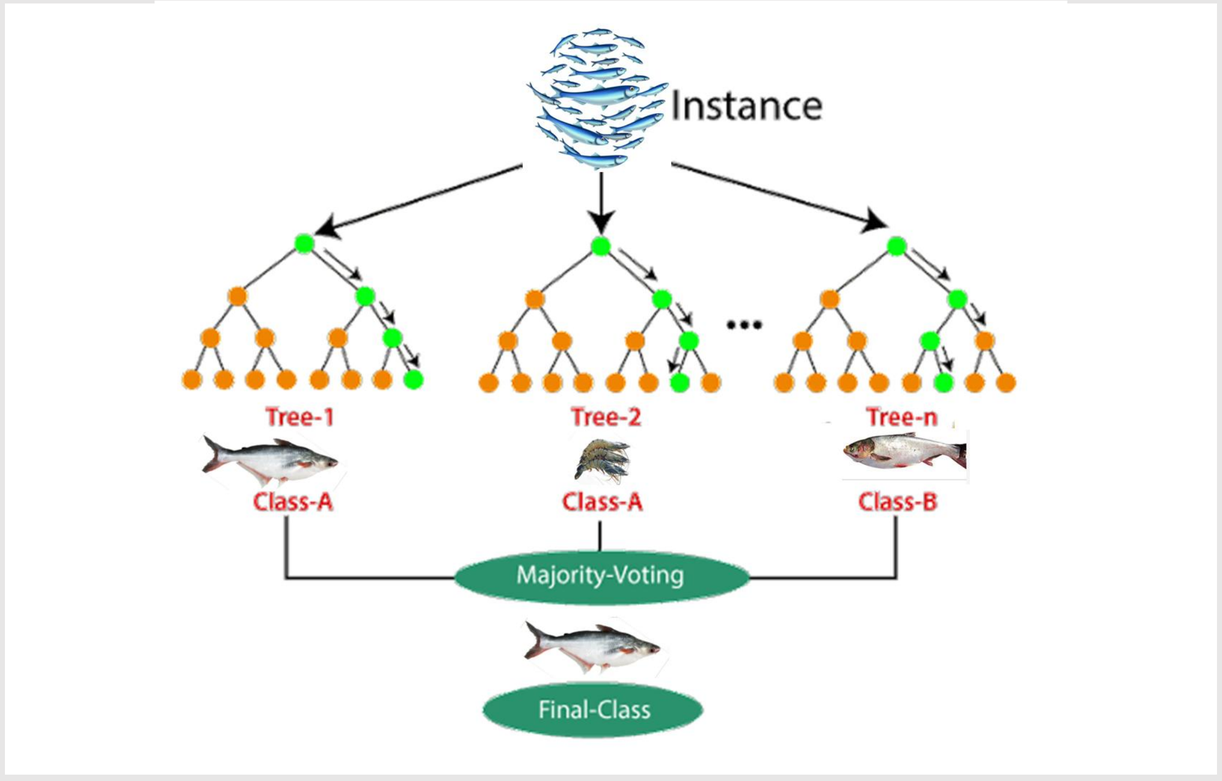
Introduction

This poster represents a hardware and software integrated system that will capable of recommending the most suitable fish species for aquaculture within a specific aquatic environment. Our approach employs a Random Forest (RF) model and is validated using a dataset that includes information on 11 different fish species. The prediction of fish species is based on various environmental characteristics, such as pH, temperature, and turbidity. We also developed a web application for predict fish species and also predict aquatic environment. We have hardware system that gives real time pH, temperature, and turbidity value of an aquatic environment. By using those given data we make decision using ML model.

Objectives

- Real time observation of an aquatic environment using hardware and software.
- Using random forest classification model to predict possible fish species that are more suitable for a specific aquatic environment.
- For a give fish species, we can know what the required condition of an aqua culture through our application.
- We can also store and make our own dataset as we get data continuously from hardware.

Classification Model



In this project we use Random Forest ML model for predicting fish survival in aquatic environments. It handles complex relationships, overfitting, missing data, and provides feature importance. With ensemble learning, scalability, and ease of tuning, it's robust for environmental data analysis, aiding in conservation strategies and ecosystem management.

Training Dataset

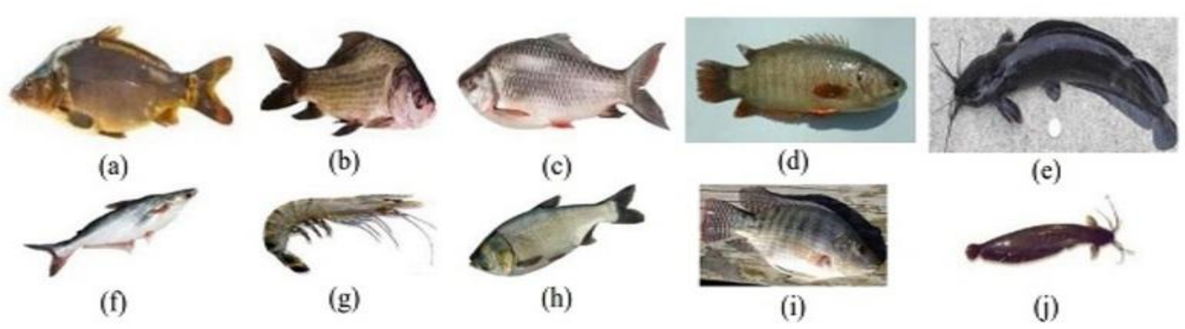
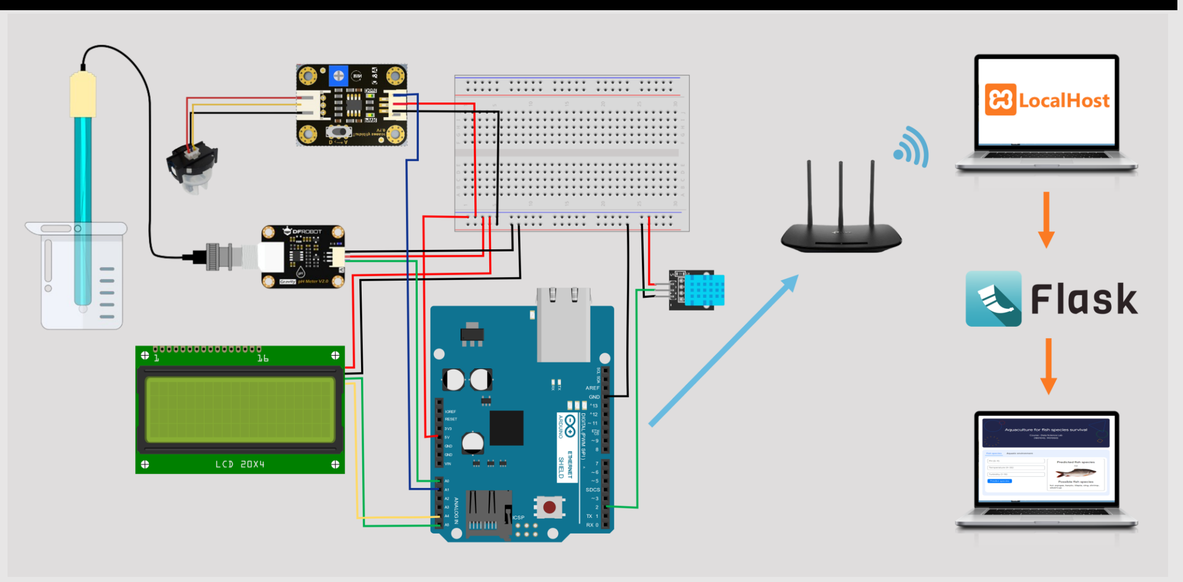


Figure 2. Sample fishes: (a) carpio fish, (b) katla fish, (c) rui fish, (d) koi fish, (e) magur fish, (f) pangas fish, (g) prawn fish, (h) silver carp fish, (i) tilapia fish, and (j) shing fish

For training our model we use existing dataset collected from Kaggle named “Real-Time Pond Water Dataset for Fish Farming”. This dataset has 4 columns and 591 rows. They are- pH, Temperature, Turbidity, and Fish. Here fish is the target variable and others are the independent variable. There are 11 fish categories, 86 pH distinct values, 46 temperature distinct values, and 85 Turbidity distinct values.

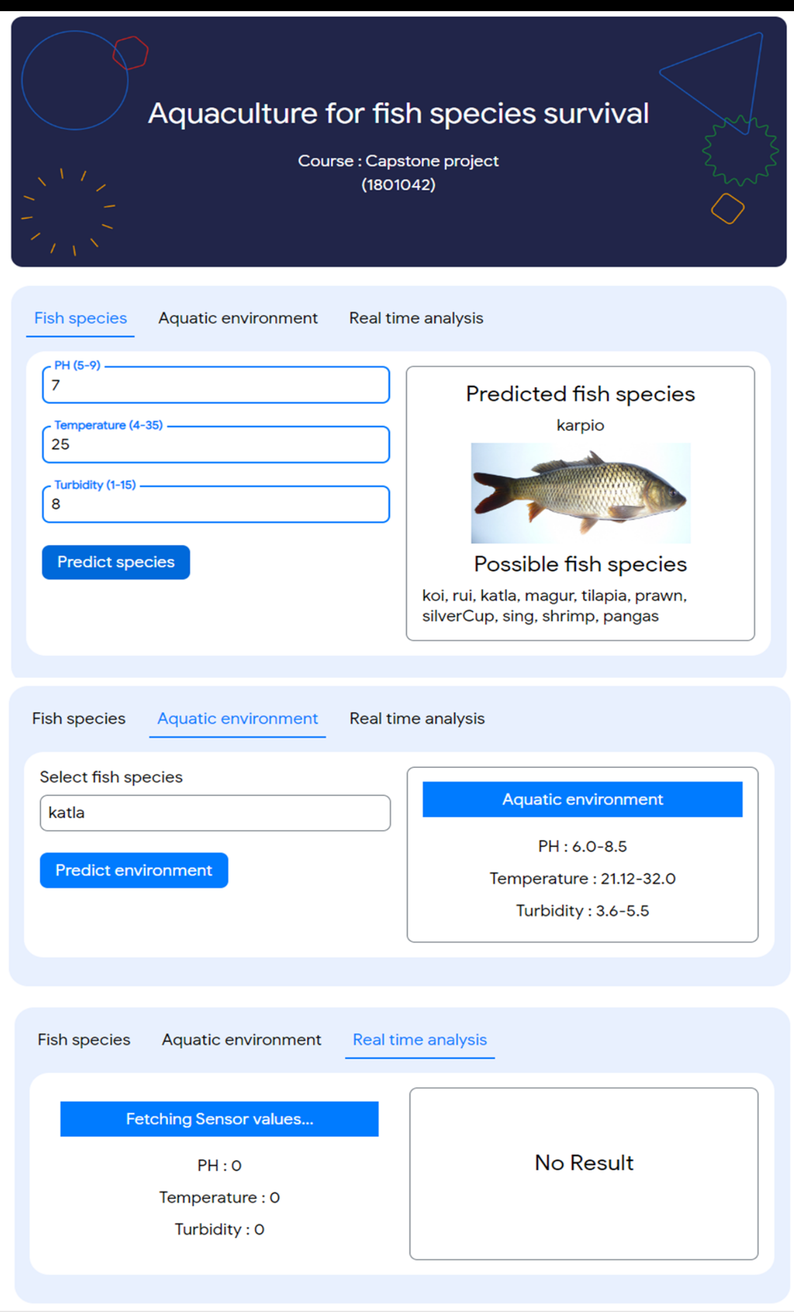
Circuit diagram and Workflow



Used Web Technologies

In our project we integrate hardware with software. In our web application we make our frontend using Html, CSS and JS, and in backend we use flask. For storing hardware data we use MySQL in local xampp server. Then using flask we read the data and apply random forest model to predict fish species. Our application also can show real time aquatic environment values.

Web application interface



Conclusion

We hoped that our project will give good services to our expected users as we do our best to make this applications as a useful tool for fishery sector. We developed this application using all latest technology and apply our working experience to make this application much better both in UI and its backend. And at last we hope for a best outcome.