Aquatic Catch Predictor.

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Motivation and Objectives.

Develop a portable device to predict fish activity and suggest optimal fishing spots.
Simplify and enhance the fishing experience using data-driven insights.

Who cares? Why does it matter?

- Recreational and competitive anglers seeking to improve their skills and catch rates.
- Saves time and resources, leading to a better fishing experience.

Goals and Deliverables:

- Design a low-power, user-friendly prediction system integrating weather, GPS, and sensors.
- Deliver a working prototype with an evaluation report demonstrating prediction accuracy and user impact.

Technical Approach and Novelty.

Limitations of current fishing forecast application:

- Current systems primarily rely on traditional knowledge and weather forecasts (No data-backed evidence).
- Often require a smartphone and internet connectivity, limiting their usability in remote fishing locations.

Approach:

- Integrate real-time weather data from environmental sensors(temperature, pressure and water activity), GPS.
- Use machine learning model (classification) to predict fishing success.
- Low power consumption and more accessible(no internet needed).

What's New:

- Real-time Data Integration: Combines multiple environmental factors for accurate predictions.
- Data-Driven Fishing Recommendations: Utilizes classification techniques to guide anglers.

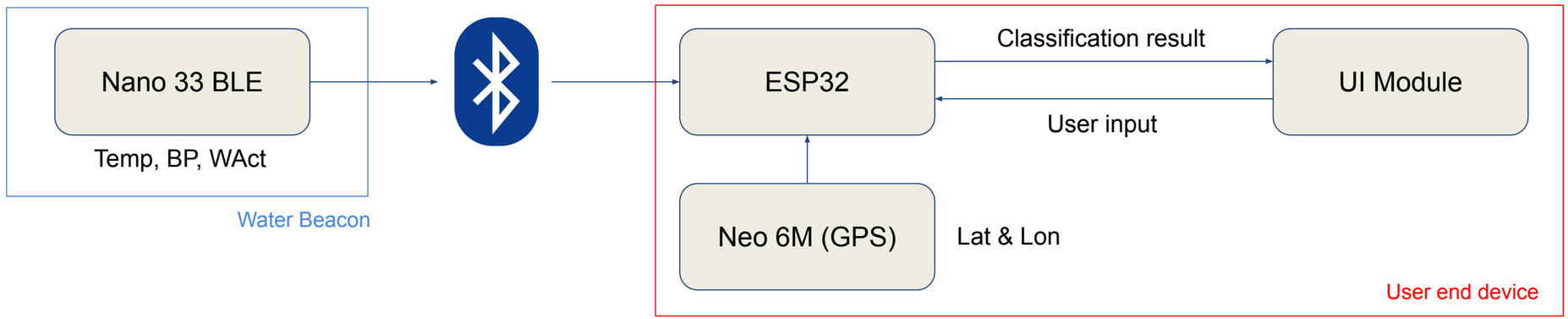
Methods.

Data Collection:

- Three people with different skill level to collect data (fish bites/half hour).
- Collectors exchange location every 10 minutes, each test point includes data from each collector (objective).

Platforms:

- Arduino Nano 33 BLE (Water Beacon)
- ESP-WROOM-32 (User end device)
- Arduino IDE (MCU), Python (Decision tree)



Evaluation and Metrics.

Prediction Accuracy:

- Use Mean Squared Error (MSE) to measure the accuracy of the regression model’s predictions for fish activity.

Fishing Success Rate:

- Compare the number of fish caught when users follow the device’s recommendations versus traditional fishing methods (e.g., trial and error or experience-based decisions).
- Conduct controlled experiments by dividing participants into two groups:
  - Group A uses the device.
  - Group B uses traditional methods.
- Record metrics such as:
  - Average catch per hour.
  - Time taken to catch the first fish.
  - Overall satisfaction with the fishing experience.

Current Status and Next Steps.

Current:

- 90 data points are collected (18 data points left)
- Water beacon finished, used in data collection
- Prototype user end device is built and tested

Future:

- Develop a 3D model for the user-end device that can be easily installed on a variety of fishing rods, ensuring compatibility and convenience for users.
- Finalize the remaining 18 data points to ensure a robust and comprehensive dataset for model training.
- Train the decision tree model using the collected dataset and implement the optimized algorithm on the user-end device for real-time predictions.
- Conduct thorough tests to evaluate the device’s performance.
    - Compare the results with traditional fishing methods, focusing on metrics like fishing success rate and user satisfaction to validate the device’s effectiveness.