Machine Learning-Based Study: Distinguishing Sea Otters from River Otters

Project Overview:

- **Project Name:** Machine Learning-Based Study to Distinguish Sea Otters from River Otters
- **Duration:** Jun 2022 - Sept 2022

Abstract: This project focuses on leveraging machine learning techniques to distinguish between sea otters and river otters. Through the collection of a comprehensive dataset and the deployment of advanced models, the study aims to contribute to wildlife conservation efforts.

Introduction: Sea otters and river otters, despite their visual similarities, play distinct roles in ecosystems. The ability to reliably differentiate between these species is crucial for effective conservation strategies. This project employs cutting-edge machine learning techniques to address this challenge.

Methodology:

Data Collection:

- Gathered a diverse dataset encompassing images of both sea otters and river otters.
- Ensured dataset quality and diversity to enhance model generalization.

Model Training using MobileNetV2:

- Utilized the MobileNetV2 architecture for training a robust classification model.
- MobileNetV2 is chosen for its efficiency and suitability for deployment on resource-constrained devices.

Model Deployment to ESP32:

- Successfully deployed the trained models to ESP32, demonstrating recognition accuracy of 96.63%.
- The deployment to ESP32 facilitates real-time recognition in field scenarios.

Key Findings: The machine learning model, based on MobileNetV2, exhibited a high accuracy rate in distinguishing between sea otters and river otters. The practical deployment on ESP32 devices underscores the feasibility of utilizing this technology in the field for wildlife protection.

Outreach and Collaboration: In an effort to contribute to wildlife protection, communication with animal protection organizations has been initiated. The goal is to explore opportunities for deploying the developed equipment in the field, enhancing monitoring and conservation efforts.

Conclusion: The successful application of machine learning techniques to distinguish sea otters from river otters marks a significant step toward effective wildlife conservation. The high accuracy achieved in real-world scenarios and ongoing collaborations with animal protection organizations highlight the potential impact of this project on the protection of these vulnerable species.

Future Directions: Continued research will focus on refining the model, expanding the dataset, and fostering collaborations to deploy the technology in the field. The ultimate aim is to create a scalable and effective solution for the conservation of sea otters and river otters.