Identification of Sri Lankan Commercial Fish Species Using MobileNet SSD and Deep Learning

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Abstract: Accurate identification of commercial fish species is essential for sustainable fisheries management, ecological conservation, and market regulation in Sri Lanka, which is home to over 90 commercially significant species. This research addresses the challenge of fish species detection by developing an efficient and accessible deep learning-based solution. The primary objective is to create a robust model that can accurately differentiate among multiple fish species and provide a practical tool for users in real-world settings. The study employs the MobileNet Single Shot MultiBox Detector (SSD), a lightweight and computationally efficient deep learning model optimized for mobile and edge device deployment. Trained on a curated dataset of images covering 27 fish species, the model achieved 81% accuracy. A mobile application was developed to facilitate real-time species identification, allowing users to capture or upload images for detection, with processing times ranging from 1 to 10 seconds, depending on internet connectivity and image size. The findings demonstrate that the MobileNet SSD model effectively balances accuracy and computational efficiency, making it ideal for mobile applications. Future enhancements will focus on expanding the model's coverage to additional species, enriching the training dataset, and optimizing the model to run directly on mobile devices to minimize detection time and enhance user experience.