



Multiclass Fish Image Classification

Deep Learning Project using
TensorFlow & Streamlit

By: Kanish Midhun K



Project Overview

- A deep learning pipeline for classifying multiple fish species.
- Implemented CNN (scratch) and Transfer Learning models (VGG16, ResNet50, MobileNetV2, EfficientNetB0).
- Trained on dataset with 10K+ fish images.
- Deployed as Streamlit web app.



Dataset

- Data directory structure:
 - data/train, data/val, data/test
- Classes: 11 fish species (bass, trout, shrimp, etc.)
- Augmentations: rotation, zoom, shear, horizontal flip, rescale 1./255

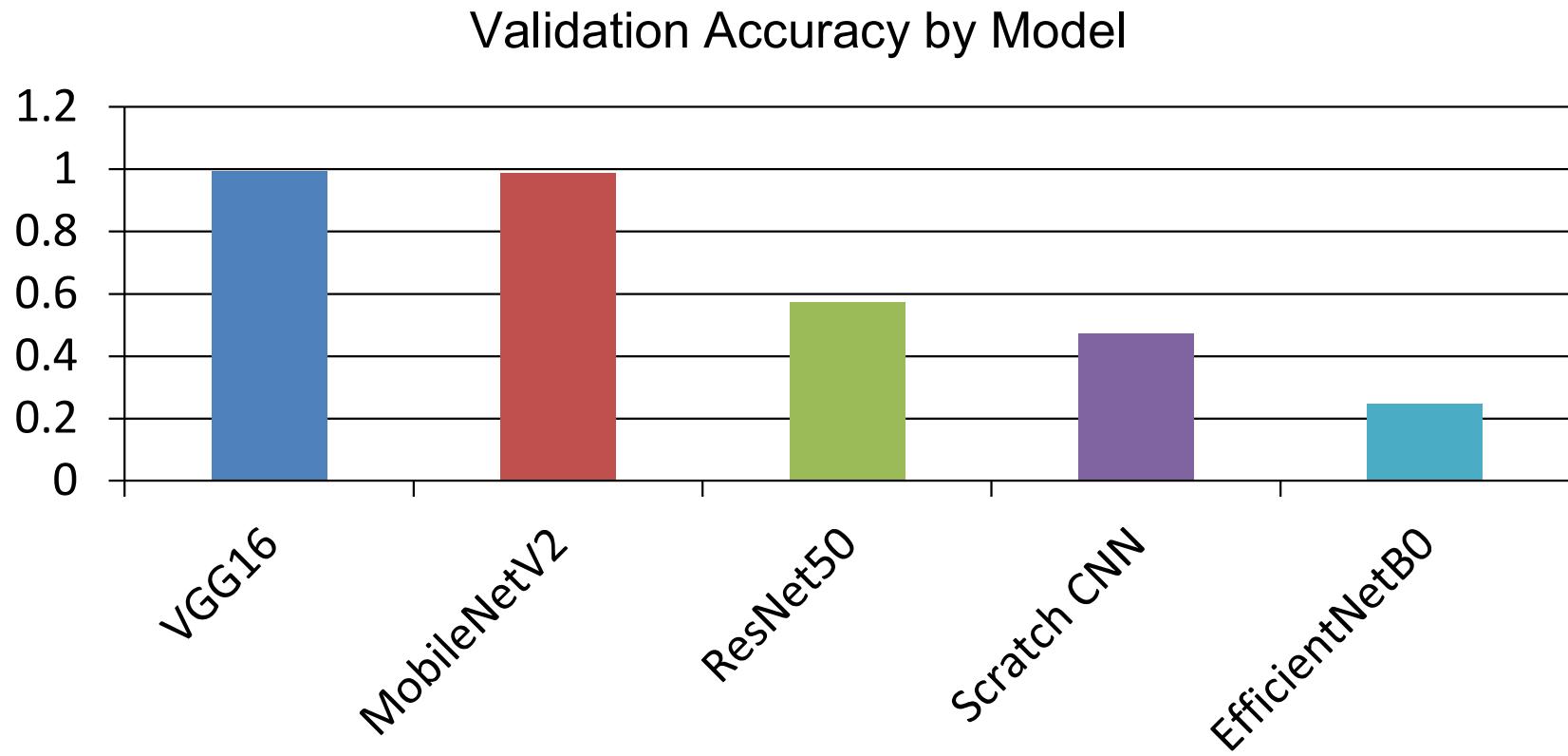


Models Used

- Scratch CNN
- VGG16 (Transfer Learning)
- ResNet50 (Transfer Learning)
- MobileNetV2 (Transfer Learning)
- EfficientNetB0 (Transfer Learning)

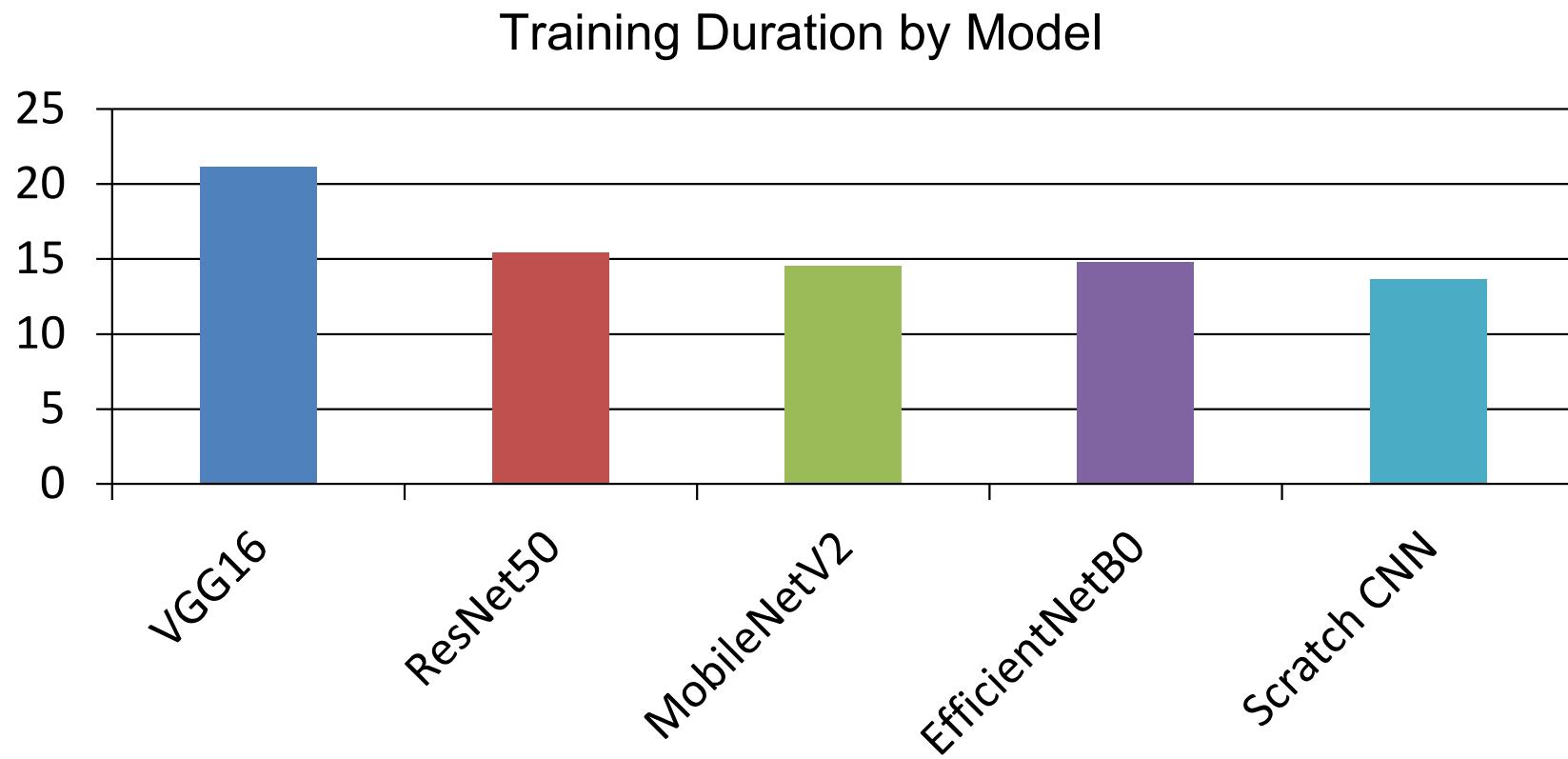


Model Accuracy Comparison





Training Time Comparison





Streamlit Web App

- Upload fish image (.jpg/.png)
 - Choose model (.h5) from sidebar
 - Displays predicted fish class + confidence
 - Shows top-3 predictions
 - Deployed via Streamlit + Ngrok (Colab-ready)
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- App file: app/streamlit_app.py



Insights

- Transfer learning dominates performance.
- VGG16 gives near-perfect 99% accuracy.
- MobileNetV2 balances accuracy & speed.
- Scratch CNN limited; EfficientNet overfits.
- Data augmentation critical for generalization.



Future Improvements

- Fine-tune EfficientNet layers for better convergence.
- Add Grad-CAM visual explainability.
- Deploy on TensorFlow Lite / Flask API / Streamlit Cloud.
- Expand dataset for more fish species.



Contact

- Kanish Midhun K
- Email: kanishmidhun.17@gmail.com
- GitHub: github.com/KanishMidhun
- Developed using TensorFlow & Streamlit