PROJECT REPORT

Dog Breed Identification Using Transfer Learning

1. Introduction :

This project develops an AI-based system to classify dog breeds from images using transfer learning. A pre-trained VGG19 CNN is fine-tuned on a dataset of dog breed images to achieve accurate recognition.

2. Problem Statement:

Manual dog breed identification is difficult and error-prone, especially for mixed breeds. The goal is to automate breed recognition using deep learning for applications in adoption platforms, lost dog recovery, and veterinary support.

3. Objectives :

- Build a transfer learning model using VGG19 for dog breed classification.
- Preprocess and augment dog breed image dataset.
- Evaluate model performance using accuracy and confusion matrix.
- Deploy the trained model in a Flask web application for real-time predictions.

4. Tools and Technologies:

- Python
- TensorFlow / Keras
- OpenCV
- Flask
- HTML/CSS
- Jupyter Notebook
- Git & GitHub

5. Dataset Source:

Kaggle Dog Breed Identification dataset.

The project uses 20 dog breed classes organized into separate folders for training and testing.

6. Project Workflow:

- Data Collection and folder organization by breed.

- Image preprocessing and augmentation using ImageDataGenerator.
- Model building with pre-trained VGG19 and custom classification layers.
- Training, validation, and evaluation of the model.
- Saving the trained model as dogbreed.h5.
- Flask integration with UI for uploading images and viewing predictions.

7.Folder Structure:

8. Results:

The trained model achieves high accuracy in identifying dog breeds. Users can upload an image through the Flask web interface and instantly receive the predicted breed label.
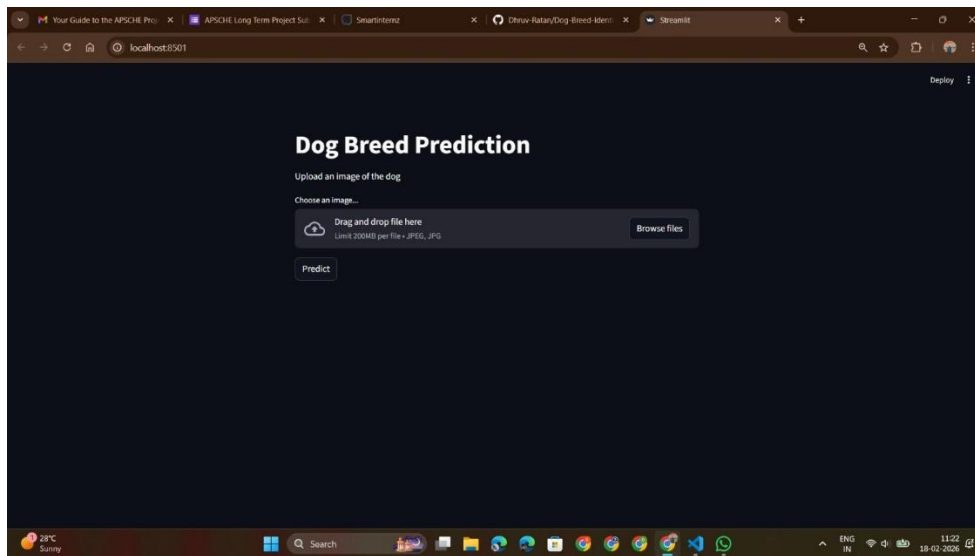
9. Conclusion:

This project demonstrates the effectiveness of transfer learning for multi-class dog breed recognition. The deployed web application provides an easy-to-use tool for real-world pet-related applications.
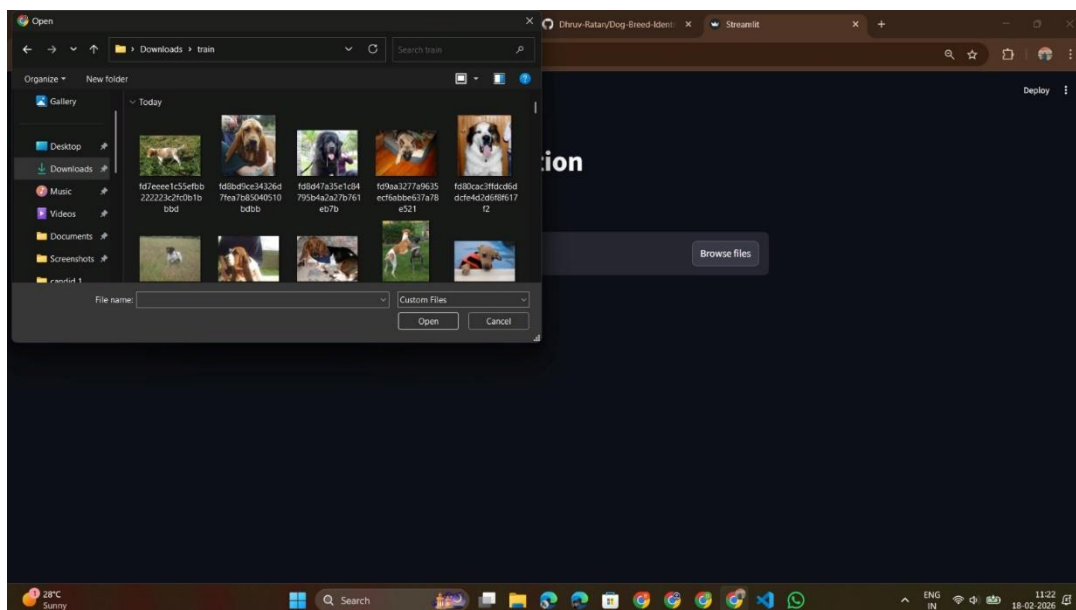
10. Future Work

- Increase the number of dog breeds supported.
- Improve accuracy using deeper architectures or ensemble models.
- Deploy the application on cloud platforms for public access.
- Add confidence score visualization in UI.
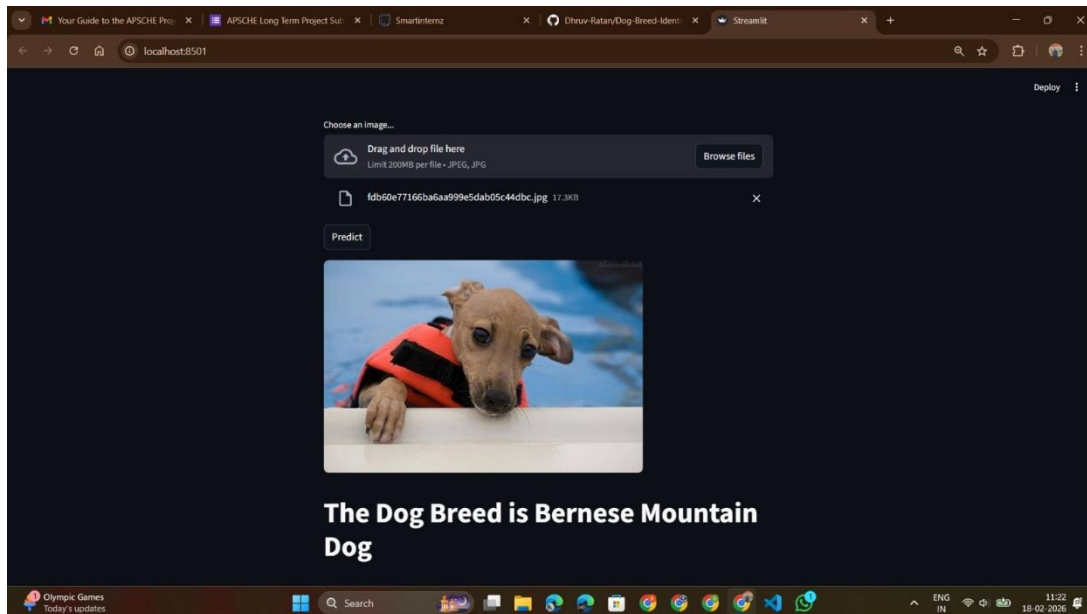
Show Case ScreenShots:

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- Allows the user to upload dog images (JPEG/PNG) through the Flask web interface.
- Provides a simple and user-friendly layout using HTML and CSS.
- Accepts image files directly from the user's local device storage.
- Sends the uploaded image to the backend for preprocessing and prediction.
- The trained VGG19 transfer learning model analyzes the image and identifies the dog breed.
- Prediction results are displayed instantly on the output page with the predicted breed label.
- Enables real-time dog breed recognition for practical applications such as pet adoption and veterinary support.

- Triggered when the user clicks the Predict button.
- The trained MobileNetV2 model processes and classifies the image.
- Uploaded image is sent to Flask backend.
- Prediction happens in real-time with fast response

- Displays the uploaded dog image preview along with the predicted breed label.
- The trained VGG19 transfer learning model analyzes the image and classifies the dog breed accurately.
- Prediction result is shown instantly on the output screen after clicking the Predict button.
- Provides real-time breed identification with a user-friendly interface.
- Predicted breed output example: Bernese Mountain Dog.
- Helps users quickly recognize dog breeds for applications in pet adoption, veterinary support, and animal welfare.
- Ensures visual confirmation by showing both the uploaded image and the predicted class name.