**Project Title:** Dog Image Classifier using Transfer Learning

**Problem Statement:** The objective of this project is to develop a machine learning model that can automatically classify whether an uploaded image contains a dog or not. The model leverages transfer learning using a pretrained MobileNet model trained on ImageNet, repurposed for binary image classification (dog vs. not-dog). This addresses the challenge of accurately detecting dogs in user-submitted images with limited data and computational resources.

**Modeling Approach:**

* **Transfer Learning:** Used MobileNet with include\_top=False to remove the original classifier.
* **Custom Head:** Added Flatten layer, Dense layer with ReLU activation, and final Dense layer with linear activation for regression or sigmoid for binary classification.
* **Compilation:** Compiled with Adam optimizer and binary crossentropy loss function for classification.
* **Training:**
  + Scaled input images using MobileNet's preprocessing function.
  + Used model.fit() with early stopping and validation split.
  + Trained initially with frozen base model and optionally fine-tuned last layers.

**Applications:**

* Photo tagging in personal libraries or social media
* Pet adoption/rescue platforms to detect dog images
* Smart home camera systems for pet monitoring
* E-commerce filtering for pet-related listings

**Conclusion:** This project demonstrates how transfer learning enables rapid development of accurate and efficient image classifiers using limited data. The model is lightweight, easy to deploy, and adaptable to various real-world scenarios.

**Saved Model File:** dog\_classifier\_model.h5