Cat vs Dog Classifier - CNN Web App

This project is a full-stack web application that uses a **Convolutional Neural Network (CNN)** to classify uploaded images as either a **cat** or a **dog**.

Overview

Users can upload an image (JPG/PNG), and the system will classify it as either a cat or dog using a trained deep learning model. The model is served through a **Flask backend**, and the interface is built with HTML, CSS, and JavaScript. The app is deployed and hosted publicly for anyone to try.

Neural Network Architecture

The CNN model was built using **TensorFlow/Keras** and trained on a dataset of over **50,000 images** from the Kaggle Dogs vs. Cats dataset.
The model takes a **128×128 RGB image** as input and outputs a binary classification (0 = Cat, 1 = Dog).

Model Summary:

Layer (Type)	Output Shape	Parameters
Conv2D (32 filters)	(126, 126, 32)	896
MaxPooling2D	(63, 63, 32)	0
Conv2D (64 filters)	(61, 61, 64)	18,496
MaxPooling2D	(30, 30, 64)	0
Conv2D (128 filters)	(28, 28, 128)	73,856
MaxPooling2D	(14, 14, 128)	0
Flatten	(25088,)	0
Dense (128 units)	(128,)	3,211,392
Dropout (0.5)	(128,)	0
Dense (1 unit)	(1,)	129

- **Total Parameters:** 3,304,769
- **Activation Functions:** ReLU (hidden layers), Sigmoid (output layer)
- **Loss Function:** Binary Crossentropy
- **Optimizer:** Adam
- **Accuracy:** ~80% on validation set

Tech Stack

- **Frontend:** HTML, CSS, JavaScript
- **Backend:** Python, Flask
- **Model:** TensorFlow / Keras (`.h5` model file)
- **Deployment:** Render.com
- **Version Control:** Git & GitHub

Features

- Upload and classify image as Cat or Dog.
- Clean, responsive frontend layout.
- Uses a deep learning model trained on real-world images.
- Fast prediction with visual feedback.
- Deployed online, accessible via browser.

📁 Project Structure for Render Deployment

```
cat-vs-dog-classifier/
│
├── app.py                # Flask backend logic
├── catVdogCNN.h5         # Trained CNN model
├── requirements.txt      # Python dependencies
├── static/               # Static files: CSS, JS, images
│   ├── style.css
│   └── script.js
├── templates/            # HTML template
│   └── index.html
```

🌐 Live Demo

🔗 Try the App Live