**PBEL Virtual Internship**

# Project Title: Image Classification of Cats and Dogs using CNN


## Submitted By:

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## Submitted To:

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# Declaration

I hereby declare that this project report titled “Image Classification of Cats and Dogs using CNN” is a result of my own work carried out during the IBM PBEL Virtual Internship. The project is original, and no part of it has been copied or submitted elsewhere for any other course or internship.

# Acknowledgement

I would like to express my heartfelt gratitude to my Project guide, Mr. Deepanshu Kumar for their valuable support, guidance, and encouragement throughout the project. Their constructive feedback and constant motivation helped me complete this internship successfully.

I also extend my sincere thanks to the IBM PBEL team for offering this incredible opportunity to gain practical experience. My appreciation also goes to my college, KCC Institute of Technology and Management, and my peers who supported me during the course of this internship.

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# 1. Introduction

The project titled “Image Classification of Cats and Dogs using CNN” was developed as part of the IBM PBEL Virtual Internship to gain hands-on experience in deep learning and image classification using Convolutional Neural Networks. The aim of the project is to accurately classify images into either cat or dog categories based on visual features.

The CNN model is trained on a dataset of labeled cat and dog images. The model learns to extract and differentiate features such as fur texture, ear shape, and body outline. Once trained, it can predict the label of unseen images with high accuracy.

## 2. Technologies Involved

• Python – Core programming language.

• TensorFlow/Keras – For building and training the CNN model.

• OpenCV – For image preprocessing and loading.

• Jupyter Notebook – For running the model code.

• NumPy & Matplotlib – For data manipulation and visualization.

• Google Colab – Cloud platform used for model training.

## 3. Problems Faced & Solution Implementation

◈ Dataset Imbalance
Problem: Unequal number of cat and dog images.
Solution: Applied data augmentation to balance the dataset and improve generalization.

◈ Overfitting
Problem: Model performed well on training data but poorly on validation.
Solution: Implemented dropout layers and early stopping techniques.

◈ Image Quality
Problem: Varying resolutions and lighting in images.
Solution: Standardized all images to a fixed resolution and normalized pixel values.

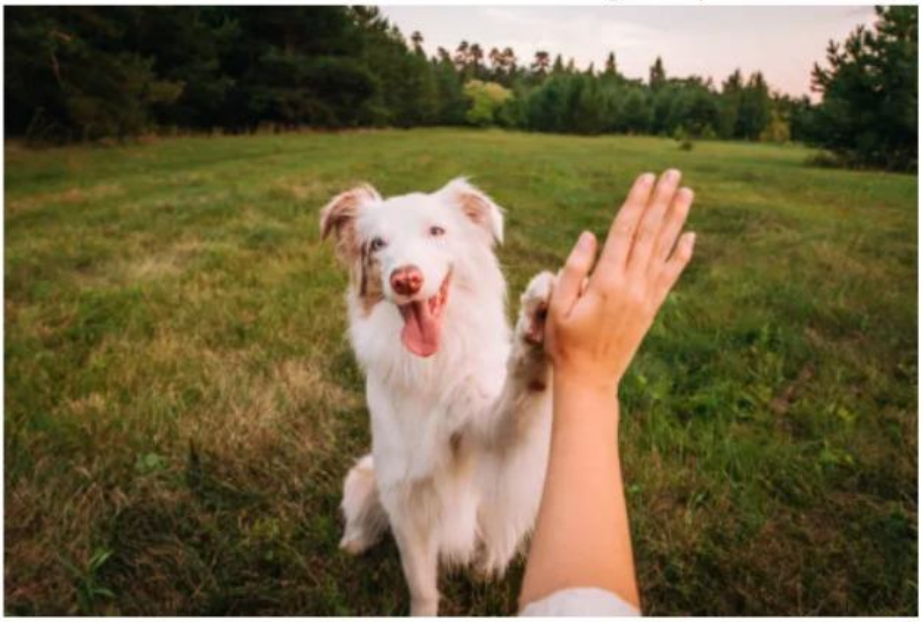
## 4. Sample Output

Sample output of model classification:

In [24]:

```
predict_image('/content/dog.webp')
```

Prediction for: /content/dog.webp



```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 39ms/step
Prediction Score: 0.60810685
MY MODEL SAYS IT'S A DOG!
```

In [30]:
```
predict_image('/content/dog2.webp')
```


```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 51ms/step
Prediction Score: 0.61289454
MY MODEL SAYS IT'S A DOG!
```

In [22]:

```
predict_image('/content/cat1.webp')
```

Prediction for: /content/cat1.webp

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 846ms/step
Prediction Score: 0.2946524
MY MODEL SAYS IT'S A CAT!
```