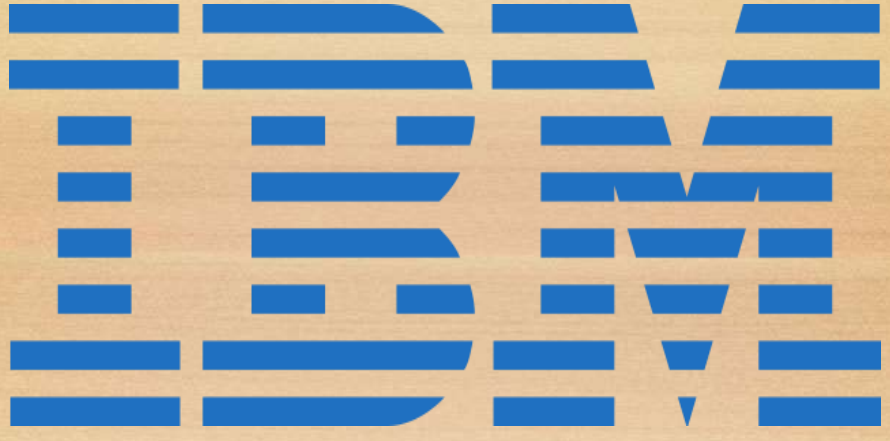

PBEL Virtual Internship

Project Title: Image Classification of Cats and Dogs using CNN

Submitted By:

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College: United college of engineering and research

Submitted To:

Name: Mr. R Devnath

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, United College of Engineering and Research, Prayagraj, and my peers who supported me during the course of this internship.

Table of Contents

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.

Features

- To build a CNN model that can accurately distinguish between images of cats and dogs.
- To understand how CNN layers work.
- To evaluate model performance using accuracy and sample predictions.

Advantages

- Automatic feature extraction
- High accuracy with large datasets
- Scalable and robust
- Support for transfer learning

Disadvantages

- Requires large amount of data
- Needs high computational power
- Difficult to interpret (black box)
- Takes time to train

2. Technologies Involved

- Python - Main programming language
- TensorFlow/Keras - For building CNN
- NumPy, Pandas - Data handling
- Matplotlib - For plotting
- OpenCV/PIL - For image processing

3. Problems Faced & Solution Implementation

- Imbalanced dataset
- Overfitting during training
- Slow training on CPU
- Low-quality or mislabeled images
- Solutions Implemented
- Used data augmentation
- Applied dropout layers
- Normalized and resized images
- Used GPU via Google Colab

Future Scope

- Use advanced models like Res-Net
- Deploy as a web/mobile app
- Expand to multi-class classification

Conclusion

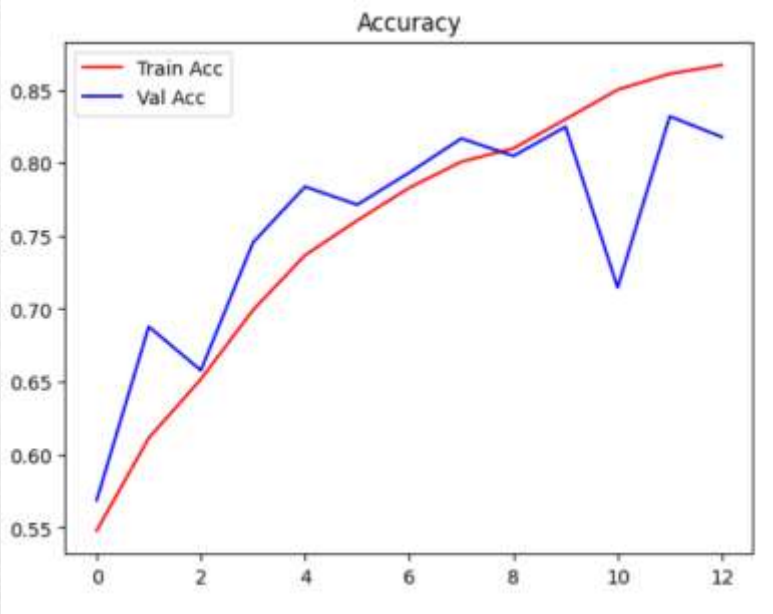
- CNN is effective for image classification
- Achieved good accuracy and generalization
- Demonstrated real-world application

References

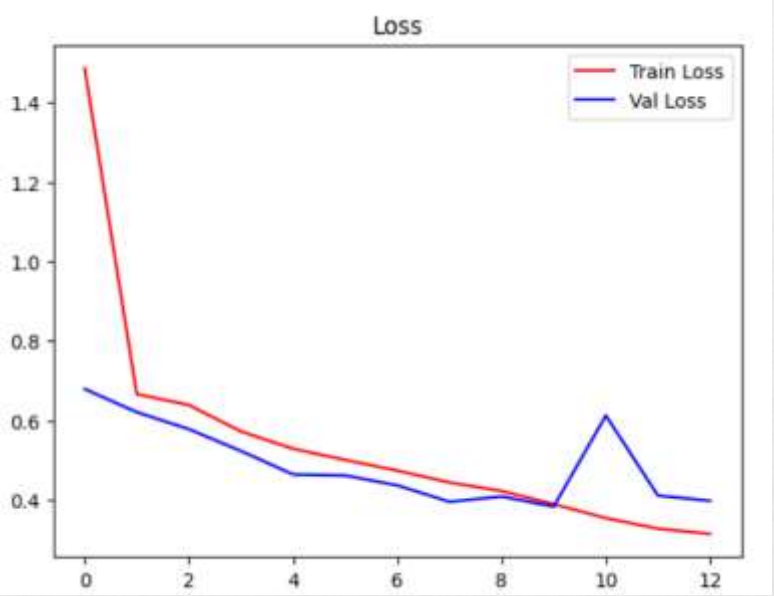
- Kaggle Dataset
- TensorFlow & Keras Docs
- IBM Cloud Resources

Accuracy and Loss Graphs

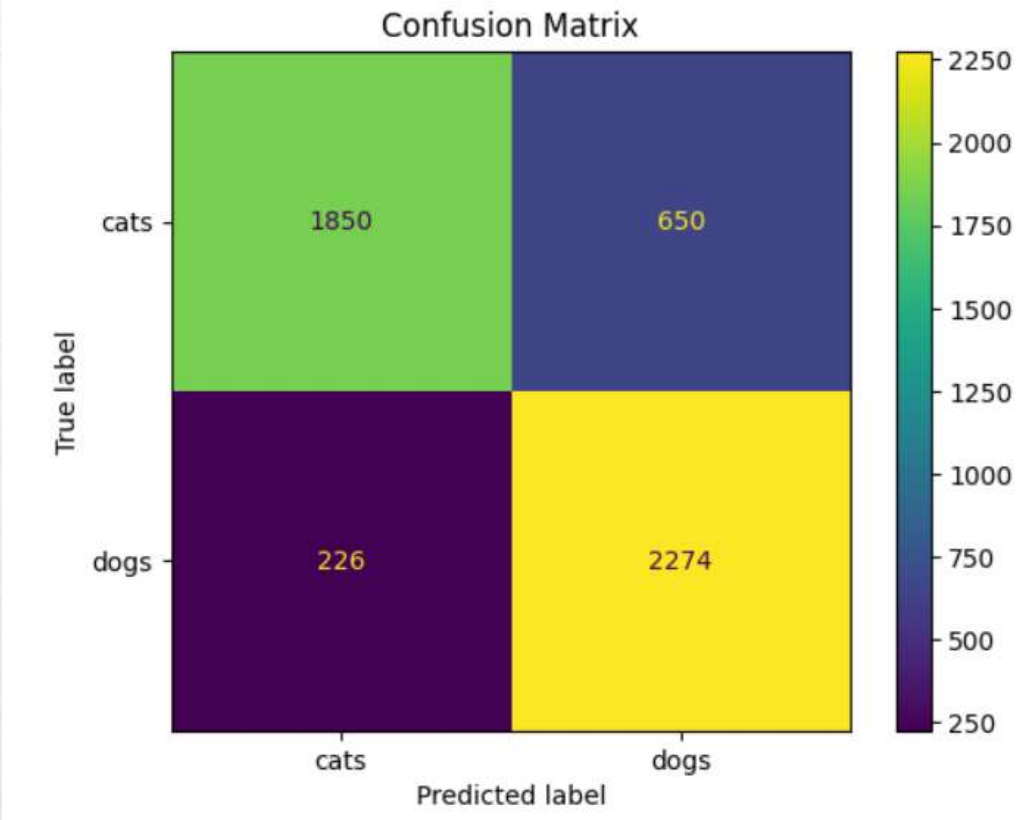
Accuracy



Loss



Confusion Matrix



4. Output Screenshot

Prediction for: /content/cat-1.jpeg

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 866ms/step
Prediction Score: 0.1362586
MY MODEL SAYS IT'S A CAT!
```

Prediction for: /content/download.jpeg


```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 43ms/step
Prediction Score: 0.8058591
MY MODEL SAYS IT'S A DOG!
```

Prediction for: /content/cat2.jpeg

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 36ms/step
Prediction Score: 0.3738218
MY MODEL SAYS IT'S A CAT!
```

Prediction for: /content/img2.jpeg

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 52ms/step
Prediction Score: 0.78028667
MY MODEL SAYS IT'S A DOG!
```

THANK YOU