Image processing
Phase 2

PROJECT PROPOSAL

Prepared by:

Enas abdulaziz alharbi 2110329
Roaa Adel 2111015
Riham mohammed 2110278

Prepared for:
Inst.Latifa

ABSTRACT:

In our project, we implement a Convolutional Neural Network (CNN) tailored for the classification of dog and cat images. Leveraging CNN's architecture, including convolutional, pooling, and fully connected layers, we aim to achieve high accuracy in distinguishing between the two classes. Our study focuses on optimizing preprocessing techniques to enhance model performance and prevent overfitting. Through rigorous experimentation on a comprehensive dataset, we evaluate the CNN's efficacy in image classification. Results demonstrate its robustness and potential for real-world applications. By contributing to the advancement of CNN-based image classification, our project underscores the significance of deep learning in solving complex visual recognition tasks.

INTRODUCTION:

In the realm of computer vision, accurately classifying images, particularly distinguishing between dogs and cats, poses a significant challenge. Despite strides in machine learning, the subtle nuances in features make this task intricate. Our study addresses this by focusing on developing a robust image classification model tailored for this purpose. We employ Convolutional Neural Networks (CNNs), renowned for their efficacy in image classification. Our approach emphasizes leveraging CNNs' hierarchical architecture to automatically extract relevant features from raw image data. Additionally, we highlight the significance of preprocessing techniques to enhance model performance. Through thorough experimentation and evaluation, we aim to contribute insights into CNN-based image classification methodologies, advancing the field's understanding and practical application.

EXPERIMENTS:

This project aims to develop and evaluate machine learning models for the classification of images as either cats or dogs. Image recognition is a fundamental task in computer vision with numerous practical applications. By leveraging a dataset of labeled images containing pictures of cats and dogs, we will explore various machine learning techniques and architectures to build accurate classifiers. The results will provide insights into the effectiveness of different approaches in distinguishing between cats and dogs in images.

Dataset: The experiment will utilize the "Cats and Dogs" dataset, which comprises thousands of labeled images of cats and dogs. This dataset is commonly used in image classification tasks and is publicly available from sources like GitHub. Each image is labeled as either a cat or a dog, allowing supervised learnin algorithms to be trained on the data.

In this project, we propose an image classifier that leverages convolutional layers, pooling layers, and a flattening layer for efficient and accurate image classification. a powerful architecture specifically designed for image processing tasks. The convolutional layers serve as feature extractors, capturing local patterns and spatial relationships within the input images.

EXPERIMENTS:

Pooling layers are employed to sample the feature maps generated by the convolutional layers. Following the pooling layers, a flattening layer is applied to transform the multidimensional feature maps into a one-dimensional vector. This flattening process facilitates the connection between the convolutional layers and subsequent fully connected layers, enabling the network to learn high-level representations of the extracted features.

To evaluate the performance of our image classifier, we employ a benchmark dataset consisting of a large number of labeled images from diverse categories. We train the model using a combination of supervised learning and backpropagation, We employ appropriate techniques for regularization and optimization to enhance the model's performance and prevent overfitting.

CONCLUSION:

In summary, our investigation into utilizing Convolutional Neural Networks (CNNs) for dog and cat image classification has yielded promising results. Through methodical experimentation and meticulous evaluation, we've showcased the efficacy of CNNs in accurately distinguishing between these two classes. By harnessing CNNs' hierarchical structure and implementing preprocessing strategies, we've achieved commendable performance in image classification tasks. These findings not only affirm the potency of CNNs in computer vision but also highlight their practical utility in real-world applications. Looking ahead, continued exploration and refinement of CNN-based approaches hold immense potential for advancing the field of image recognition and its manifold applications.

REFRENCES:

S. Koirala, “sudarshan-koirala/CNN-for-image-Classification,” GitHub, Mar. 14, 2024. https://github.com/sudarshan-koirala/CNN-for-image-Classification.

“CNN-for-image-Classification/README.md at master · sudarshan-koirala/CNN-for-image-Classification,” GitHub. https://github.com/sudarshan-koirala/CNN-for-image-Classification/blob/master/README.md.

“CNN-for-image-Classification/dataset/test_set at master · sudarshan-koirala/CNN-for-image-Classification,” GitHub. https://github.com/sudarshan-koirala/CNN-for-image-Classification/tree/master/dataset/test_set.

D. Sharma, “CNN For Image Classification | Image Classification Using CNN,” Analytics Vidhya, Jan. 11, 2021. https://www.analyticsvidhya.com/blog/2021/01/image-classification-using-convolutional-neural-networks-a-step-by-step-guide/

TensorFlow, “Convolutional Neural Network (CNN) | TensorFlow Core,” TensorFlow, 2019. https://www.tensorflow.org/tutorials/images/cnn