



COLLEGE OF ENGINEERING

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Machine Learning: Literature review for Cat and Dog recognition

Group assignment

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Literature Review: Dog and Cat Image Recognition with CNNs

This section incorporates insights from a study by Adriyanto et al. (2022) on classifying dog and cat images using a Convolutional Neural Network (CNN) [1]. The paper explores a fundamental CNN architecture with three convolutional layers, ReLU activation, and max pooling for feature extraction. It details the specific kernel sizes, filter numbers, and output dimensions for each layer.

A valuable contribution of this work is its demonstration of core CNN concepts applied to image classification. However, the achieved **accuracy of 45%** on the test dataset is lower than what is typically reported in this domain.

To enrich the literature review, here's a comparative analysis with other relevant aspects:

- **CNN Architectures:** Compared to the three-layer model used in this paper, several studies explore deeper and more complex CNN architectures for cat vs. dog recognition. It's important to investigate how these architectural variations influence performance.
- **Data and Performance:** The paper utilizes a dataset of 2000 images (1000 dog and 1000 cat) for training and validation, with a smaller test set. While data augmentation techniques are employed, the overall dataset size is relatively small compared to other works. Investigating the impact of larger and more diverse datasets on model accuracy is crucial.
- **Evaluation Metrics:** The paper reports accuracy, precision, recall, and F1-score for evaluation. Consideration should be given to how these metrics compare to performance benchmarks established in other studies on cat vs. dog image recognition.
- **Transfer Learning:** Explore how transfer learning with pre-trained CNN models like VGG16 or InceptionV3 compares to training a CNN from scratch as done in this paper. Transfer learning often achieves high accuracy with less training data.

By incorporating these comparative aspects, the literature review gains depth and strengthens the analysis of CNNs for dog vs. dog image recognition. It highlights the effectiveness of CNNs for this task while acknowledging the need for further exploration of advanced architectures, larger datasets, and transfer learning techniques to achieve optimal performance.

References

- [1] A. e. al., "Dog and can iimage recognition with CNN," *Classification of dog and cat images using the CNN*, p. 6, 2022.