Thesis Title	Indoor Scene Classification Using Machine Learning on Object-detection Based Features
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ABSTRACT

The classification of scenes from images is a fundamental task in computer vision, vital for various applications ranging from autonomous driving to surveillance systems. An ongoing challenge in this field is the identification of discriminative features for accurate classification. This study addresses this challenge by comparing the effectiveness of two approaches: object-based feature extraction and deep learning.

We propose a novel methodology that leverages YOLOv3, a state-of-the-art pre-trained model for object detection, to extract object-based features from scene images. By utilizing YOLOv3, we obtain feature vectors representing the presence and characteristics of objects within each scene. These features are then used as input for four distinct machine learning algorithms to classify scenes.

Concurrently, we develop a deep learning model using the original images, which typically requires more computational resources and time for training. We conduct comprehensive experiments to evaluate the performance of both approaches across various scene classification tasks.

Surprisingly, our results demonstrate that simple machine learning models utilizing object-level features achieve comparable performance to deep learning

methods. This finding suggests that focusing on object-based representations can effectively classify scenes while circumventing the resource-intensive nature of deep learning algorithms.

Keywords: Deep learning, Training, Machine Learning Algorithms, Computational Modeling, Object Detection, Feature Extraction, Convolutional Neural Networks