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Image Captioning and Criminal Data Retrieval using Deep Learning and Vision Transformers

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Abstract: *Content-Based Image Retrieval (CBIR) and image captioning have gained significant attention in recent years due to their potential applications in various fields, including law enforcement and criminal investigations. This project aims to develop an intelligent system that combines the power of deep learning models, VGG19 and ResNet50, to facilitate the retrieval and captioning of criminal images based on their visual content. The proposed system will consist of two main components: a ContentBased Image Retrieval (CBIR) system and an image captioning module. The CBIR system will be built using the VGG19 and ResNet50 deep convolutional neural networks, pre-trained on large-scale image datasets. These models have shown exceptional performance in feature extraction and representation learning, making them ideal candidates for image retrieval tasks. In addition to image retrieval, the project will also focus on generating descriptive captions for criminal images using the captioning module. This module will employ an attention-based mechanism to emphasize relevant image regions while generating captions. The captioning model will be trained on a large-scale captioned image dataset to learn the correlation between visual features and textual descriptions. The integration of the CBIR system and the image captioning module will result in a comprehensive tool that not only retrieves similar criminal images but also provides descriptive captions, aiding investigators in understanding the context and content of the retrieved images. This combined approach will significantly enhance the efficiency and effectiveness of criminal image analysis and help law enforcement agencies in identifying suspects and potential connections between different criminal activities.*

Keywords: Machine learning, Deep learning, Neural Network, Convolutional Neural Network, VGG 19, RESNET 50

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