IMAGE CLASSIFICATION USING GRAPH-AUTOENCODERS

PROJECT SYNOPSIS

BACHELOR OF TECHNOLOGY
IN
COMPUTER ENGINEERING

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INTRODUCTION

In a world increasingly inundated with visual data, the need for robust and precise image classification systems has become paramount. From medical diagnostics to autonomous vehicles, and from content recommendation to security, image classification plays a pivotal role in diverse domains. However, the intricacies and complexities of visual data demand novel approaches that can uncover latent similarities and dissimilarities between images.

This project embarks on a journey to explore the fusion of cutting-edge technologies, where the power of graph theory meets the versatility of autoencoders in the realm of image classification. This project also aims to explore the viability of combining graph auto-encoders with a contrastive learning technique which will allow for a completely novel approach to image classification.

MOTIVATION

Images are unstructured data, and traditional image classification models may not consider semantic relationships between different regions of an image. Hence the need for a more complex technology - Graph Autoencoder. Graph autoencoders are well-suited for capturing complex relationships and dependencies in data. Using them for image classification can help uncover intricate patterns that traditional methods might miss.

OBJECTIVE

The primary objective of this project is to develop an image classification model using graph auto-encoders and evaluate its performance in comparison to existing image classification methods. The key steps of the project include data collection, preprocessing, model development, and testing. Once the initial image classification model is created using graph auto-encoders, we will further enhance its capabilities by incorporating contrastive learning techniques.

TOOLS & TECHNOLOGIES

- Hardware - Intel i7 Processor, 16GB RAM configuration laptop
- Language - Python
    - PyTorch library

REFERENCES

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[3] H. Zhang, P. Li, R. Zhang and X. Li, "Embedding Graph Auto-Encoder for Graph Clustering," in IEEE Transactions on Neural Networks and Learning Systems, doi: 10.1109/TNNLS.2022.3158654.

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