CSE 535 Final Project Report

Approach to the Problem:

The problem given was to develop a gesture recognition system that could recognize different hand gestures from videos. We approached this problem by using deep learning techniques and creating a neural network-based model to extract features from images in the video frames and comparing them to a pre-trained model for gesture classification. The approach involved the following steps:

Collecting Data: We collected data for training by recording videos of different hand gestures.
Pre-processing: The videos were pre-processed by extracting frames from them and resizing them to a specific size to fit the pre-trained neural network model.
Feature Extraction: The pre-trained CNN model was used to extract features from the middle frame of each video.
Similarity Comparison: The extracted features were compared with the pre-extracted features of the training dataset using cosine similarity.
Recognition: The gesture with the lowest cosine similarity value was considered as the recognized gesture for the video.
b. Solution:
The approach resulted in a gesture recognition system that can recognize hand gestures from videos. We used the HandShapeFeatureExtractor class to extract features from the images in the video frames. We pre-processed the data by resizing the frames to 300x300 pixels and converting them to RGB format. We used the cosine similarity metric to compare the similarity between the features extracted from the testing videos and the pre-extracted features of the training dataset. The recognized gesture is the one with the lowest cosine similarity value.

In conclusion, our approach to solving the gesture recognition problem was based on deep learning techniques and achieved a high level of accuracy. The solution we developed is effective in recognizing hand gestures from videos, and it can be further improved by training on more data and optimizing the hyperparameters.