

Human Action Recognition using Convolutional Neural Networks (CNN)

Project Description:

- The project aims to build an Image Classification Model using Convolutional Neural Networks (CNN) to classify human activities into 15 different categories. The dataset consists of over 12,000 labeled images, with each image depicting a single human activity. The images are organized into 15 folders, each representing a specific activity class. The model will be trained to recognize activities such as calling, clapping, cycling, dancing, drinking, eating, fighting, hugging, laughing, listening to music, running, sitting, sleeping, texting, and using a laptop. The goal is to accurately classify the activity depicted in each image, leveraging the powerful feature extraction capabilities of CNNs.

Why is it Good?

- Human Action Recognition (HAR) has a wide range of applications, including surveillance, healthcare, human-computer interaction, sports analysis, and entertainment. An effective HAR system can provide valuable insights into human behavior and improve the automation and intelligence of various systems

How Do You Think You Will Do It?

- Data Preprocessing: Organize the dataset into training and validation sets. Also apply data augmentation (rotation, scaling, flipping) to diversify training data. Model Architecture: Design a CNN with multiple convolutional, max-pooling, and fully connected layers. Use dropout regularization to prevent overfitting. Training: Compile the model with the Adam optimizer and categorical cross-entropy loss. Train the model on the training data and validate on the validation set, adjusting hyperparameters as needed. Evaluation: Assess model performance on the test data using accuracy, precision, recall, and F1-score. Conduct error analysis to identify and address misclassifications.

What Data Will You Use?

- The dataset features 15 different classes of Human Activities.
- The dataset contains about 12k+ labelled images including the validation images.
- Each image has only one human activity category and are saved in separate folders of the labelled classes
- Link: [Human Action Recognition \(HAR\) Dataset \(kaggle.com\)](https://www.kaggle.com/datasets/martincervantes/human-action-recognition-har-dataset)

How Will You Evaluate Your System Performance?

- Accuracy, Precision, Recall, F1-score, Confusion Matrix, Cross-Validation and Error Analysis