MACHINE LEARNING ENGINEER NANODEGREE

CAPSTONE PROJECT

TITLE: Asl alphabet

Belal Elsayed Elwikel

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Domain Background

With the recent huge advances in technology, the importance of visual recognition and image processing has significantly increased. As Deep Learning and computer Vision help us better understand images and extract useful information out of them. American Sign Language Alphabet is a natural language that serves as the predominant sign language of Deaf communities in the United States. This can include simultaneously employing hand gestures, movement, orientation of the fingers, arms or body and facial expression the convey a speaker's ideas. Based on the [research](#) and our presence that there is difficulty in the recognition of the American Sign Language alphabet from the images and a model was proposed accurately 83% and we try to provide a model with higher accuracy.

Problem Statement

In the American sign language Alphabet, alphabets can be expressed by moving the hands in a certain way that represent the alphabet. In this project we will be used this dataset to train a model to classify the image with hands sign into its respective alphabet from A to Z using CNN architecture implemented with keras. The goal of this project is to make the classifier capable of taking an images of hand movement and predict its respective alphabet is sing language.

Datasets and Inputs

In this project, I'll be using subset of [this dataset](#), it contains 87,000 images which are 200x200 pixels. There are 29 classes, of which 26 are for the letters A-Z and 3 classes for SPACE, DELETE and NOTHING. so, I will be using good number from each classes to get high accuracy and good predict. Split the dataset of training, testing and validation sets before shuffling the data frame which contains directory of used images **Preview for content of the dataset**

Input: -

Data frame contains Images paths from the directory

Solution Statement

To solve this problem, I will build and train a model that can classify the image into one of the 29 mentioned classes.

I intend to make classifier using Convolutional Neural Network. And if possible, I will use machine learning model like svm. And compare which one is best in performance.

Benchmark Model

I'll using a CNN model to classify the images, I'll benchmark my model against the results presented in this research paper. I'll compare between the performance of my models and use the one with best performance. And I will benchmark my model against other models in Kaggle kernel to check if my score is higher or lower.

Evaluation Metrics

According to dataset description test is randomized and shuffled so I will use accuracy score on test set to evaluate the classifier.

Project Design

In this project, I'll start with the visualizing the dataset and try to get a better insight about the data, then doing preprocessing to the dataset Then, I'll split the data into training, validation and testing sets .After that I'll try model After building the models compare between the their performance to determine which one is better to complete the project

Step 1 : Import Datasets

- **Step 2: Data Exploration**

- **Step 3: Data Preprocessing**

- **Step 4: create Model Architecture**

- **Step 5: Train the Model**

- **Step 6: Test the Model**

- **Step 7: Test the Model on Sample Images**