Sign Language Recognition based on Hands Symbols Classification

Triloki Gupta, Guided by: Dr.S.R.Balasundaram

National Institute of Technology, Tiruchirappalli

trilokicse@gmail.com, blsundar@nitt.edu

Abstract—Understanding the exact context of symbolic expressions is challenging job in the social media until unless it is properly specified. This problem finds a communication gap between the people belonging to different community. Communication is always having a great impact in every domain and how it is considered the meaning of the thoughts and expressions that attract the researchers to bridge this gap for every living being. In this work, we proposed an idea for feasible communication between hearing impaired and normal person with the help of machine learning (SVM, Logistic Regression) & deep learning approach (CNN).

Keywords— Sign Language Recognition (SLR); Indian Sign Language; SVM(Support Vector Machines); CNN(Convolution Neural Network)

Motivation

Sign language is learned by deaf and dumb, and usually it is not known to normal people, so it becomes a challenge for communication between a normal and hearing impaired person. Its strike to our mind to bridge the between hearing impaired and normal people to make the communication easier. Sign language recognition (SLR) system takes an input expression from the hearing impaired person gives output to the normal person in the form text or voice. The system is found useful in the field of confidential, secure communication for training every class of living being. The gestural expressions performed by trainer or hearing impaired person are listed in fig 1 what signify the importance of this work.

Problem Statement

Understanding the exact context of symbolic expressions is challenging job in the social media until unless it is properly specified.

This problem finds a communication gap between the people belonging to different community. Communication is always having a great impact in every domain and how it is considered the meaning of the thoughts and expressions that attract the researchers to bridge this gap for every living being.

Objective

Communication is always having a great impact in every domain and how it is considered the meaning of the thoughts and expressions that attract the researchers to bridge this gap for every living being.

In this work, we proposed an idea for feasible communication between hearing impaired and normal person with the help of –

- Machine Learning,
  - o SVM(Support Vector Machine)
  - o Logistic Regression

- Deep Learning approach
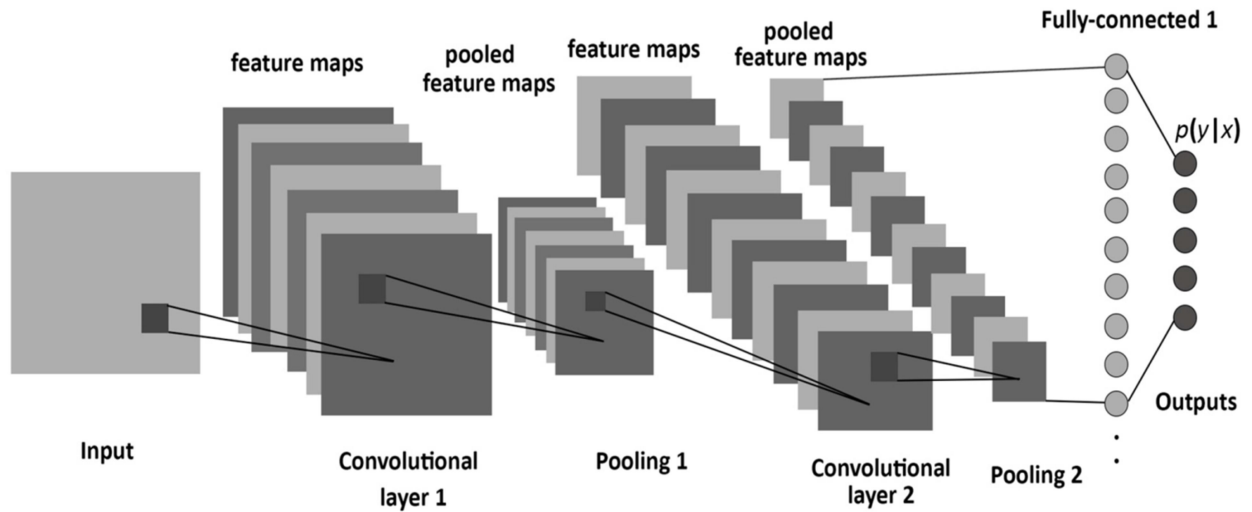 - o CNN(Convolutional Neural Network)

Model(CNN)

Fig. Architecture of Convolutional Neural Network

Steps of Algo

1. Convolution

2. ReLU(rectified linear unit)

3. Max pooling

4. Flattening

5. Fully connected

6. Softmax

Plan of implementation

IDE

- Anaconda:
    - Jupyter
    - Spyder

Packages

- Deep Learning:
    - Keras (Convolution2D, MaxPooling2D, Dense, Dropout, Flattening, ….)
    - TensorFlow
    - matplotlib
- Machine Learning:
    - Scikit-learn(SVM, Logistic Regression, …….)
    - OpenCV, numpy, pandas, matplotlib

About Dataset

- **Benchmark dataset:** Sample

| A | C | E | Q | T | W | Y |

- **Real World Dataset:** Sample

| A | F | L | R | X |

Conclusion

- **Work done so far:**

    - Till now I have completed CNN part with benchmark dataset(Black & White)

- **Work to be done:**

    - Deep Learning(CNN) with real world dataset

    - Machine Learning(Logistic Regression, SVM) with real world dataset

References

[1] Pan, T. Y., Lo, L. Y., Yeh, C. W., Li, J. W., Liu, H. T., & Hu, M. C.(2016, April). Real-time sign language recognition in complex background scene based on a hierarchical clustering classification method. In Multimedia Big Data (BigMM), 2016 IEEE Second International Conference on (pp. 64-67). IEEE.

[2] Naresh Kumar(2017). Sign Language Recognition for Hearing Impaired People based on Hands Symbols Classification. International Conference on Computing, Communication and Automation (ICCCA2017)

[3] Ameen, S., & Vadera, S. (2017). A convolutional neural network to classify American Sign Language fingerspelling from depth and colour images. Expert Systems.