Indian Discern Gestures Using Tensor Flow

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Abstract
Primary means of communication between individuals is communication. Due to their inability to verbally communicate, deaf & dumb individuals are forced to depend on visual means of expression. Numerous languages have been spoken & translated on a global scale. In this context, "Special People" refers to those who have trouble hearing and/or communicating. People who are "The Dumb" or "The Deaf" having trouble hearing or comprehending what another person is saying. Misunderstandings may occur when individuals rely upon lip reading, lip syncing, or sign language to communicate. Our system is designed to assist these persons with unique needs in participating equally in society. Our proposed system captures the video. Splits it into frames. Video frames will be processed by trained model in backend, which will then identify the hand gesture performed by impaired individual. The next step is to translate sign language's meaning into spoken language. The MobileNet convolutional neural network, the TensorFlow library for training & retraining MobileNet, & TensorFlow Mobile Lite for executing the learned model using an Android smartphone are all used in our study.

Keywords: MobileNet, Convolutional Neural Network, TensorFlow, Deaf and dumb

INTRODUCTION

It seems like every day, a new technological advancement is announced that will make people's lives simpler. The advancement of technology has had a huge impact on society. The human species has placed a gear in technological advancement, but they aren't in mood to shift away from it. Artificial intelligence, smart phones, as well as other areas of technology are the subject of extensive study. This study paved the way for brand new innovations that made people's lives simpler. However, studies of deaf & dumb population are far less common. When compared to other fields, this one has received very little coverage. The primary barrier to success for this individual is the inability to communicate with regular people. People who are deaf or dumb have a harder time expressing themselves than the average person. This enormous obstacle makes individuals feel uncomfortable and isolated by society. Deaf & dumb persons are unable to convey their emotions because they fear being misunderstood. In order to keep an open line of communication open, HGRVC system can locate & monitor hand motions of dumb & deaf persons. It is possible to use a webcam for gesture recognition. Following this, pre-processing is used to scale images to usual dimensions. Aim of this work is creating an algorithm which interprets hand gestures as written language. The goal of this project is to utilize a deep learning approach to analyze a collection of still photos of hand gestures, deduce the most likely outcome, and then translate that inference into text. Hand motions are observed as part of the detecting process. The textual output provided by this technology aids in bridging communication gap amongst deaf & people. Like British Sign Language & International Sign, ISL relies on the use of both hands. ● ISL alphabets have been obtained from British Sign Language and French Sign Language alphabets. ● Unlike its American version, which only utilizes one hand, this system use both hands to signify the alphabet. Sign language is visual kind of communication that bridges the gap amongst those who are deaf or hard in hearing. An example of non-verbal communication whereby body movements communicate meaning is the gesture, that can take the shape of a pattern that is either static or dynamic, or both. Sharing ideas and emotions, as well as gaining a mutual understanding of one another, all need effective communication. Disabled individuals, such as those who are deaf or dumb, have a more difficult time expressing themselves via normal speech. Because of this, they have resorted to sign language as a means of communication. But since most individuals don't have any training or expertise with sign language, it might be difficult to interpret. Visual motions and signals that make up sign language are used for communication by deaf & mute. It's an extremely organized code gesture, with clear meanings for each sign. These symbols are used for more than just writing letters and numbers; they can convey typical phrases like greetings and whole sentences. American Sign Language (ASL), British Sign Language (BSL), and Indian Sign Language (ISL) are only few of 143 sign languages now in use across globe. [8]. Similar to how spoken languages vary from place to country, so too does sign language. Due to its widespread use as a teaching medium, American Sign Language (ASL) recognition has already seen significant

development. When compared to ISL, gesture representation in ASL is straightforward since it only requires one hand. ISL is more difficult than ASL since it employs both hands for gesture representation. This fact reduces investment in scientific exploration of the area. With use of Indian Sign Language, this initiative aims to take first baby steps toward building social & communicative bridge amongst able-bodied persons and those with disabilities. Since our project simply focuses upon ISL's alphabet & numbers, it may easily be expanded to include common phrases & words, making it easier for individuals of all abilities to communicate and comprehend one another. This initiative has potential to aid deaf & dumb people by bridging gap between humanity & technological advances in century in which India is making great strides with regard to of digital & technical advancements.

RELATED WORK

In [1],A Saudi SLRSas per CNN's, Alaa H Al-Obodi, et.al, IJERT,2020, The system relies upon newly released (2018) Saudi Sign Language Dictionary as its basis. For this research, we assembled a dataset of forty different Saudi signs, with an average of seven hundred photos per sign. After creating a dataset, we used it to train a deep CNN.

In [2], Real-time Vernacular Sign Language Recognition by MediaPipe& Machine Learning Arpita Halder a ,AkshitTayade, IJRPR Vol (2) Issue (5). The primary goal of this study is to showcase technique which streamlines Sign Language Recognition by making use of open-source infrastructure and machine learning algorithm provided by MediaPipe. The predictive model is lightweight enough to be readily implemented on mobile devices. American, Indian, Italian, & Turkish sign language databases are utilized for training & analysis of framework's capabilities. Suggested model is fast, accurate, and reliable, with typical accuracy of 99%.

In [3],.Towards Continuous Sign Language Recognition with Deep Learning,BorisMocialov, et.al ,2017. The emphasis of this study is on recognizing natural language, specifically sign language. This method integrates heuristics for epenthesis-based segmentation of video streams with stacked LSTMs for automated segment classification. This method achieves over 95% accuracy when segmenting video data in real time, and more than 80% accuracy when recognizing signs from their segments.

In [4], An Effective Indian Sign Language Recognition System utilising Sift Descriptor, Jasmine Kaur, C. Rama Krishna, IJEAT,Aug 2019, SIFTis utilized as a descriptor in this research to solve these problems. It takes the fitness function into account & uses an Artificial Bee Colony (ABC) for obtaining features that will be used to train FFBPNN. Dataset for alphabet was collected from film by manually selecting frames, while dataset for numbers was developed with help of deaf & dumb pupils from NGO "Sarthak."

PROPOSED SYSTEM

To facilitate communication between the hearing population and the deaf and dumb, a system tailored to the general public is being developed. Users have to start video while holding their Android device such that the camera is facing person who is disabled. The video frames will then be processed by trained model on backend, which will then identify hand gesture performed by impaired individual. Sign language's meaning will eventually be translated into spoken language.

METHODOLOGY

A. Data: The Evil Ports [3] data set is utilized along with our own custom data collection. A-Z hand gestures and other static indicators are included in collection. The dataset as a whole has between 900 & 1000 examples for every letter, resulting in a massive collection & high-quality, efficient output. Sign pictures are clicked in diverse backdrop contexts to boost inference rate in various situations throughout run time. At time model is being trained, dataset is divided in training & testing dataset.

B. Convolutional Neural Net: Recent successes in image recognition were achieved using CNNs, which are extracted feature models in deep learning. Models are being used by several market giants like Google, Facebook, & Amazon. In addition, Google has recently used CNNs to analyze video data. CNNs take their cues from human brain's visual cortex. The convolutional neural network's (CNN) simulated neurons would each communicate with a small section of visual field. This is achieved by executing trainable weighted discrete convolutions on picture. Feature maps are formed when various filters are added to every channel and combined with activating functions of neurons. The next step is a pooling strategy, in which feature maps' important information is extracted and combined. These methods are implemented in stages. The MobileNet CNN, the TensorFlow library for training & retraining MobileNet, & TensorFlow Mobile Lite for executing the learned model using an Android smartphone are all used in our study.

- MobileNet: MobileNets are compact, low-delay, low-power models tailored to specific resource requirements of wide range of applications. In same way that other well-known large-scale models, like Inception, are utilized for classification, detection, embedding, & segmentation, they may be utilized as a foundation for such tasks. TensorFlow Mobile allows for the effective functioning of MobileNets in mobile devices.
- TensorFlow: TensorFlow is a free and open-source framework designed to facilitate fast numerical calculation. Its modular design simplifies the distribution of compute among PCs, clusters of servers, mobile and edge devices, and more (CPUs, GPUs, TPUs). Substantial support for machine & deep learning is included, & flexible numerical computing core is put to use in a wide variety of different scientific fields thanks to its original development by scientists and engineers on Google's Brain team inside Google's artificial intelligence division.

● TensorFlow Mobile Lite: When it comes to deploying machine learning models for mobile & embedded devices, TensorFlow Lite is the recommended option. It allows for on-device machine learning interpretation for Android, iOS, as well as other platforms with minimal latencies & a smaller binary size.

SYSTEM ARCHITECTURE

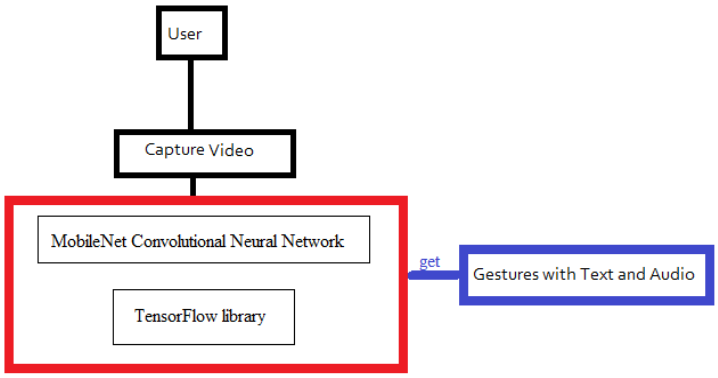

Figure 1: System Architecture

Implementation

Figure 2: Main Screen

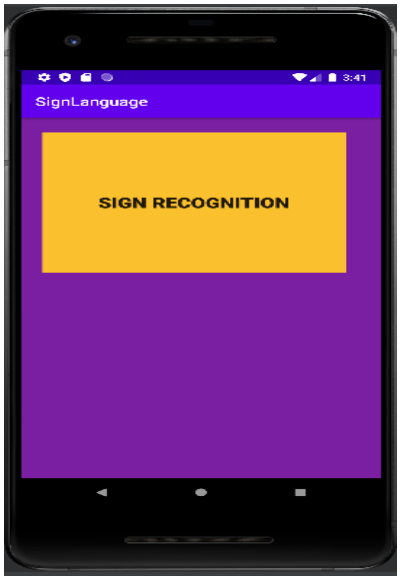

Figure 3: Sign Recogniton

Figure 4: No hand Detected

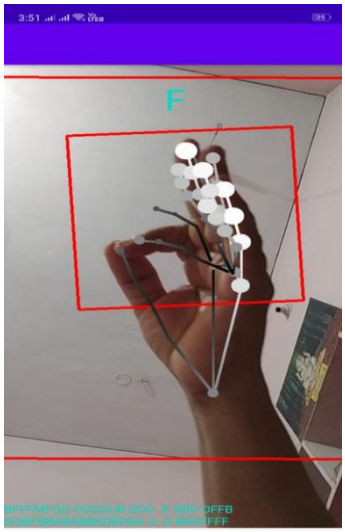

Figure 5 :Alphabet identification based on hand gesture

Figure 4: Voice to Text

CONCLUSION

A reliable sign language interpreter will serve as an effective intermediary in discussions between hearing persons & deaf & communities. With help of this program, anyone will soon be able to read sign language on spot, without a translator. This program will facilitate communication among deaf & dumb & rest of society. We hope our program can make it easier for the deaf & dumb to communicate in public locations including stores, hospitals, and more. Our solution, when

fully implemented, will be able to provide text, voice, and gesture capabilities. Deaf/dump people communicate with sign language, normal people can reply with voice then it shows in text format. In the future, scientists want to determine which clues, including hand form, facial emotions, and body language, contribute to fluent communication.

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