CONVERSION OF SIGN LANGUAGE INTO TEXT AND VOICE USING CNN

[1]DR.CH.Suresh Babu,[2]T.Prathyusha,[3]SK.Sameer Ahamed,[4]D.Maneesha,[5]P.Tharun

[1] Professor, Department of IT, SRGEC, Gudlavalleru,

2Undergraduate Student, Department of IT, SRGEC, Gudlavalleru,

3Undergraduate Student, Department of IT, SRGEC, Gudlavalleru,

4Undergraduate Student, Department of IT, SRGEC, Gudlavalleru,

5Undergraduate Student, Department of IT, SRGEC, Gudlavalleru,

ABSTRACT_ *The only means of communication for someone who cannot hear or speak is through sign language. People who are physically disabled can communicate their thoughts and feelings more effectively by using sign language. The alphabets and gestures of sign language have been identified in this work using a novel scheme of sign language recognition. We can recognise signs and output the appropriate text with the aid of computer vision and neural networks.*
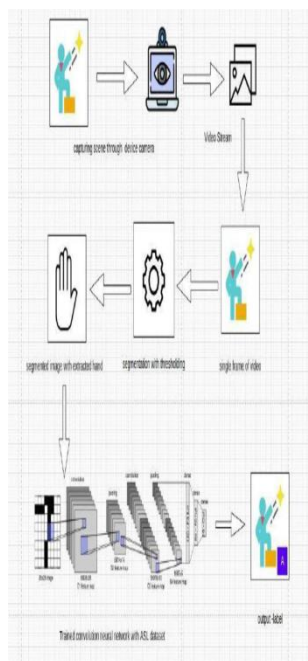
Keyword's: *Sign Language Recognition ,Convolution Neural Network2, Image Processing3, Edge Detection4, Hand GestureRecogniton5*

1.INTRODUCTION

Verbal communication performed by humans is one of the most unique traits in the entire beast area. Humans have used communication as a tool to partake and expand our knowledge of the world. It's safe to say that humans have created agreements, societies, technologies, strategies and further, only through effective communication. In moment's world, communication between individualities is essential to the development and conservation of society. But unfortunately, some individualities with hail/ speech disabilities are unfit to perform this introductory mortal commerce. This hedge in communication alienates them from society and hinders effective communication. Since it isn't doable to assume that every person who communicates with similar impaired individualities knows sign language, we need a system that will annihilate this communication hedge. In this design, we're proposing one similar system.

2.LITERATURE SURVEY

A gesture might represent a physical action or an expression of emotion. Both hand gestures and body motion are included. It can be divided into two groups: static gestures [1] [2] [3] [4] and active gestures [5] [6] [7] [8]. For the former, a sign is indicated by the body's alignment or the hand's gesture. The latter transmits some messages through body or hand movement. Gesture recognition technology enables computer and human communication [9] [10] [11]. Gesture recognition is used to achieve human-computer interaction, which is very different from the conventional hardware-based approaches. By identifying the gesture or movement of the body or certain body parts, gesture recognition can ascertain the user's intent. The hand gesture has been improved by numerous scholars throughout the years [12] [13] [14] [15].

Fig 3.1:System Architecture

3.PROPOSED WORK

Our proposed system is sign language recognition system using convolutionneural networks which recognizes various hand gestures bycapturing video andconverting it into frames. Thenthe hand pixelsare segmented and the image it obtained and sent for comparison to the trained model. Thus our system is more robust in getting exact text labels of letters.

3.1 IMPLEMENTATION

CNNs have become the de facto standard for image-related problems, and their success can be attributed to their ability to learn features without requiring human intervention. This is achieved through the use of convolutional layers that scan the input image and identify local patterns, such as edges, textures, and shapes. These patterns are then combined in higher layers to form more complex features that correspond to specific objects or concepts.

Apart from image recognition, CNNs have been successfully applied in a wide range of domains, including natural language processing, speech recognition, and recommender systems. In these applications, the input is not necessarily an image but could be a sequence of words, an audio signal, or a set of user preferences. However, the underlying principles of feature learning and hierarchical representation remain the same.

Furthermore, CNN architectures have evolved rapidly in recent years, with deeper and more complex models being developed to handle larger and more diverse datasets. These models have achieved state-of-the-art performance in various tasks, such as object detection, segmentation, and classification. However, they also come with challenges, such as longer training times, overfitting, and computational constraints.

In summary, CNNs have revolutionized the field of deep learning and have become an indispensable tool for solving image-related problems. Their success has spurred interest in other domains and has paved the way for new architectures and techniques.
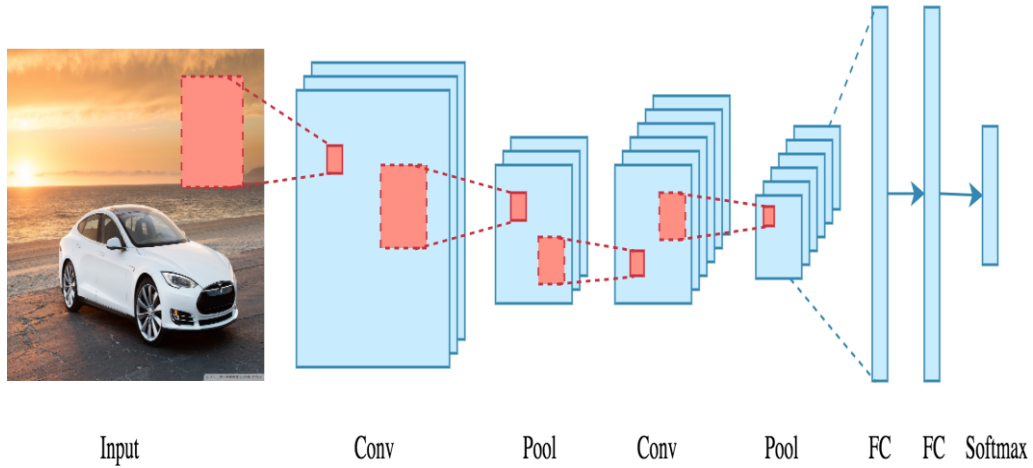

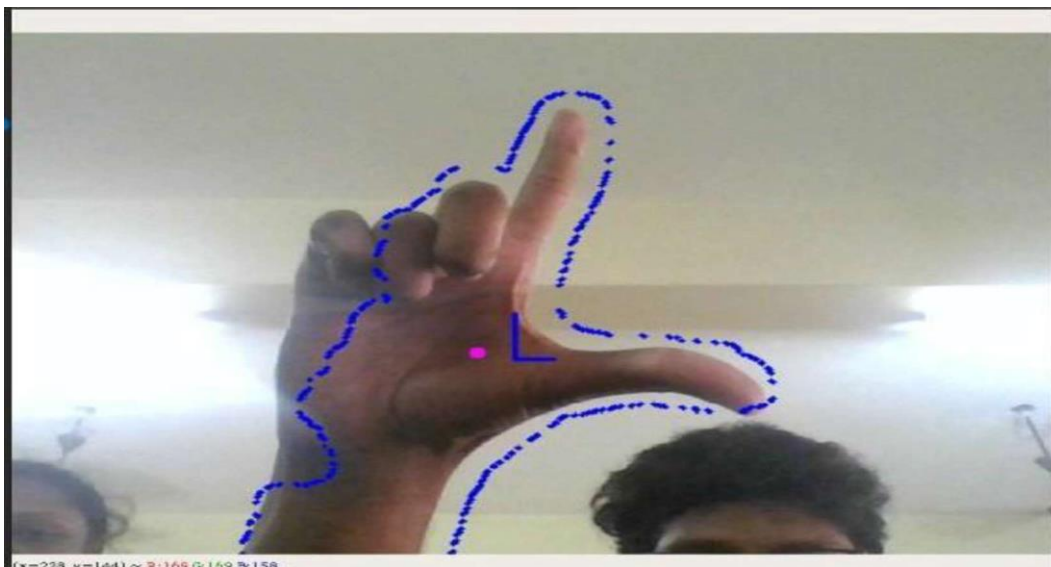**Fig 3.2 CNN Architecture**

4.RESULTS AND DISCUSSION

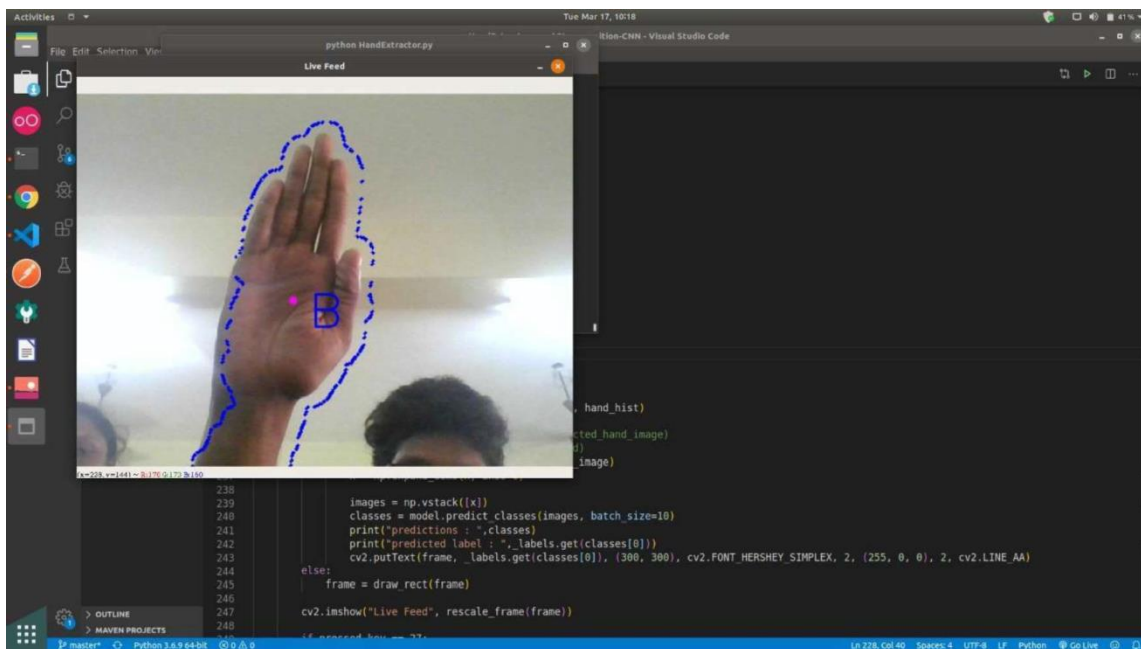**Fig5.1:Screenshot of the result obtained for letter A**

Fig5.2:ScreenshotoftheresultobtainedforletterW

Fig5.3:ScreenshotofresultobtainedforletterL

Fig5.4:ScreenshotofresultobtainedforletterB

5.CONCLUSION

Applications today require a variety of images as sources of data for clarification and analysis. To carry out a variety of applications, a number of features must be extracted. Degradation happens when an image is changed from one form to another, such as when digitising, scanning, communicating, storing, etc. As a result, the final image must go through a process known as image enhancement, which consists of a variety of techniques aimed at enhancing an image's visual presence. Image enhancementis fundamentally enlightening the interpretability or awareness of information in images for human listeners and providing better input for other automatic image processing systems. Image then undergoes feature extraction using various methods to make the image more readable by the computer. Sign language recognition system is a powerful tool to preparae an expert knowledge, edge detect and the combination of in accurate information from different sources. The intend of convolution neural network is to get the appropriate classification

FUTUREWORK

The proposed sign language recognition system can be expanded to recognise gestures and facial expressions in addition to sign language letters. Sentences will be displayed as a more appropriate translation of language rather than letter labels, which is more appropriate. This improves readability as well. The range of various sign languages can be expanded. The letter can be detected with greater accuracy by adding more training data. It is possible to expand this project to speak the signs..

REFERENCES

[1] A. D. Wilson and A. F. Bobick, "Learning visual behavior for gesture analysis," in Proceedings of International Symposium on Computer Vision-ISCV. IEEE, 1995, pp. 229–234.

[2] Y. LeCun, Y. Bengio, and G. Hinton, "Deep learning," nature, vol. 521, no. 7553, p. 436, 2015.

[3] Y. LeCun, P. Haffner, L. Bottou, and Y. Bengio, "Object recognition with gradient-based learning," in Shape, contour and grouping in computer vision. Springer, 1999, pp. 319–345.

[4] E. Stergiopoulou and N. Papamarkos, "Hand gesture recognition using a neural network shape fitting technique," Engineering Applications of Artificial Intelligence, vol. 22, no. 8, pp. 1141–1158, 2009.

[5] T.-N. Nguyen, H.-H. Huynh, and J. Meunier, "Static hand gesture recognition using artificial neural network," Journal of Image and Graphics, vol. 1, no. 1, pp. 34–38, 2013.

[6] Q. Chen, N. D. Georganas, and E. M. Petriu, "Hand gesture recognition using haar-like features and a stochastic context-free grammar," IEEE transactions on instrumentation and measurement, vol. 57, no. 8, pp. 1562–1571, 2008.

[7] P. Molchanov, S. Gupta, K. Kim, and J. Kautz, "Hand gesture recognition with 3d convolutional neural networks," in Proceedings of the IEEE conference on computer vision and pattern recognition workshops, 2015, pp. 1–7.

[8] C. J. L. Flores, A. G. Cutipa, and R. L. Enciso, "Application of convolutional neural networks for static hand gestures recognition under different invariant features," in 2017 IEEE XXIV International Conference on Electronics, Electrical Engineering and Computing (INTERCON). IEEE, 2017, pp. 1–4.

[9] Z. Zivkovic, "Improved adaptive gaussian mixture model for background subtraction," in null. IEEE, 2004, pp. 28–31.

[10] Z. Zivkovic and F. Van Der Heijden, "Efficient adaptive density estimation per image pixel for the task of background subtraction," Pattern recognition letters, vol. 27, no. 7, pp. 773–780, 2006.

[11] M. Grundland and N. A. Dodgson, "Decolorize: Fast, contrast enhancing, color to grayscale conversion," Pattern Recognition, vol. 40, no. 11, pp. 2891–2896, 2007.

[12] R. M. Haralick, S. R. Sternberg, and X. Zhuang, "Image analysis using mathematical morphology," IEEE transactions on pattern analysis and machine intelligence, no. 4, pp. 532–550, 1987.

[13] Y. Zhu and C. Huang, "An improved median filtering algorithm for image noise reduction," Physics Procedia, vol. 25, pp. 609–616, 2012

Team Members
1. TallapureddyPrathyusha
2. Shaik Sameer Ahamed
3. DasiManeesha
4. Para Tharun

Team Members Photos

1. TallapureddyPrathyusha

2. Shaik Sameer Ahamed

3.   DasiManeesha

4.   Para Tharun

Guide Name
Dr.Ch.SureshBabu,M.Tech,Ph.D.,