Marathi Sign Language Recognition for Physically Disabled People

Aditya A. Darekar[1], Narayan B. Pawar[2], Rishikesh D. Pawar[3], Vikrant S. Sangale[4], Prof. Mrs. Varsha Khandekar[5]

Student, Department of IT[1,2,3,4]

Project Guide, Assistant Professor, Department of IT[5]

Smt. Kashibai Navale College of Engineering, Pune

Abstract: *Sign language is a general term for a language that uses a variety of expressions to communicate in everyday situations. In comparison to other sign languages, ISL interpretation has received less research attention. An automatic translation system for gestures of manual alphabets in Marathi sign language is presented. It is concerned with hand images that allow the user to interact with the system. The system allows deaf people to communicate with hearing people without the use of any other technology. Dumb people use hand signs to communicate, hence normal people face problem in recognizing their language by signs made. Hence there is a need of the systems which recognizes the different signs and conveys the information to the normal people. Hand gesture recognition is essential for human-computer interaction. We propose a real-time method for hand gesture recognition. The background subtraction method is used in our framework to extract the hand region from the background. The palm and fingers are then segmented so that the fingers can be detected and recognized. Finally, a rule classifier is used to predict hand gesture labels. Experiments on a 1300 image data set show that our method works well and is very efficient. Machine learning, and computer vision have all seen significant advancements. They have made a significant impact on how we perceive the world around us and how we apply their techniques in our daily lives. Many studies on sign gesture recognition have been conducted using various techniques such as CNN. However, the majority of them necessitate additional computing power. Result of our project is very much depending on the accuracy of identifying the correct meaning of sign language, many papers that we have studied have achieved this accuracy % up to 85 – 90 % but all of us will try to achieve maximum % of accuracy so that our project will be on the top of all other available systems. In order to extract features (binary pixels) and make the system more robust, we proposed normalizing and re-scaling our images to 64 pixels in our research. We use CNN to classify ten alphabetical American sign gestures and achieve a 98 percent accuracy.*

Index Term: Random Forest, Hand Gesture Recognition, Sign Language, Ridge Classifier, Sign Language Recognition, etc.

REFERENCES

[1] Chung, H.-Y., Chung, Y.-L., & Tsai, W.-F. (2019). An Efficient Hand Gesture Recognition System Based on Deep CNN. 2019 IEEE International Conference on Industrial Technology (ICIT).

[2] Kopuklu, O., Gunduz, A., Kose, N., & Rigoll, G. (2019). Real-time Hand Gesture Detection and Classification Using Convolutional Neural Networks. 2019 14th IEEE International Conference on Automatic Face & Gesture Recognition (FG 2019).

[3] Zhan, F. (2019). Hand Gesture Recognition with Convolution Neural Networks. 2019 IEEE 20th International Conference on Information Reuse and Integration for Data Science (IRI).

[4] A. A. Alani, G. Cosma, A. Taherkhani and T. M. McGinnity, "Hand gesture recognition using an adapted convolutional neural network with data augmentation," 2018 4th International Conference on Information Management (ICIM), 2018, pp. 5-12, doi: 10.1109/INFOMAN.2018.8392660.

[5] C. J. L. Flores, A. E. G. Cutipa and R. L. Enciso, "Application of convolutional neural networks for static hand gestures recognition under different invariant features," 2017 IEEE XXIV International Conference on Electronics, Electrical Engineering and Computing (INTERCON), 2017, pp. 1-4, doi: 10.1109/INTERCON.2017.8079727.

[6] Jie Huang, Wengang Zhou, Houqiang Li and Weiping Li, "Sign Language Recognition using 3D convolutional neural networks", 2015 IEEE International Conference on Multimedia and Expo (ICME), pp. 1-6, 2015.

[7] V. John, A. Boyali, S. Mita, M. Imanishi and N. Sanma, "Deep Learning-Based Fast Hand Gesture Recognition Using Representative Frames", 2016 International Conference on Digital Image Computing: Techniques and Applications (DICTA), pp. 1-8, 2016.

[8] S. R. Bhagwat, R. P. Bhavsar and B. V. Pawar, "Translation from Simple Marathi sentences to Indian Sign Language Using Phrase-Based Approach," 2021 International Conference on Emerging Smart Computing and Informatics (ESCI), 2021, pp. 367-373, doi: 10.1109/ESCI50559.2021.9396900.

[9] C. R. Estrivero-Chavez, M. A. Contreras-Teran, J. A. Miranda-Hernandez, J. J. Cardenas-Cornejo, M. A. Ibarra-Manzano and D. L. Almanza-Ojeda, "Toward a Mexican Sign Language System using Human Computer Interface," 2019 International Conference on Mechatronics, Electronics and Automotive Engineering (ICMEAE), 2019, pp. 13-17, doi: 10.1109/ICMEAE.2019.00010.

[10] K. Wang, B. Xiao, J. Xia and D. Li, "A Dynamic Hand Gesture Recognition Algorithm Using Codebook Model and Spatial Moments," 2015 7th International Conference on Intelligent Human-Machine Systems and Cybernetics, 2015, pp. 130-133, doi: 10.1109/IHMSC.2015.202.

[11] J. Shijie, W. Ping, J. Peiyi and H. Siping, "Research on data augmentation for image classification based on convolution neural networks," 2017 Chinese Automation Congress (CAC), 2017, pp. 4165-4170, doi: 10.1109/CAC.2017.8243510.

[12] N. Tubaiz, T. Shanableh and K. Assaleh, "Glove-Based Continuous Arabic Sign Language Recognition in User-Dependent Mode," in IEEE Transactions on Human-Machine Systems, vol. 45, no. 4, pp. 526-533, Aug. 2015, doi: 10.1109/THMS.2015.2406692.

[13] S. M. Htet, B. Aye and M. M. Hein, "Myanmar Sign Language Classification using Deep Learning," 2020 International Conference on Advanced Information Technologies (ICAIT), 2020, pp. 200-205, doi.

[14] A. Thongtawee, O. Pinsanoh and Y. Kitjaidure, "A Novel Feature Extraction for American Sign Language Recognition Using Webcam," 2018 11th Biomedical Engineering International Conference (BMEiCON), 2018, pp. 1-5, doi: 10.1109/BMEiCON.2018.8609933.

[15] M. A. Rahaman, M. Parvez Hossain, M. M. Rana, M. Arifur Rahman and T. Akter, "A Rule Based System for Bangla Voice and Text to Bangla Sign Language Interpretation," 2020 2nd International Conference on Sustainable Technologies for Industry 4.0 (STI), 2020, pp. 1-6, doi: 10.1109/STI50764.2020.9350468.