

## System that Assists the Differently Abled People

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### ABSTRACT

Many times, in our city we see that the garbage bins or dustbins placed at public places are overloaded. All human beings are able to see, listen and interact with their external environment naturally. There are some people who are differently abled and unfortunately they do not have the ability to use their senses to the best extent. Such people are dependent on other means of communication like sign language or hand gestures. As this hinders the communication between the challenged person say bed-ridden or even paralysed and the common people, it affects to a great extent in their progress and makes them difficult to achieve their dreams. To bridge this gap in communication there is a need of system of gesture recognition or sign language.

**Keywords :** Gesture, Ageing, Disability, Recognition

### I. INTRODUCTION

According to the World Health Organization (WHO), 466 million people across the world have disabling hearing loss (over 5% of the world's population), of whom 34 million are children. Studies expect these numbers to rise to 900 million by 2050. The world's older population continues to grow at an unprecedented rate. Almost 8.5 percent of people worldwide (617 million) are aged 65 and above today. The pace of ageing of the population today is much faster when compared to the past. Such people depend on other means of communication like sign language or hand gestures. This presents a major roadblock for people in the elderly communities when they try to engage in interaction with others, especially in their educational, social and professional environments. As this hinders the communication between the challenged person say bed-ridden or even paralysed and the common people, it affects to a great extent in their progress and makes them

difficult to achieve their dreams. Not just the elderly, it also affects the deaf and dumb community as well as even they cannot convey their thoughts properly. Most of the times, it becomes hard for them to even convey simple messages such as needing food and water. It makes their day-to-day lives miserable. The deaf community makes use of sign language to communicate but most of the people cannot understand this language as they are not trained to understand it. The main objective is to help the elderly, deaf and dumb people by making it easy for them to communicate with others. Having a system that is easy to use, reliable, efficient and cost effective to solve this problem is very important as this can help millions of people around the world.

### II. LITERATURE REVIEW

Recognition of the pattern using discrete wavelength transform [1]: This system is considered as a pattern recognition technique that has two important

modules: feature extraction and classification. In this system sign language is recognised using discrete wavelength transform and nearest neighbour algorithm. The proposed system has given 99.23 % of accurate results. This is one of the main advantage of proposed system. The disadvantages of this system is that for most of the people sign Language is difficult to understand.

Recognition of Hand Gestures for Dumb People [2]: The static hand gesture recognition system using digital image processing is presented in this system. SIFT algorithm is used for recognizing hand gesture. The features of SIFT have been computed at the edges. These edges are invariant to scaling, rotation, addition of noise. SIFT algorithm is one of the classic approach, for most of the descriptors proposed later. It is also more accurate than any other descriptors, it is Rotation and scale invariant. The disadvantages are it is mathematically complicated and computationally heavy. SIFT algorithm is based on Histogram of the Gradients. The gradients of each Pixel in the patch should be computed. These computations cost time.

Recognition of Indian and American sign language [3]: A real time vision-based system for hand gesture recognition for human computer interaction is presented. This system is able to identify 35 different hand gestures. The hand gestures are given by Indian and American Sign Language at faster rate with virtuous accuracy. RGB-to-GRAY segmentation technique is used. This system has proposed a method of improvised Scale Invariant Feature Transform (SIFT) and same was used to extract features. The system is model using MATLAB. To design and for efficient user-friendly hand gesture recognition system, a GUI model has been implemented. The advantage is that the RGB-to-GRAY segmentation technique minimizes the chances of false detection.

The disadvantage is that it is not effective for low powered devices.

System for recognising large Number of Hand Gestures [4]: A hierarchical gesture algorithm to recognize the hand gestures is presented. A very low-resolution images are processed. Each input frame of sequence is mapped onto a sequence of resulting in a trajectory. Using PCA, HMM and Graph matching, the reduction in the size of the image and noise removal, for temporal analysis and recognition of gestures are made respectively. The advantage of this system is that the algorithms handles inputs of variable length. These algorithms are the most flexible generalization of sequential profiles. The disadvantage is that the Hidden Markov models, such as the forward backward algorithm, are quite expensive.

Recognition of Ethiopian Sign Language Using Artificial Neural Network (ANN) [5]: Detection and recognition of hand gestures for an Ethiopian sign language using Gabor Filter (GF) along with the Principal Component Analysis (PCA) is presented. All features from digital images are extracted using Principal component analysis and Artificial Neural Network (ANN) is used for recognizing the ESL from extracted features and to translate into Amharic voice

Skin colour-based hand gesture recognition [6]: In this system, the hand gestures models were built by considering differentiation of gestures and human tendency. Human skin colours are used for segmentation of hand. The mechanism of hand tracking was suggested to locate the hand. This location of hands is based on rotation and zooming models. This method of hand-forearm separation was able to improve the quality of hand gesture recognition. The gesture recognition was implemented matching the templates of multiple features. But this system has the limitation where the

use of the skin colours method for hand segmentation which may dramatically affect the performance of the recognition system in the presence of skin-coloured objects in the background. The limitation of this system gave scope to develop a system which recognises hand gestures using numbers.

Recognition of hand gestures using numbers [7]: In this system each number from 1 to 10 is considered as one hand gesture. There are 3 main steps in this system which are named as capture of image, application of threshold, and recognition of number. Many techniques of feature extraction have been used to extract the features of the gesture images. These techniques include Orientation Histogram. The limitation of this system is that the histogram technique works well if examples of the same gesture map to similar orientation histograms, and different gestures map to substantially different histograms. The same gestures having different orientation histograms and different gestures having similar orientation histograms affects the system's effectiveness. The limitations of this method gave scope to develop a real-time static isolated gesture recognition application.

Real-time static isolated gesture recognition application [8]: Real-time static isolated gesture recognition application is presented. In this system, Markov model approach is used. In this system all the features are extracted from gesture silhouettes. This proposed system considers nine different hand poses along with various degrees of rotation. This simple and effective system used coloured images of the hands. Recognition phase is performed in real-time. This recognition phase is performed using a camera video. Recognition system is capable to process 23 frames in one second on a Quad Core Intel Processor. It is easy to implement the solution to the static one hand gesture recognition problem.

The proposed system has achieved (96.2 %) accurate results. But, the authors said that the presence of skin coloured objects in the background may affect the performance of the system because the system relied on a skin-based segmentation method. The main disadvantage of gesture recognition from colour images is if the background has colour properties like the skin then it gives low reliability of the segmentation process

Hand Gestures based on Shape Parameters [9]: The recognition of Hand Gestures based on Shape Parameters is presented. This system recognizes the hand gestures based on shape parameters. Computer vision techniques are used to extract shape information. Hand gestures is matched using shape based approach.

Gesture recognition for human-computer interaction (HCI) using neural networks [10]: The recognition of hand gesture for HCI using neural networks is presented There are multiple processes included in this system such as detection, segmentation, feature extraction and finally, recognition of gesture assigned as control commands. Each stage includes a neural network for skin colour detection, principal component analysis and the clustering encoding for hand gestures.

### III. CONCLUSION

In the system that is being proposed a novel technology is used where the movements from the fingers is captured by the flex sensors which is then fed to the Arduino microcontroller. The microcontroller processes the output voltage of the flex sensors. The threshold values for every gesture is stored in the database of the microcontroller along with a message. The LCD displays the corresponding message from the database and the voice is generated using APR33A3 which amplifies the speaker output.

This system is accurate and efficient when compared to other image processing systems because the image processing system requires the image to be very accurate. In most cases the elderly people who are bed-ridden cannot make accurate gestures that can be captured and analyzed by image processing technique. So, this leads to the wrong interpretations and failure in case of emergency situations. In other systems, complicated algorithms are used along with Artificial neural networks and computer vision. All these techniques also have the same disadvantage as the conclusion of the result is reached by the accuracy of the image. So, with a use of few more components, more reliable and efficient system is proposed.

#### IV. REFERENCES

- [1]. Rajat Agarwal, Ankush Mittal, Balasubramanian Raman, "Hand Gesture Recognition using Discrete Wavelet Transform and Support Vector Machine", Conference on Signal Processing and Integrated Networks, February 2015
- [2]. Ms Kamal Preet Kour, Dr. (Mrs) Lini Mathew, "Literature Survey on Hand Gesture Techniques for Sign Language Recognition", International Journal of Technical Research & Science, Volume 2 Issue VII, August 2017
- [3]. Neelam K Gilorkar, Manisha M Ingle, "Real Time Detection and Recognition Of Indian and American sign Language Using Sift", International Journal Of Electronics And Communication Engineering& Technology, Volume 5, Issue 5, May (2014), pp. 11-18
- [4]. Shamaie, Atid and Sutherland, Alistair (2003) "Accurate recognition of large number of hand gestures.", Iranian Conference on Machine Vision and Image Processing, 13-15 February 2003, Tehran, Iran.
- [5]. Admasu, Yonas, Raimond, Kumudha, "Ethiopian sign language recognition using Artificial Neural Network", International Conference on Intelligent Systems Design and Applications (ISDA), January 2011
- [6]. Rahmat, Romi, Chairunnisa, T, Gunawan, Dani, Pasha, Muhammad Fermi, Budiarto, Rahmat, "Hand gestures recognition with improved skin color segmentation in human-computer interaction applications", Journal of Theoretical and Applied Information Technology, February 2019
- [7]. Swapna, Bhavsar, Futane, Pravin, Dharaskar, Rajiv, "Hand Gesture Recognition System for Numbers Using Thresholding", Computation Intelligence and Information Technology First International Conference, CIIT 2011, Pune, India, November 7-8, 2011, January 2011
- [8]. Yusnita, Lita, Rosalina, Rosalina, Roestam, Rusdianto, Wahyu, R, "Implementation of Real-Time Static Hand Gesture Recognition Using Artificial Neural Network", VL - 11, Communication and Information Technology) Journal, October 2017
- [9]. Surabhi S. Gatagat, Devyani D. More, Kalpana D. Varat, Janhavi S. Toshkhani, "Shape Parameter-Based Recognition of Hand Gestures", International Journal of Innovative Research in Computer and Communication Engineering, Vol. 3, Issue 10, October 2015
- [10]. Panwar, Meenakshi, Mehra, Pawan, "Hand gesture recognition for human computer interaction", International Conference on Image Information Processing (ICIIP), 2011

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