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Assisted by: Ms. D. N. Dissanayake

Ms. K. G. R. N. Gamaethige

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DEVELOPMENT OF A LOW COST AUTOMATED REAL TIME CHARACTER RECOGNITION SYSTEM WITH VOICE OUTPUT

Thilakarathne, N.^{1*}, Wanniarachchi, W. K. I. L.¹ and Chamika, D.²

¹. Department of Physics, Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka

². Arthur C Clark Institute for Modern Technologies, Katubedda

**nirashathilakarathne1217@gmail.com, iwanni@sjp.ac.lk*

Recent technology advancements in high performance processing hardware and intelligent learning algorithms have caused an up-raise in technologies that aims to mimic human behavior. When it comes to a visually impaired person they can't read a context of a book or a paper as an ordinary human being. In this research work, an attempt is made to develop off-line or online recognition strategies for the isolated printed English character (A to Z) recognition in order to help visually impaired people to overcome their disability in reading. Machine learning algorithms can be trained to recognize specific letter shapes and sizes because in printed materials the font, size and the features of letters are comparably similar to each other. For word recognition systems, variability in the form of noise caused by imperfection in letters, image acquisition methods and background noise has become the most challenging issue for performance. However the uses of neural networks have shown successful results in yielding comparably high recognition accuracy levels.

The proposed system uses a real time images processed by MATLAB to identify the characters. Images are obtained in specific formats such as JPEG, BMT etc. Then the noise which comes to the image in acquisition is filtered. After that colored image is converted to gray scale and the identified image is then converted to a binary image using a suitable threshold. Then blob detection is used to identify connected areas and bounding boxes are used to identify individual letters. Finally recognition is done using a Statistical algorithm which uses a pre stored example database of English alphabet and saved pictures. Apart from the recognition part a complete system of image acquisition and a text to voice conversion strategy is developed to make the system more useful. Moreover the developed system which unlike prevailing systems has the ability to not only recognizes characters but also to speak the recognized words for the user. Another advantage of the proposed system is that it can be implemented using off-the-shelf components like raspberry pi and associated image acquisition devices which results in minimizing overall cost of the system.

Keywords: *Character Recognition, Image Processing, Neural Networks, Blob Detection*