

# INTEGRATION OF MULTI-MODAL FEATURES FOR SICKLE CELL ANEMIA IDENTIFICATION USING MULTILAYER PERCEPTRON

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## **Abstract:**

*SCA is a legacy community of diseases of red blood cells. Persons with sickle cells in their red blood cells have abnormal protein. Sickle cell anemia is a red cell condition that is inherited and does not produce enough rotary cells in the body to hold oxygen. It may cause severe pain, anaemia and other symptoms. It is dangerous. The early diagnosis is required for sickle cell anemia. In this study, the integration of multi-modal features for sickle cell anemia identification using multilayer perceptron of SCA system is discussed. Initially, the input images are given to multimodel feature is used for feature extraction and Multilayer Perceptron (MP) classifier is used for classification. The performance of SCA system produces the classification accuracy of 95%using MP classifier.*

**Keywords:** *Sickle cell anemia, Multi model features, MP classifier, classification*

## **INTRODUCTION**

Human blood samples detection in diagnosing the sickle cell anemia is discussed in [1] using Gaussian filter. The input images smoothed and preprocessed by using Gaussian filter. Then the second derivative is examined. The pixels are marked as edge pixels. Brain Cancer Back propagation Network Identification Program Implementation and MRI [2] The research includes the extraction by discrete transformation of the wavelet texture from the given MRI brain sample and the subsequent neuro classification of the procedure.

Detection of these cells is a concern because of tumor cell formation. Classification of brain MRI image with data mining algorithms [3]. An important task is to identify cancer in MRI of the brain. Specific methods for classifying brain cancer are used in the present study. This accessible image processing technique is used to successfully identify and remove brain cancer from MRI images. Classification and segmentation of brain tumors in MRI images using PNN [4]. Among the numerous cancers, the extent of the brain tumor is very severe to save a lifetime of prompt diagnosis and appropriate care.

Classification of brain tumors based on Naïve Bayes. The preprocessors are used for the brain MRI data base, morphological operations, subtracting pixels, the maximum entropy threshold, the extraction of statistics and the prediction algorithm based on Naïve Bayes classification [5-6]. Classification of brain image with SVM study of various waves [7]. The transforming wavelet is used for the extraction of functions. Most techniques of transformation generate the same dimensional value coefficient as the original image.

SCA classification is presented in this study. The rest of the paper is organized as follows: The methods and materials used for SCA classification is discussed in section 2. The experimental results and discussion are explained in section 3. The last section concludes the SCA.

## **Methods and Materials**

The perceptron is very useful for classifying data sets that are linearly separable. They experience significant limitations with data sets that do not adhere to this pattern as discovered with the XOR problem. The XOR problem shows that there is a set that is not linearly separable with every four-point classification. This restriction is exceeded and data sets which are not linearly separable by the Multilayer Perceptron (MLPs). They use a more sturdy and dynamic architecture to learn models of regression and classification for complicated datasets. The Perceptron consisted of a complete related reference layer and input layer. MLPs have the same input and output layers, but may have several hidden layers between them

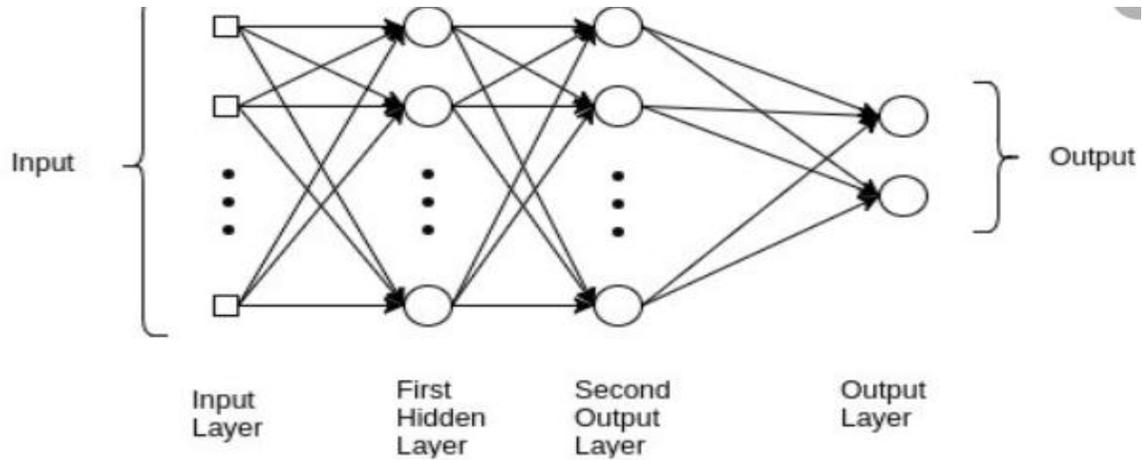
Initially, the input sickle cell images are given to multimodel feature extraction technique. Finally, MP classifier is used for prediction.

**Multimodal feature extraction:**

Modality refers to the way something occurs or is perceived, and a study issue is characterized by several modalities. Multimodal computer education is a lively multi-disciplinary research area exploring some of artificial intelligence's original goals through the incorporation and simulation of a variety of modalities of communication, including language, acoustic and visual communication. A multimodal text uses a combination of two or more modes of communication, such as printing, images and speaking, as in film and computer presentations. At least one way other than reading and writing like listening, communicating, watching, and representation requires a multi-modal presentation [8]. Multimodal fusion is the process by which information from various input modes is integrated and combined into a complete command. Multimodal computer education is a lively multi-disciplinary research area exploring some of artificial intelligence's original goals through the incorporation and simulation of a variety of modalities of communication, including language, acoustic and visual communication.

**MP Prediction:**

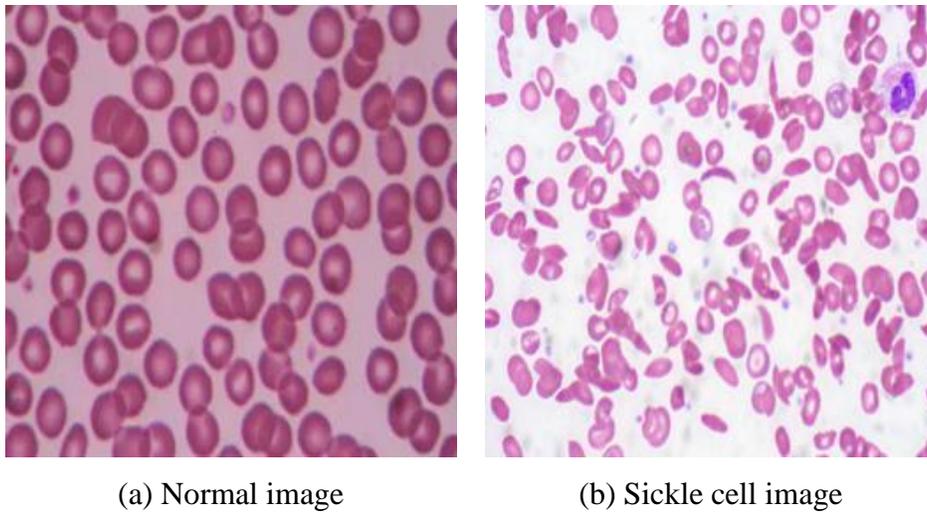
A MP is a type of Artificial Neural Network feed (ANN). MP is often used for uncertainty in relation to any feed transmission ANN and also for networks consisting of many perceptron layers. Multilayer perceptrons are often called "vanilla" neural networks, particularly when one layer is secret. The input layer, occult layer and output layer are at least three layers of nodes. Each node is a neuron, except for input nodes [9-10], with a non-linear activation mechanism. In MP's several layers and nonlinear triggering, the supervised teaching technique called backpropagation training is used. It is possible to distinguish data which are not linearly separable. The MP architecture as seen in Figure 1.



**Figure 1 Architecture of MP**

**Results and Discussion**

The input images are given to multimodal feature for feature extraction, then the MP classifier is used for prediction. The sample SCA images and normal images are shown in figure 2.



(a) Normal image

(b) Sickle cell image

**Figure 2 Sample SCA images and normal images**

The multimodal feature is used for feature extraction and MP classifier is used prediction. The classification accuracy, sensitivity and specificity are shown in Table1.

**Table 1 Classification accuracy, sensitivity and specificity of SCA system using MP classifier**

Multimodal features	Performance of SCA system (%)		
	Accuracy	Sensitivity	Specificity
1	80	79	81
2	84	83	85
3	88	87	89
4	92	91	90

From the above figure, it is observed that the overall classification accuracy is 92%. The classification accuracy is 92% and its sensitivity and specificity are 91% and 90%. The minimum classification accuracy is 80% and its sensitivity and specificity are 79% and 81% by using multimodal features and MP classifier.

### **Conclusion:**

An integration of multi-modal features for sickle cell anemia identification using multilayer perceptron is described in this study. Initially the images are given to multimodal technique for feature extraction. The MP classifier is used for final output prediction. The overall classification accuracy is 92% by using energy and KNN classifier. Its sensitivity and specificity are 93 % and 91% by using multimodal technique and MP classifier.

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