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MALARIA PARASITE CLASSIFICATION USING ENERGY BASED KNN CLASSIFIER

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Abstract:

Plasmodium is a type of unicellular eukaryote compulsory for vertebrates or insect parasites. The early diagnosis is required for malaria. In this study, the automatic classification of malaria system is discussed. Initially, the input images are given to gaussian filter, then energy feature is used for feature extraction and K-Nearest Neighbor (KNN) classifier is used for classification. The performance of malaria system produces the specificity of classification 93%using KNN classifier.

Keywords: Malarial parasite, Gaussian filter, Energy feature extraction, KNN classifier

INTRODUCTION

Investigate the best feature selection approach for automated computer training in whole slide images of peripheral blood streams, based on malaria detection [1]. For through classification carried out, confusion matrices are created. Several classification performance measures are recorded. In the event of a poorly qualified technician, false detection can occur. We also proposed in this research a method to automate a technician's manual work to reduce the human error and increase the accurate diagnosis of malaria [2].An groundbreaking digital technique that detects parasite protozoa of the Plasmodiume genus as part of the technical advances in bio imaging processing.

The algorithm is used to find different colours optimum output in microscopic images with a blood stream [3]. This is useful in telepathology and in rural areas with limited personnel can automate the malaria screening. Image processing techniques are used to identify and later recognize a parasite as a target group [4]. Three category photos were correctly categorized, with a lower recognition rate in one category.

The major drugs for prophylaxis and malaria prevention are antimalarial antivolates [5].A particular group of mutations in the dihydrophalate reducctase is readily used to improve

resistance to pyrimethamine and proguanil antifolates. Malaria is an infectious disease and is treated frequently through Giemsa's staining blood streak microscopic assessment [6-8]. Since the assessment process automation creates a severe health problem

Malarial parsite classification is presented in this study. The remaining paper has been arranged accordingly: The methods and materials used for the classification of malaria are discussed in the section 2. The results and discussion are explained in section 3. The last section concludes the malaria.

Methods and Materials

Initially, the input malarial parasite images are given to gaussian filter for pre-processing. Then feature is used for feature extraction. Finally, KNN classifier is used for prediction.

Pre-processing using gaussian filter:

Gaussian filters have the ability to bypass a phase feature while raising the rise and fall time. The fact that the gaussian filter has the shortest group delay is closely linked to this action. A Gaussian filter is a filter with a Gaussian effect in electronics and signal processing. Gaussian filters have the ability to bypass a phase feature while raising the rise and fall time [9]. This is closely related to the minimum possible group delay in the Gaussian filter.

Energy feature extraction:

The signal energy is mostly found in the approximation and some information. The energy is the sum of accurate transformation coefficients by the wavelet. The energy of the wavelet coefficient depends on the input signal in different scales. The first-level approximate coefficient produces much more energy than the rest of the decomposition tree coefficients at the same point. Due to their high frequency elements, the energy of the information coefficients is more distinctive to use.

KNN Prediction:

KNN is one of the simplest algorithms used in machine learning for regression and classification. KNN algorithms use data and similarity-based classification of new data points. The specified number examples (K) is selected nearest to the query. KNN is an algorithm for slow, non-parametric computing.

Results and Discussion

The images are given to gaussian filter for pre-processing, then the energy features are used for feature extraction and KNN classifier is used for prediction. The classification accuracy, sensitivity and specificity are shown in Table1.

Table 1 Classification accuracy, sensitivity and specificity of malarial parasite detection system

	Accuracy (%)	Sensitivity (%)	Specificity (%)
Normal images	95	96	94
Abnormal images	93	94	92

From the table above the overall classification is observed accuracy is 97%. The classification accuracy of normal images is 95% and its sensitivity and specificity are 96% and 94%. The classification accuracy of abnormal images is 93% and 94% and 92% are its sensitivity and specificity.

Conclusion:

An automatic classification of malaria parasite using KNN is described in this study. Initially the images are preprocessed by Gaussian filter. Then removed with energy characteristics. For the final performance estimation the KNN classifier is used. By using energy and the KNN classifier, the overall classification accuracy is 95%. It's sensitivity and specificity are 96% and 94%. The accuracy for malarial images is 93% and also its sensitivity and specificity are 94% and 92%.

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