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Identification of Spectral Graph Wavelets for Microcalcifications in Mammogram Images

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Abstract: Breast cancer is one of the dangerous disease for ladies in world. The available system deals Microcalcifications (MCs) in breast cancer and detectection is difficult till now. But using mammogram images inital stage itself idetenfication is simple as well as very easy to detect the breast cancer. In this study, the system has to identify the MCs classification by using Spectral Graph Wavelet Theory (SGWT) and K-Nearest Neighbour (KNN) classifier. To extract their energy in each sector and make them together to identify the results by using the algorithm.

INTRODUCTION

Breast cancer is very dangerous disease and mainly affected by ladies even 25 years ladies also affected is the very pathetic situation in world[1-3]. The main moto of the system has to detect as soon as possible advances stage itself can make the patient safe as well as treatment is easy and safe so many life of the people is important for that process the mammogram image are used to process the entire system to identify the mammogram image is breast cancer or not by using the factors extraction of energy level in the image as well as identify the image is cancer or malignant image[4-6]. In this study, the system has two algorithm one is for extraction of energy level another one is for the identification of feature extract data with the system[7, 8].

MATERIALS AND METHODS

The proposed system is developed by two algorithms one is spectral graph wavelet another one is kNN classifier[9, 10] (Fig. 1).

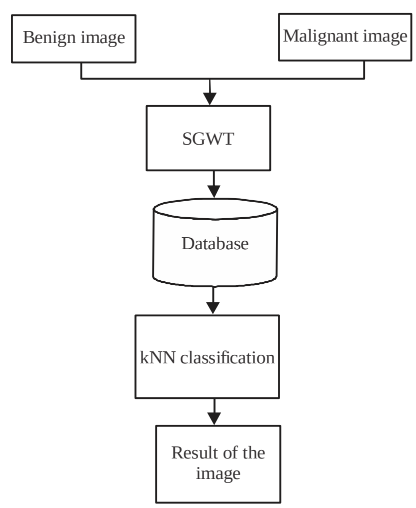

Fig. 1: Basic block diagram for proposed system

Spectral graph wavelet theory: This is achieved using the spectral representation of the operator. In particular,

Table 1: Performance of the system

	Values				
SGWT	1	2	3	4	5
False (+ve)	115	116	101	112	116
True (+ve)	111	112	113	113	112
False (-ve)	112	111	110	110	111
True (-ve)	131	121	121	111	131
Sensitivity (%)	89.99	93.52	97.45	98.89	99.01

for our spectral graph wavelet kernel p, the wavelet operator $T_p = p(L)$ acts on a given function f by modulating each Fourier mode[11, 12]:

$$Tp\hat{f}(l) = p(\lambda_l)\hat{f}(l)$$

The inverse Fourier transform is:

$$(Tpf)(n) = \sum_{l=0}^{N-1} p(\lambda_l)\hat{f}(l)X_l(n)$$

The wavelet operators at scale y are then defined by $T_p^y = p(yL)$. It should be emphasized that even though the "spatial domain" for the graph is discrete, the domain of the kernel p is continuous[13, 14].

kNN classifier: In kNN classifier is just a matching algorithm with database to show whether extracted energy level from the SGWT is matched with the database to give the result is bengin or malignant for the patient[15]. The kNN classifier is the second and very important stage for the entire process to give the accurate result for the patient[16, 17] (Table 1).

RESULTS AND DISCUSSION

The system deals with identification of cancer from mammogram images through wavelet transformation for that purpose to identify the microcalcification as well as mass from the images for that purpose wavelet and kNN classifier is used to detect and identify the process from open source database like MIAS database is used for the proposed system (Table 1).

CONCLUSION

In this study, MIAS database is used for the execution of entire system and the system has totally two algorithm namely SGWT used to get the feature and kNN classifier used to match the feature with the database for the finally, result here totally 136 images taken for the process from that totally 88 images are malignant and 48 images are bengin images has been find out.

IMPLEMENTATION

In this system totally 136 mammogram images are taken from MIAS database for the entire process from that 88 images are malignant and 48 images are bengin images has been find out from the proposed system[15, 19].

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