



## A SURVEY ON QBIC SYSTEM FOR ECG REPORTS

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### Abstract

Feature extraction from ECG graph play a major role in diagnosing the heart abnormality. As the huge growth of medical image processing many research scholars, scientists have worked effectively on feature extraction from the graphical images of ECG report. Heart assault examine by a specialist is old and required exceptionally prolonged stretch of time to recognize stroke. The important thing of this work is to offer very little time to study the graphical ECG reports and give the required information for the further treatment. Recognizing coronary failure from the ECG report is demanding because of confusion, carelessness, delay, distinctive among the individuals dependent on age, gender, etc. Several methods are incorporated to extract feature from ECG reports are morphological analysis, Independent Component analysis (ICA) leads to effective identification of several abnormality of a heart and will diminish the misguided judgment, misconception of graphical ECG reports. So the significant thing of the work is to outfit an examination on the exactness of generally utilized algorithms by researchers and scientists in separating features from the ECG reports. In this paper, the consequences of different strategies for separating feature from the ECG reports have been examined vivaciously and this correlation examination work causes the inquires about to back out the time multifaceted nature they find in looking for changed combinational work.

**Keywords:** ECG reports, ICA, morphological analysis.

### 1. INTRODUCTION

Cardiovascular sickness remains the main source of mortality in the western world, due to this more than 16 million passing's every year around the world. Changes in way of life, for example, decreasing cholesterol admission and practicing routinely can lessen the odds of a lethal occasion related with CVD. In this way, early detection is a basic advance in the counteractive action of death related with CVD. An ordinary specialist visit, which incorporates an ECG, is an imperative advance towards early identification, brings about enormous volumes of patient information that must be deliberately examined. Traditional strategies for checking and diagnosing electrocardiographic changes depend on recognizing the nearness of specific sign highlights by a human spectator. QRS complex is the most unmistakable component in electrocardiogram in light of its shape; consequently it is taken as a kind of perspective in ECG feature extraction. PC based restorative symptomatic frameworks have been created so as to help medicinal experts in the investigation of enormous volumes of patient information. Different signal handling methods have been used in separating features from the biomedical image and investigate these features which have their very own benefits and bad marks. Such strategies work by changing the generally subjective demonstrative criteria into an increasingly objective quantitative sign component grouping issue. The means used to address above expulsion, think about a model, the discoveries of ECG signals for recognizable proof of ECG changes utilizing the auto-connection work, recurrence area features, time-recurrence examination, and wavelet change. A few strategies comprise of arrangement of band pass channels having recurrence scope of QRS edifices yet

these techniques have constrained exactness in dissecting ECG includes in nearness of high recurrence clamour just as the ECG signal influenced by serious gauge float. As of late, there has been an expanding enthusiasm for applying procedures from the areas of nonlinear examination and turmoil hypothesis in contemplating the conduct of a dynamical framework from a test time arrangements, for example, ECG signal.

The ECG report feature extraction framework gives principal features to be utilized in ensuing programmed examination. As of late, various procedures are raised to distinguish these features. Presently proposed strategy for ECG wave examination was relayed on time space strategy. Yet, this isn't constantly satisfactory to study every feature of ECG reports. In this way the recurrence portrayal of a wave is essential. The diversions in the ordinary electrical examples demonstrate different heart issue. Heart operations, in the typical state are electrically captivated.

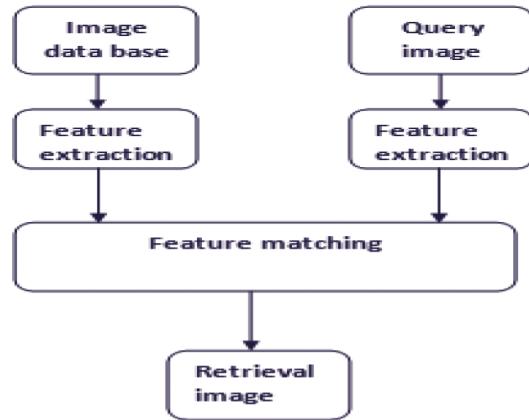
The aim of this is to find out whether features extracted are useful for query by image content (QBIC) system. Different methods proposed before in writing to extracting the features of ECG report is investigated. This paper examines and an audit has been made to discover the best among them with less computational multifaceted nature and more exactness in expectation and feature extraction.

### 2. OVERVIEW OF QUERY BY IMAGE CONTENT (QBIC)

It helps in finding digital data present in large data base. As we know in order to search we use old technique like searching keyword, shape, tags, alphabet etc to avoid such difficulty we

came across new method called content based image retrieval system (CBIR). As the name indicate it's a query based image retrieval process as shown in figure 1, in which 1 st an image taken with some features, in order to identify some of feature we use this CBIR system so that we can easily identify the exact image very soon and we can save time as well. This uses distance measure technique to identify the required image feature. Which will say about the content present in the query image with the help of content extracted image?

Surface is a troublesome idea to speak to the ID of explicit surfaces in a picture is accomplished essentially by displaying surface as a two-dimensional dim level variety. The general splendour of sets of pixels is processed with the end goal that level of complexity, consistency, coarseness and directionality might be evaluated. The issues are in distinguishing examples of co-pixel variety and partner them with specific classes of surfaces, for example, sleek, or harsh.



**Figure 1: General Block Diagram of Content Based Image Retrieval**

### 3. SURVEY

The variety of methods and techniques used for feature extraction from ECG reports are discussed below.

Xiaomin Xu Ying Liu put forward (2004) "ECG QRS Complex Detection Using Slope Vector Waveform (SVW) Algorithm". In this paper it comprises two pieces of activities namely, changing stage separation and non-straight enhancement. perfect inclination vectors for features extraction are obtained from Changing stage separation and also improve S/N extent outputs from the non- straight upgrade, the superb 'QRS' revelation paying little mind to whether the signal are sullied with noises are obtained by SVW.

Felipe E. Olvera (2006) put forward "Electrocardiogram Waveform Feature Extraction Using the Matched Filter". In this he has taken major 4 databases from MIT-BIH are Arrhythmia, Sinus Rhythm, Sudden Cardiac Death, and the

Long Term ST Database. These signals are resampled and applied trough Chebyshev Type 1,6th-order low-pass filter to cut off any signal components beyond 50 Hz. Then feature are extracted and compared with query image to give information regarding obtained ECG reports.

S.S Mehta and V.S Chouhan (2008) put forward "Detection of QRS Complexes in 12-lead ECG using Adaptive Quantized Threshold". In this paper the introduced algorithm utilizes a changed meaning of ECG wave slope, similar to element of finding a QRS. A succession of changes of the filtered and baseline drift revised ECG signal is utilized for extraction of another altered slope feature. Two element parts are consolidated to infer the last QRS feature signal. Various quantized sufficiency limits are utilized for recognizing QRS-buildings from non-QRS districts of the ECG waveform. A satisfactory sufficiency limit is consequently chosen by the introduced algorithm and is used for depicting the QRS-complexes.

Dr. Devendra Prasad and V.K Srivastava (2013) put forward "Dwt - Based Feature Extraction from ecg Signal". In this paper it uses non stationary ECG signal to process. With the help of discreet wavelet transformation features are extracted and finally classified with the help of neuro fuzzy logic. This method involves Data acquisition; Pre-processing, Feature Extraction and Classification [8].

Muhidin A. Mohamed, Mohamed A. Deriche (2014) put forward "An Approach for ECG Feature Extraction using Daubechies 4 (DB4) Wavelet". In this DB4 Wavelet is chosen because of the likeness of its scaling capacity to the state of the ECG signal. R peak recognition is the center of this present algorithm's feature extraction. All other essential peaks are separated concerning the area of R peaks through making windows corresponding to their ordinary intervals.

I.S. Siva Rao, T. Srinivasa Rao and P.H.S. Tejo Murthy (2015) put forward "QRS Detection of Ecg - A Statistical Analysis". In this paper which will expel the conflicting wavelet change coefficient, denoising is done in ECG signal. Further, QRS complexes are recognized and in which each peak can be used to find the peak of discrete waves like P and T with their subordinates. Which include pan-Tompkins' method and multi-wavelet transform leads to new algorithm. From the above survey we can say that all work are done just extracting feature of ECG reports as well as identified few diseases.

### 4. KEY DISCOVERIES OF THE REVIEW

From the vigour's survey we found that maximum work has been done to extract features from the graphical ECG reports, which intimate there is less work done regarding some

specific heart problems? It's our privilege to work on specific heart problems with the help of different methods employed for feature extraction and classification. Studying particular diseases is a very helpful work and we can reduce time required to analyse a diseases. So we can overcome time bound and save life very quickly.

Some of the methods like PCA, ICA are accurate feature extraction methods and some of classifiers like ANN, SVM, and neuro fuzzy logic are best to identify particular diseases classification and recovery from abnormality. With the help of CBIR can analyse ECG reports to find the particular diseases and do treatment very quickly.

S I . no	Author, Title	Methodology	Results	Limitations and Recommendation
1	“Detection of ECG Characteristic Points Using WT” Chongxun Zheng Cuiwei Li and Changfeng Tai 1995	wavelet transforms algorithm	Its feature extraction accuracy is about 99.8%	- Wavelet Transform power lies In multi scale data analysis. -It not applicable to non linear phase - Working with 10 min ECG data requires 1 min i.e. (250/s sampling frequency), by and large. This operational speed isn't adequate to investigate long-term ambulatory ECG information.
2	“A Patient Adaptable ECG Beat Classifier Using - Mixture of Expert Approach” Yu Hen Hu et al.,1997	-mixture-of-experts (MOE) approach -SOM,LVQ based approach	Its feature extraction accuracy is about 85%	-Downside of this approached technique is required to build up a Local Expert classifier for every particular patient, within just 5 minute of patient's ECG report. -the Global Expert performs inadequately due to the small Variety in the morphology of typical beats present in the report.
3	“ECG QRS Detection Using Slope Vector Waveform (SVW) Algorithm” Ying Liu Xiaomin Xu 2004	Slope Vector Waveform algorithm, adaptive Thresholding.	Its feature extraction accuracy is about 88%	-This method operates preferably in time domain mode. -which depends on ecg signal operating frequency.
4	“ECG Waveform Feature Extraction Using -Matched Filter” Felipe E. Olvera 2006	matched filter method	Its feature extraction accuracy is about 85%	- Troublesome was the detection Threshold on the signal features of intrigue. - Matched filter didn't recognize square Wave shapes.
5	“Feature Extraction for ECG Time Series Mining- Based on Chaos Theory” Alan Jovic Nikola Bogunovict 2007	Chaos methods Phase space reconstruction, Spatial filling file, Central inclination measure	Its feature extraction accuracy is about 75%	-It isn't evident whether typical heart or heart with different issue shows noteworthy chaotic Behavior. -it applied only small number of samples.
6	“Detection of QRS Complexes in 12 lead ECG- using AQT” S.S Mehta and V.S Chouhan 2008	Adaptive quantized algorithm	Its feature extraction accuracy is about 98.56%	-it doesn't have any data base to say about disease or abnormality. - Decrease of baseline drift is alluring for implementing amplitude-threshold strategy
7	Parameter Extraction of ECG by detecting QRS complex based on Lab VIEW Abhishek Mudgal et al.,2012	Virtual Instrumentation (Lab VIEW)	Its feature extraction accuracy is about 90%	-false detection of peak will leads to damage of whole system. -no discrimination regarding ecg graphical report. -does not identify any abnormality.
8	Dwt - Based Feature Extraction from ecg Signal V.K.Srivastava Dr. Devendra Prasad 2013	Discrete wavelets transform (DWT) algorithm and neuro-fuzzy method.	Its feature extraction accuracy is about 88%	-it does not identify the abnormality it just extract feature and classify it. -no heart beat count facility.

9	“An approach for ECG Feature Extraction using Daubechies 4 Wavelet” Muhidin A. Mohamed et al.,2014	Daubechies Wavelet Transform method	Its feature extraction accuracy is about 90%	-it depends on amplitude and duration of intervals. -it does not read heart beat -it doesn't identify any abnormality.
10	QRS Detection of Ecg - A Statistical Analysis I.S. Siva Rao et al.,2015	Pan-Tompkins method, multi-wavelet transforms method.	Its feature extraction accuracy is about 92%	-still need to compare large data set based on age and gender. -compare more with affected ecg graphical reports
11	A Robust Approach to Wavelet Transform Feature Extraction of ECG Signal Naveen Munjal et al.,2016	Wavelet transforms baseline wander removal algorithm and subsequent segmentation.	Its feature extraction accuracy is about 95%	-it won't identify any specific abnormality. -no comparative study regarding ecg graphical printouts
12	“ECG Printout Features Extraction Using Spatial Oriented Image Processing Techniques” Pocholo James M. Loresco et al.,2017	spatial-oriented image processing methods RMSE and normalized RMSE methods used for testing	Its feature extraction accuracy is about 95.424 %	Even methodology got high accuracy but PR interval feature extraction achieved a less accuracy of 87.196%. - Noisy ECG readings in printouts also constraints brought by meandering benchmark and Fuzzy gauge affect the feature extraction.
13	“A combined approach WNN for ECG feature based disease classification” Anurag Krishna Shukla et al., 2017	Wavelet Based method and Artificial Neural Network	Its feature extraction accuracy is about 80%	-it's only applicable to analyse Bradycardia and Tachycardia. -still we are not getting much accuracy need to improve.
14	“Disease Detection By Feature Extraction Of Ecg Signal Based On ANFIS” Harjot Singh et al.,2017	Wavelet, Adaptive neuro fuzzy inference system (ANFIS), MSE and RMSE	Its feature extraction accuracy is about 85%	-we can adopt new system that is neuro-fuzzy system to increase accuracy.
15	“Comparison Of Feature Extraction Techniques- A Case Study On Myocardial Ischemic Beat Detection” Dr.M.Meenakshi , H.S Niranjana Murthy 2018	Feature extraction methods are morphological analysis, Independent Component analysis (ICA), etc. ANN, SVM and KNN are Some of classifier.	ANN model based ICA feature extraction has Classification accuracy of about 96.85%	-it's only applicable to ischemia heart disease. -there is no age or gender based ischemia analysis. -it can be implemented different kind of heart abnormalities.

Table1: Analysis of Different Methods Utilized for Feature Extraction from ECG Report.

Sl. no	Methods	Accuracy (%)
1	wavelet transforms	99.85
2	MOE	80
3	SVW	88
4	matched filter	85
5	Chaos method	75
6	Adaptive quantized	98.56

7	Lab VIEW	90
8	neuro-fuzzy method	88
9	Daubechies Wavelet Transform	90
10	Pan-Tompkins method	92
11	Wavelet transforms baseline wander removal algorithm	95
12	spatial-oriented image processing	95.42
13	Artificial Neural Network	80

14	ANFIS	85
15	ICA	96.85

**Table2: Comparison Table with Different Methods and Accuracy.**

## 5. CONCLUSION

The assessment of ECG report has been thoroughly diagnosing numerous heart sicknesses. Different strategies and changes have been proposed before in writing for extracting feature from ECG. This proposed paper gives a table of different ECG include extraction strategies and algorithms proposed in writing as shown in table 1 and table 2. The feature extraction system or algorithm created for ECG must be exceptionally exact and ought to guarantee quick extraction of features from the ECG wave. This paper approach additionally uncovered a relative table assessing the presentation of various algorithms that were approached before for ECG wave feature extraction. The upcoming work primarily focuses on building up an algorithm to get precise and quick feature extraction. In addition extra factual information will be used for assessing the presentation of an algorithm in ECG wave feature identification. Increasing the exactness of analysing the cardiovascular abnormality at the most punctual is essential on account of patient observing framework. Consequently our upcoming work additionally does some progress in diagnosing the heart abnormality with the help of CBIR system.

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