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XML DATA PROCESSING APPROACH FOR AUTOMATIC IDENTIFICATION OF CARDIAC ABNORMALITIES IN ECG

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Abstract – In medical applications, the process that records the electrical activity of the heart is termed as Electrocardiography (ECG). The traditional way of ECG is in the form of the transthoracic interpretation of heart's electrical activity. Existing methodology focuses on diagnosing the 37 cardiac abnormalities by using XML ontology and ontological schema to identify the disease acquired. This methodology does not tune-up the image of the ECG before processing as the noise percentage misleads to the diagnosis report. In the proposed methodology, an image validation of histogram check is formulated to rectify the noise acquired in the input ECG Image. The validated ECG sample image has been measured with its height and amplitude to measure the abnormalities using XML ontology.

Keywords: Cardiac abnormalities, XML ontology, ECG diagnosis

1. INTRODUCTION

Currently, 12-lead electrocardiogram (ECG) monitoring systems have proprietary formats for operation and data storage, and are manufactured by a multitude of different vendors. [1] Which can be No. 1 – No. 12 for each electrode lead. In the wave boundary, start indicates the sample number that starts the wave; peak indicates the sample number of the peak point of the wave; and End indicates the sample number that ends the wave [2][3][4]The diagnosis knowledge was collected from available rules obtained from a variety of sources including cardiology textbooks, interviews with experienced cardiac surgeons, and peer reviewed papers in the published literature [5] was used to restrict and validate ECG data instantiated into XML documents. Waveform data and structure were also encoded in XML schema. This task made use of the ecgpuwave™ software available from PhysioNet™[6] To detect the boundary of each wave (start, peak, and end) [7]The system converts data from PhysioBankbecause such data was stored in the PhysioBankformat and did not conform to any open standard [8] was used to determine the accuracy of the model in diagnosing normal and abnormal conditions. For accuracy, the list of abnormal conditions found by the software for each ECG was compared with their actual known diagnoses that were provided with the ECG data from physiobank [9,10] This research used an acceptable error rate of 10% determined from information about ECG decision support systems and algorithms for classifying cardiac diseases in the literature and from recommendations from three experienced cardiac physicians.

2. EXISTING SYSTEM

Image processing is one of the recent trends in computer technology. Image processing is important in the medical field to analyze and predict the disease syndrome. Electrocardiography (ECG) is the recording of the heart's electrical activity that plays a major role for a human being, utilized in the medical field for diagnosing the acquired syndrome. The cardiac diagnosis prediction report is generated with three positions. They are start, peak and end positions. With reference to the prediction report, A Schema of ontology is generated. The description of XML document is carried out by XML schema. Several constraints on the structure such as document type and syntactical constraints are defined to implement the XML schema.

The ontological schema records designs the XML schema for easier mapping of the Input digital electrocardiographic data. The resultant of the existing system is the diagnosis report of the input Electrocardiographic data. The resultant sorts out the possible abnormalities with the advent of the pulse rate estimated in the ECG curve.

2.1DISADVANTAGE

1) No validation of image
2) False positive disease prediction

3. PROPOSED SYSTEM

The proposed system incorporates a technique of automatic generation of diagnosis report with ECG image that will be a useful innovation to the medical field. The variations in heartbeat such as irregular, slow, fast and normal acquiring by the diagnosis report. A validation process is incorporated in the proposed system to remove the noisy information in input image. The accuracy of diagnosis report decides the strength of removal.

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The cardiac predictions of curves and XML schema identified by an ontological schema. The identification process also used to map both ontological schema information and input image. Hence, proposed system reduces the false prediction of syndrome problem. The pixel of input image is validated by using the histogram techniques for further processing. The resultant of the proposed system generates the syndrome diagnosis with a valid

3.1 ADVANTAGE

1) Image validation using histogram approach
2) Accurate disease prediction
3) Process of segmentation is evolved to measure the curve variation

4. ARCHITECTURE OF THE SYSTEM

The Architecture includes the eight modules. They are discussed in detail in following sections.

4.1 IMAGE ACQUISITION

The process of retrieving images from a source is termed as image acquisition. The capturing of images in acquisition is done automatically. The first step in image processing workflow sequence is an image acquisition since image is required for further processing.

4.2 HISTOGRAM IMAGE VALIDATION

The input data will be electrical activity format, validate the condition (slow, fast, irregular, normal) of heart. The time-domain ECG signals are used in traditional methods. But, the new computerized ECG utilizes the frequency information for pathological condition.

4.3 IMAGE SEGMENTATION

The entire image is covered by set of regions and contours represented as segments, which are the output of image segmentation. With reference to characteristic or property the pixels in some region are same. The noise components from various sources are suppressed in further processing of ECG signal.

input image thereby identifying the rhythm, endpoint and axis positions of the curve.

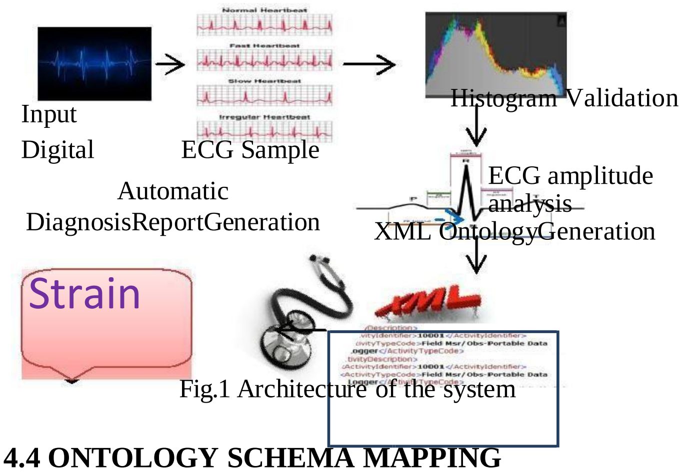

Fig.1 Architecture of the system

4.4 ONTOLOGY SCHEMA MAPPING

The integration of heterogeneous databases requires ontology alignment. Each database have own vocabulary. In the semantic web context, many actors involve to provide own ontology matching. The interoperation of heterogeneous resources is done by using matching process. Hence, to improve the interoperate performance Ontology alignment tools are used. The classes of data in ontology are "semantically equivalent". "Truck" is the example data for alignment.

4.5 XML SCHEMA MAPPING

This is otherwise called as "XML Schema Definition" language, or XSD. XML schema documents are used to define and validate the content and structure of XML data. XML schemes are expressed by various developed languages.

4.6 CARDIAC ABNORMALITIES DETECTION

At high frequencies, the Wavelet Transform (WT) used for detection of cardiac abnormalities provides good time resolution and poor frequency resolution. At low frequencies, WT provides good frequency resolution and poor time resolution. The filtering operations in detection process changes the resolution of the signal. The number of coefficients provided by DWT (Discrete Wavelet Transform) are same as coefficients as original signal.

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4.7 ECG DIAGNOSIS REPORT GENERATION MODULE

In this module, the Modern standard ECG is implemented using more electrode connection points. The stored procedures in the module enables the users to change the business logic without actually tinkering with the application. The Final report is comprehensive for the following reasons in Best-Case Performance, average-Case Performance, Worst-Case Performance.

4.8 PERFORMANCE EVALUATION MODULE

The parameters of amplitudes, time shifts and scale factors are stored in this module. The output of integrator split into two. They are large amplitude pulse for every QRS (waves) and lower amplitudes for noise spikes. The peak is classified as QRS if filtered ECG and integrator output exceed their threshold. It is then monitored by computing estimate of signal and threshold.

5. IMPLEMENTATION AND RESULTS

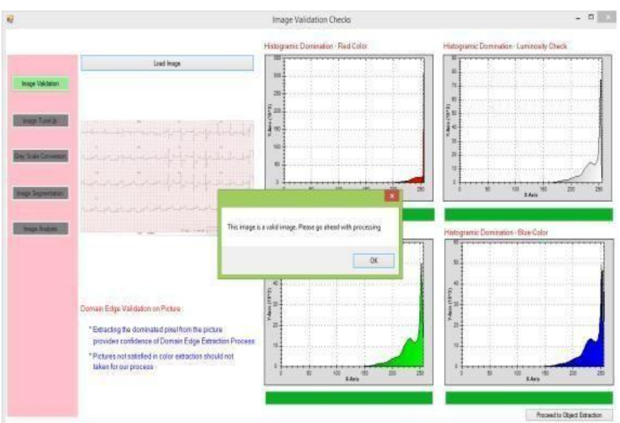

Figure 2.1 Image validation

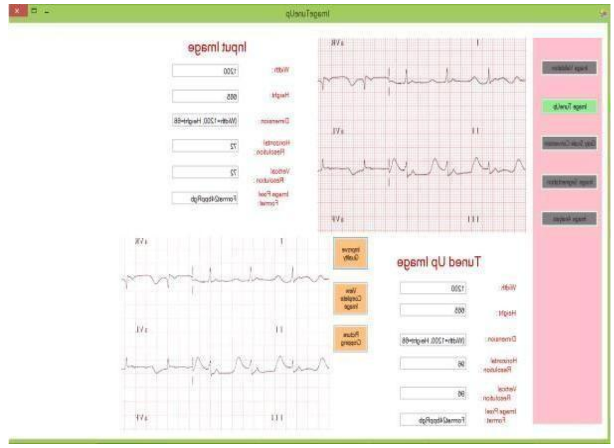

Figure 2.2 Image Tuning process

Figure 2.3 Gray scale conversion

Figure 2.4 Image segmentation

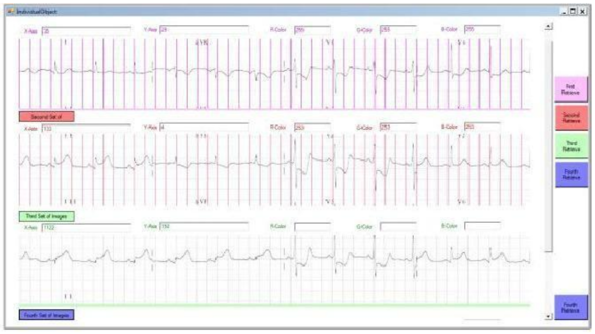

Figure 2.7 XML schema mapping

Figure 2.5 Fetching values for first set of images

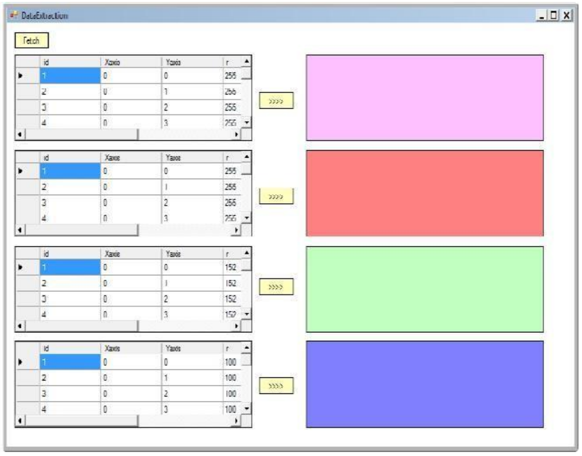

Figure 2.8Data Extraction

Figure 2.6 Fetching values for second set of images

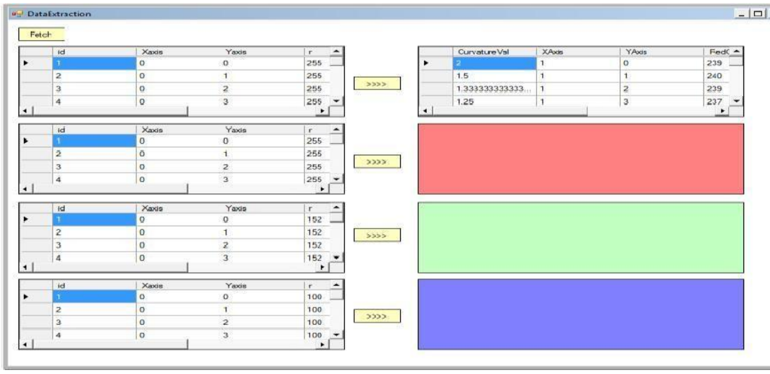

Figure 2.9 Extracting data for first set of images

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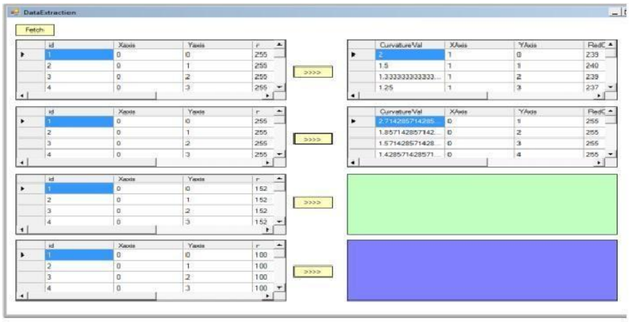

Figure 3.0 Extracting data for second set of images

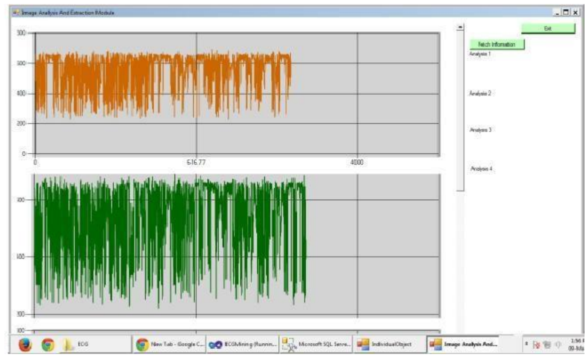

Figure 3.3 Images analysis

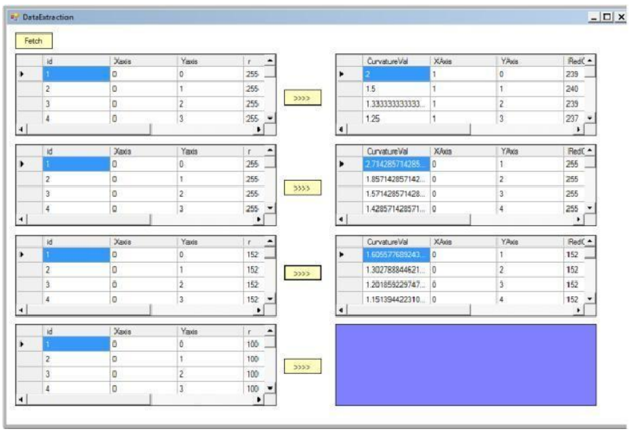

Figure 3.1 Extracting data for third set of images

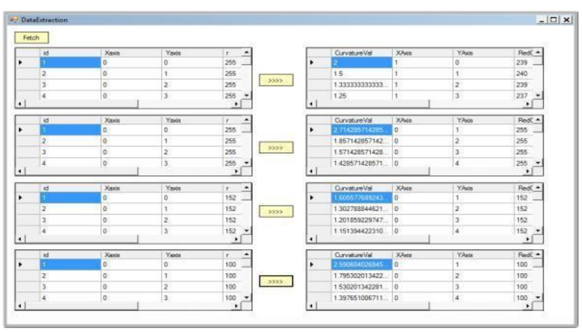

Figure 3.2 Extracting data for fourth set of images

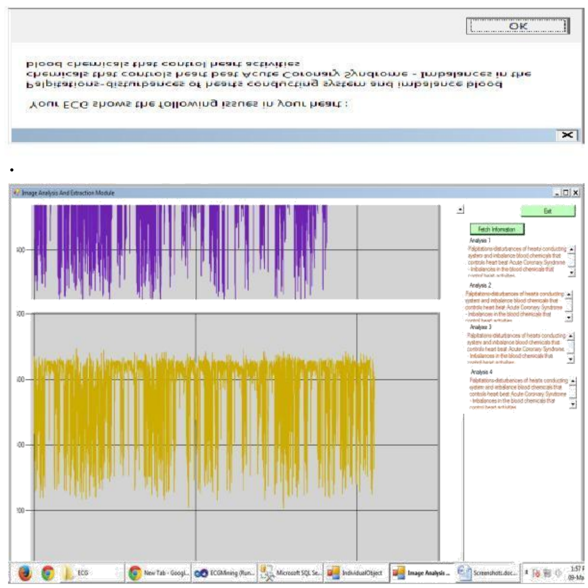

Figure 3.4 cardiac abnormalities

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6. CONCLUSION

The Proposed system incorporates a way of Automatic generation of identification report with graphical record image which will be helpful innovation to the medical field. The manipulation of identification report with the graphical record curve acquires several variations in heartbeat like irregular, slow, quick and traditional. A validation method is incorporated within the proposed system to get rid of the hissing info from the inputted image because it deceives the accuracy of the identification report. A metaphysics schema is intended to spot the internal organ predictions of curves. The proposed system overcomes the matter of false prediction of syndrome by confirming the input image mistreatment bar chart techniques that validates the additional process. The resultant of the proposed system generates the syndrome identification with a legitimate input image thereby distinguishing the rhythm, endpoint and axis positions of the curve.

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