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DEVICE FOR EARLY DETECTION OF CARDIAC ARREST AND TUBERCULOSIS

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Abstract:- *In India, about 25 percent deaths occur in the age group of 25-69 years because of a cardiac arrest. Many people among us lose their life because of heart attack. The patient can be monitored after the occurrence of heart attack only to overcome and help our society death rate and early detection of a heart attack. This heart attack detection system helps to inform if a person is about to have a heart attack by analyzing the number of beats per minute (BPM) and informs as early as the heart beat level does not fall within the permissible limit. Thus this system can be used for prior detection of heart attack.*

1. INTRODUCTION

To pre-detect Cardiac Arrest by developing an algorithm and using heart beat sensor with Arduino(ATmega328microcontr-oller). The cardiac arrest is detected by the device which has the images of the patient's heart functioning. With the help of ATmega328microcontroller the device detects whether the heart is normal or abnormal. This embedded micro controller uses IOT and hence displays the detailed information page.

IMAGE

An image is an array or a matrix of square pixels (element of picture) arranged in columns and rows. An image is an artifact, a two-dimensional picture that has a similar appearance to some subject as physical person or object.

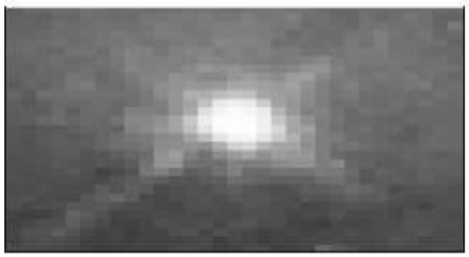


Fig 1.1: An image – an array or a matrix of pixels.

1.1 PIXEL

The Pixel is nothing but converted array of small integers of the image, it represent a physical quantity such as scene radiance, processed by computer or other digital hardware and stored in a digital memory.

An image, a photo, say. Let's make things easy and suppose the photo is black and white so no color. It consider the image as being a two-dimensional function, where the function values give the brightness of the image at any given point. It assume that the such an image brightness values can be any real numbers in the range 0.0 (black) to 1.0 (white). The ranges of x and y, it depend on the image, it take all real values between their minima and maxima. Discrete dots, each of which has a brightness associated with it. These dots are called picture elements or pixels. The pixels constitute its neighbourhood surrounding a given pixel . A neighbourhood can be characterized by its shape in the same way as a matrix: It speak of a 3*3 neighbourhood, or of a 5*7 neighbourhood. Except in very special circumstances, neighbourhoods have odd numbers of rows and columns; this ensures that the cuhood as shown in figure 1.2. If a neighbourhoorrent pixel is in the center of the neighbourhood. An example of a neighbourd has an even number of rows or columns or both, it is necessary to specify which pixel in the neighbourhood is the "current pixel".

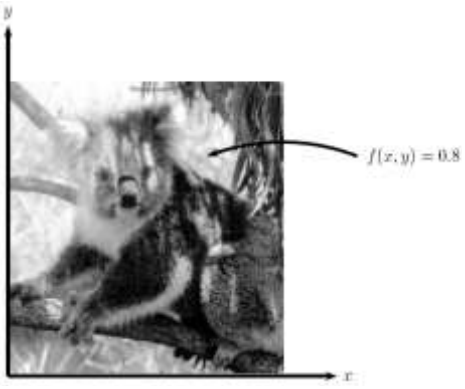


Figure 1.2 A Gray Scale Image.

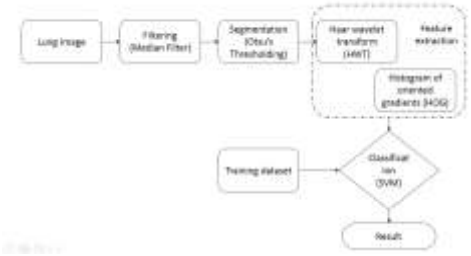
1.2 TUBERCULOSIS

Tuberculosis (TB) is an infectious disease of bacterium Mycobacterium Tuberculosis (MTB). Tuberculosis commonly affects the lungs, and also affect other parts of the body. Most infections do not have symptoms, called as latent tuberculosis. Nearly 10% of latent infections progress to active disease which, if left untreated, kills about half of those infected. The classic symptoms of active tuberculosis commonly include a chronic cough with blood containing sputum, and fever, weight loss

MYCOBACTERIA

The major cause of TB is Mycobacterium Tuberculosis, aerobic, non motile bacillus. The high lipid content of the pathogen accounts for many of its unique clinical characteristics. It divides every 16 to 20 hours, which is an extremely raises slow rate compared with other bacteria, which usually divide in less than an hour. Mycobacteria have an outer membrane lipid bilayer. As a result of the high lipid and mycolic acid content of its cell wall of a Gram stain is performed, MTB either stains very weakly "Gram-positive" or does not retain dye . MTB can survive in a dry state for weeks and withstand weak disinfectants. In nature, the bacterium can grow only in the upper region of lung. The upper region of lung is segmented.

1.3 FLOW DIAGRAM



2. FLOW DIAGRAM DESCRIPTION

First the input image selected for identification of brain tuberculosis affect in lung images. The selected image may have some noise so the image filtered by using median filter which removes the salt and pepper noise in the image. The filtered image then segmented using Otsu's thresholding algorithm which segments the lung part of the X-ray image image. Then the features of the image (i.e., mean, variance, entropy, standard deviation, etc.,) are extracted by using the Haar wavelet transform (HWT) and Histogram of oriented gradients (HOG). Finally the features of the input image are compared with the trained dataset using support vector machine. The trained dataset consists of features of normal and affected lung images. Finally the result will be shown whether tuberculosis was affected or not.

BLOCK DIAGRAM

HEART BEAT SENSOR:

Heartbeat of the person is the sound of the valves in his/her's heart contracting or expanding as they force blood from one region to another. The number of times the heart beats per minute (BPM), is the heart beat rate and the beat of the heart that can be felt in any artery that lies close to the skin is the pulse.

ATmega328

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (in which 6 pins used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a reset button. It contains everything needed to support and USB connection, a power jack, an ICSP header, and the microcontroller; simply connect it to a computer with power it with a AC-to-DC adapte or a USB cable or battery to get started.

ESP8266 ETHERNET SHIELD

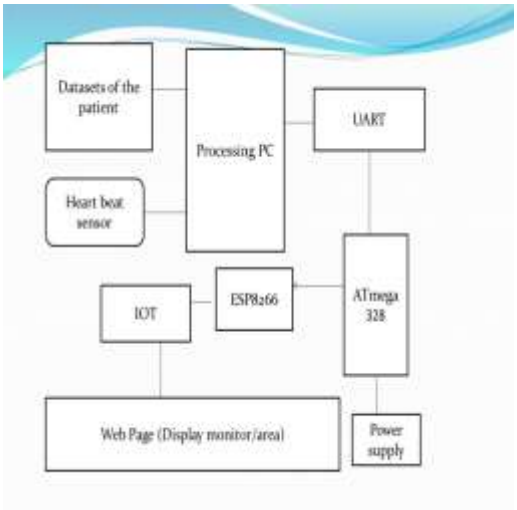
ESP8266 is in access point mode, it communicate with any station that is connected to it, and two stations

UART:

Universal Asynchronous Receiver-Transmitter for asynchronous serial communication in which the data format and transmission speeds are configurable is a computer hardware device. The electric signaling levels and methods are handled by a driver circuit external to the UART.

IOT

A web page is a document that act as a web resource on the World Wide Web. When accessed by a web browser it displayed the web page on a mobile device or monitor .The Internet of Things (IOT) refers to use the intelligently connected devices and systems to leverage data gathered by embedded sensors and physical objects. Or actuators in machines.



CONCLUSION

TB reinforced the need for rapid diagnostic improvements and new modalities to detect TB and drug-resistant TB, as well as to improve TB control. An automatic method is presented to detect abnormalities in frontal chest radio-graphs which are aggregated into an overall abnormality score.

The method aimed at finding abnormal signs of a diffuse textural nature, such as it encountered in mass chest screening against Tuberculosis (TB). The scheme starts with filtering the chest cardiographs using median filter then the features of the filtered image will be extracted using Haar wavelet transform (HWT) and histogram of oriented gradients then the automatic segmentation of the lung fields will be done by using Otsu's thresholding algorithm. Finally the extracted futures are compared with the trained data sets using support vector machine and the result will be shown whether then tuberculosis is affected or not.

All the above process completed and lung images are successfully classified whether the lung image was affected or not by using support vector machine.

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