STUDY OF HEART RATE VARIABILITY (HRV) USING PHOTOPLETHYSMOGRAPHY (PPG)

The aim of this project is to conduct an analysis based study on Heart Rate Variability (HRV) of different group of people. HRV's are measured by acquiring the Pulse Plethysmo- Graphs of the suggested subjects. PPG's of these subjects are acquired using basic PPG circuitry and also using Polyrite. Different groups of subjects were selected such as Smokers & Non-Smokers, Diabetes patients and people who practicing Yoga. The PPG datas of these subjects were analysed using a MATLAB program.

Analysis is done in two different domains, time and frequency. Various time domain parameters like Standard Deviation, Root Mean Square Deviation, NN50 etc. Frequency domain parameters like VF, LF were calculated using the developed MATLAB program. And a comparative study with the parameters of normal people were done and noticed the difference.

The purpose of this project is twofold. The first purpose is to detect peaks from raw photoplethysmography (PPG) signals. The second purpose is to estimate the heart rate variability (HRV) by finding the peaks in PPG signal. Heart Rate Variability (HRV) is a measure of the fluctuation of the time interval between heart beats and is calculated based on time series between stroke derived from electrocardiogram (ECG), arterial pressure (AP) or PPG signals, separately. PPG is a method widely used to measure blood volume of tissue on the basis of blood volume change in every heart beat. In the estimation of HRV signal from PPG signal, HRV is calculated by measuring the time intervals between the peak values in PPG signal. Finding peak values correctly from PPG signals, the HRV signal can be estimated.