INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student	:	Rajesh Kumar Tripathy
Roll Number	:	136102010
Programme of Study	:	Ph.D.

Thesis Title: New Diagnostic Features from Multilead ECG Signal for Detection of Cardiac Ailments

Name of Thesis Supervisor	:	Prof. Samarendra Dandapat
Thesis Submitted to the Department/ Center	:	EEE
Date of completion of Thesis Viva-Voce Exam	:	15/05/2017
Key words for description of Thesis Work	:	ECG, Multilead ECG, Cardiac Ailments, Diagnostic Features, Feature Selection, Classification

SHORT ABSTRACT

Electrocardiogram (ECG) provides the diagnostic information about the depolarization and the relaxation activities of heart chambers. This diagnostic information is captured using morphological features (amplitude, duration and shape of P-wave, QRS-complex and T-wave of ECG). The variations in the morphological features of ECG are the symptoms of particular heart pathology. It is a time-consuming task for medical experts to visually identify any subtle changes in the morphological features during 24 hours of ECG recording. Therefore, the automated analysis of ECG signal using various signal processing techniques is required for accurate detection of cardiac ailments. This thesis documents our investigations on the diagnostic information of ECG signal for detection of various cardiac abnormalities. There are three major contributions. First, the multiscale energy and eigenspace features are proposed for detection and localization of myocardial infarction (MI) from multilead ECG. Second, the complex wavelet magnitude and phase features are evaluated for detection of bundle branch block (BBB), heart muscle diseases (HMD) and MI. Third, the variational mode energy and entropy features are tested for detection of shockable ventricular arrhythmia. Comparison with the existing methods for detection of cardiac abnormalities shows the effectiveness of the performance of the proposed diagnostic features of ECG signal.