

# Assignment 2 : QRS Detection from ECG signals

10 points

Due Date: October 9, 2021

## 1 Background

A dependable QRS recognition algorithm has numerous applications. A popular technique is the computer interpretation of the 12-lead ECG. Arrhythmia monitors are now widely used in coronary care units. Holter tape recording, which is widely used, necessitates a Holter scanning device that includes a QRS detector to analyse the tapes much faster than in real-time. Arrhythmia monitors for ambulatory patients that analyse the ECG in real time are currently in development. When an arrhythmia occurs, such a monitor can be programmed to immediately store an interval of the abnormal ECG for subsequent transmission to a central station where a physician can interpret it.

Such a device necessitates highly accurate QRS recognition. False detection results in unnecessary data transmission to the central station or requires an extensive memory to store any ECG segments that are captured unnecessarily. As a result, an accurate QRS detector is an essential component of many ECG instruments.

## 2 Problem Statement

To perform QRS detection on ECG signals from the [MIT-BIH Arrhythmia Database](#). The students need to detect the heart rate of the subjects using the detected QRS signals. Students are expected to use the [Pan-Tompkins](#) method to detect QRS signals.

## 3 Procedure

- Open the [colab file](#), and follow along the lines. The dataset downloading util and some other utils have already been completed for you. You can start with running them.
- Before starting, go through the colab to understand the assignment in a better way.
- You have been provided with 10 ECG signals for this assignment.

- You are required to complete the given code template and the other components that are present in the colab file.
- Once completed with the code, students need to report the corresponding QRS detection and intermediate signals as well as the heart rate for each ECG signal and show the in a presentable manner in the Results section.
- For any doubts, add your questions to the [FAQ document](#).

## 4 Deliverables

1. You are required to submit the completed colab file with the following file name **RollNo\_Assignment2.ipynb**
2. Here is the marking scheme.
  - Code (5 marks)
    - QRS Detection (3 marks)
    - Plotting QRS Signals (1 mark)
    - Heart Rate Detection (1 mark)
  - Report (5 marks)
    - Understanding Algorithm (2 marks)
    - Results (2 marks)
    - Conclusion (1 mark)
3. Please submit the report within the colab file.
4. Avoid any sort of malpractice and adhere to the institute's code of conduct.