SPRINT 1: Classification of Arrhythmia by Using Deep Learning With 2-D ECG Spectral Image Representation

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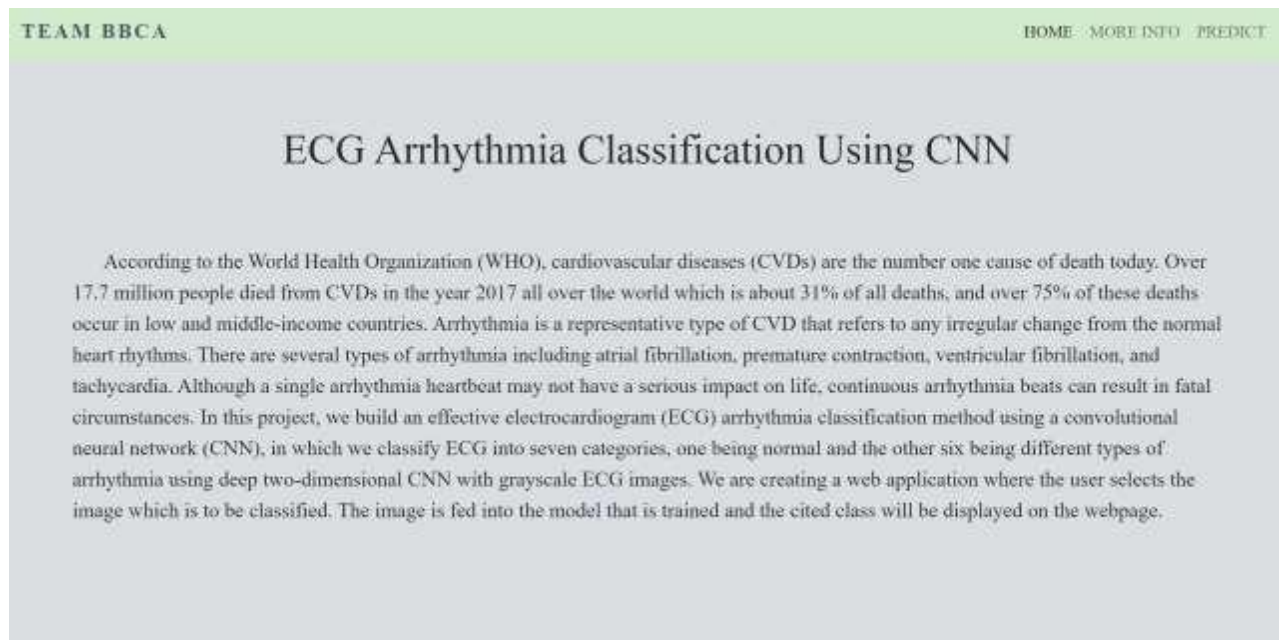**Code:** Updated in GitHub in the Deliverables section in Sprint1 folder.

Description of USN and Screenshots:

USN-1:
As a user, I will get the full idea of ECG Arrhythmia classification using CNN where the details of the webpage will be given and info about different CVDs are provided. The homepage must properly define the Arrhythmia, its causes and effects and understand how the application helps in solving the problem.
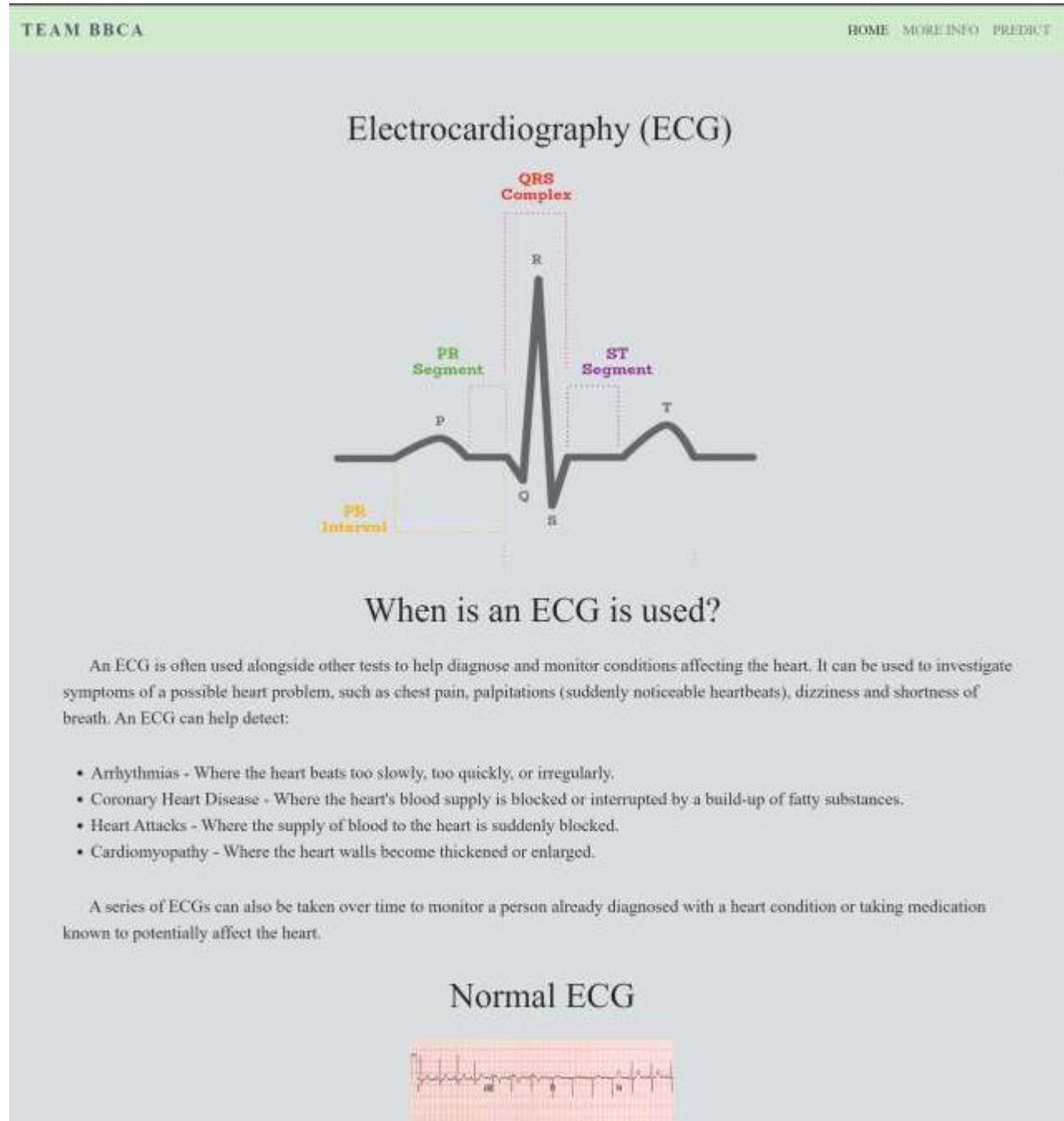
Screenshot:

TEAM BBCA   HOME   MORE INFO   PREDICT

ECG Arrhythmia Classification Using CNN

According to the World Health Organization (WHO), cardiovascular diseases (CVDs) are the number one cause of death today. Over 17.7 million people died from CVDs in the year 2017 all over the world which is about 31% of all deaths, and over 75% of these deaths occur in low and middle-income countries. Arrhythmia is a representative type of CVD that refers to any irregular change from the normal heart rhythms. There are several types of arrhythmia including atrial fibrillation, premature contraction, ventricular fibrillation, and tachycardia. Although a single arrhythmia heartbeat may not have a serious impact on life, continuous arrhythmia beats can result in fatal circumstances. In this project, we build an effective electrocardiogram (ECG) arrhythmia classification method using a convolutional neural network (CNN), in which we classify ECG into seven categories, one being normal and the other six being different types of arrhythmia using deep two-dimensional CNN with grayscale ECG images. We are creating a web application where the user selects the image which is to be classified. The image is fed into the model that is trained and the cited class will be displayed on the webpage.

USN-2:

As a user, I can enter the webpage and view the homepage about the information about Electrocardiography **(ECG)** giving a clear perspective of the signals. I must also be able to comprehend all medical jargon related to Arrhythmia such as ECG, Coronary Heart Disease, Cardiomyopathy and its types.

Screenshot

TEAM BBCA   HOME   MORE INFO   PREDICT

Electrocardiography (ECG)

When is an ECG is used?

An ECG is often used alongside other tests to help diagnose and monitor conditions affecting the heart. It can be used to investigate symptoms of a possible heart problem, such as chest pain, palpitations (suddenly noticeable heartbeats), dizziness and shortness of breath. An ECG can help detect:

- Arrhythmias - Where the heart beats too slowly, too quickly, or irregularly.
- Coronary Heart Disease - Where the heart's blood supply is blocked or interrupted by a build-up of fatty substances.
- Heart Attacks - Where the supply of blood to the heart is suddenly blocked.
- Cardiomyopathy - Where the heart walls become thickened or enlarged.

A series of ECGs can also be taken over time to monitor a person already diagnosed with a heart condition or taking medication known to potentially affect the heart.

Normal ECG

A normal ECG is illustrated above. Note that the heart is beating in a regular sinus rhythm between 60 - 100 beats per minute (specifically 82 bpm). All the important intervals on this recording are within normal ranges.

Abnormal ECG

Electrocardiographic abnormalities include first-degree heart block, right and left bundle branch block, premature atrial and