

# **PROJECT DESIGN PHASE**

**BY,**

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# **CLASSIFICATION OF ARRHYTHMIA BY USING DEEP LEARNING WITH 2D ECG SPECTRAL IMAGE REPRESENTATION**

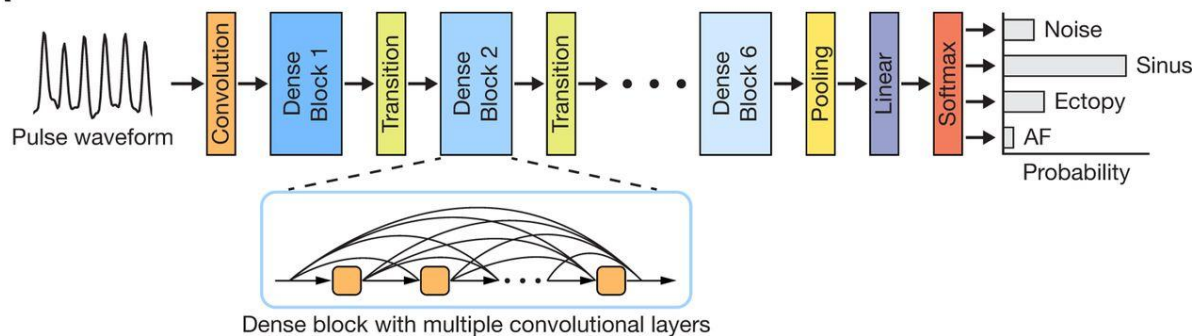
CARDIOVASCULAR DISEASES (CVDs) ARE THE LEADING CAUSE OF HUMAN DEATH, WITH OVER 17 MILLION PEOPLE KNOWN TO LOSE THEIR LIVES ANNUALLY DUE TO CVDs[3]. ONE OF THE COMMON SOURCES OF CVDs IS CARDIAC ARRHYTHMIA, WHERE HEARTBEATS ARE KNOWN TO DEVIATE FROM THEIR REGULAR BEATING PATTERN. A NORMAL HEARTBEAT VARIES WITH AGE, BODY SIZE, ACTIVITY, AND EMOTIONS. IN CASES WHERE THE HEARTBEAT FEELS TOO FAST OR SLOW, THE CONDITION IS KNOWN AS PALPITATIONS. AN ARRHYTHMIA DOES NOT NECESSARILY MEAN THAT THE HEART IS BEATING TOO FAST OR SLOW, IT INDICATES THAT THE HEART IS FOLLOWING AN IRREGULAR BEATING PROBLEM.

**PROPOSED SOLUTION:**

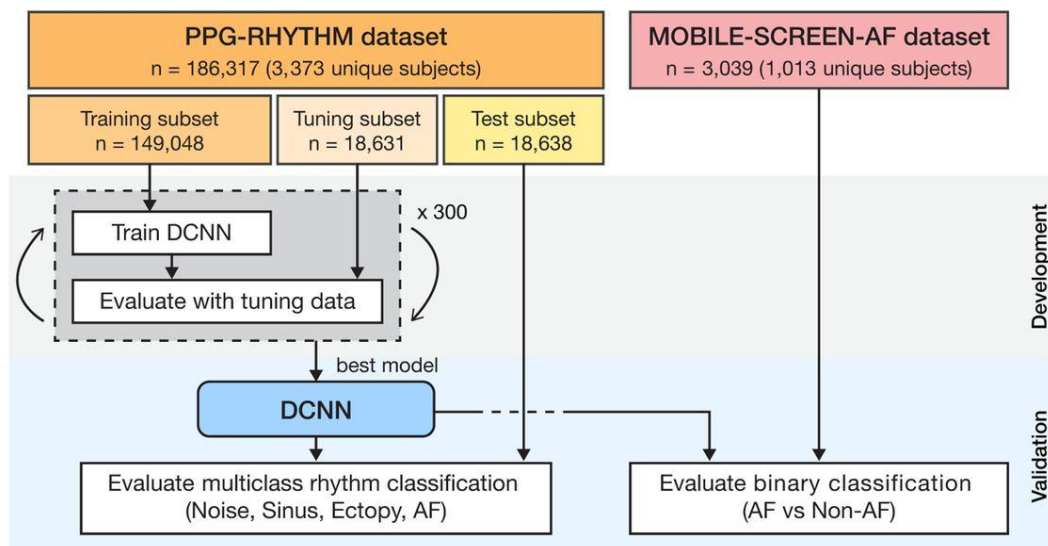
- THECSS ECG SIGNAL DETECTS ABNORMAL CONDITIONS AND MALFUNCTIONS BY RECORDING THE POTENTIAL BIO-ELECTRIC VARIATION OF THE HUMAN HEART.
- TO OVERCOME THIS CHALLENGE FOR THE VISUAL AND PHYSICAL EXPLANATION OF THE
- ECG SIGNAL, COMPUTER-AIDED DIAGNOSTIC SYSTEMS HAVE BEEN DEVELOPED TO AUTOMATICALLY IDENTIFY SUCH
- SIGNALS AUTOMATICALLY .
- MOST OF THE RESEARCH IN THIS FIELD HAS BEEN CONDUCTED BY INCORPORATING
- DIFFERENT APPROACHES OF MACHINE LEARNING (ML) TECHNIQUES FOR THE EFFICIENT IDENTIFICATION AND ACCURATE EXAMINATION OF ECG SIGNALS
- ECG SIGNAL CLASSIFICATION BASED ON DIFFERENT APPROACHES HAS BEEN PRESENTED IN THE LITERATURE INCLUDING FREQUENCY ANALYSIS, ARTIFICIAL NEURAL NETWORKS (ANNs) ,HEURISTIC-BASED METHODS , STATISTICAL METHODS , SUPPORT VECTOR MACHINES (SVMs), WAVELET TRANSFORM , FILTER BANKS , HIDDEN MARKOV MODELS , AND MIXTURE-OF-EXPERT METHODS .
- AN ARTIFICIAL NEURAL NETWORK BASED METHOD OBTAINED AN AVERAGE ACCURACY OF 90.6% FOR THE CLASSIFICATION OF ECG WAVES.

## TECHNICAL ARCHITECTURE

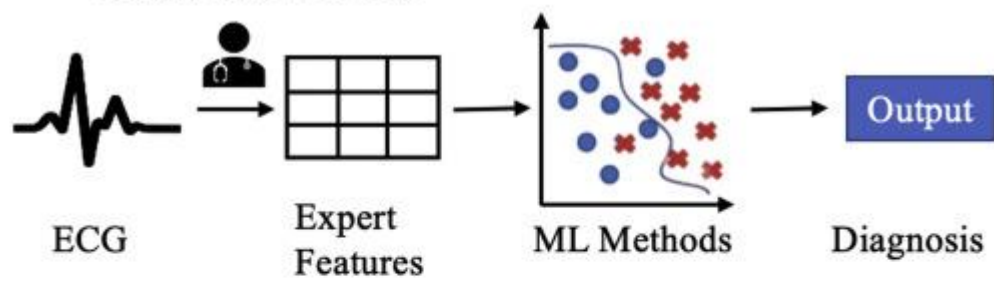
**A**



**B**



**A Traditional methods**



**B Deep learning methods**

