**Machine Learning and End-to-End Deep Learning for the Detection of Chronic Heart Failure From Heart Sounds**

**ABSTRACT:**

We present a method for CHF detection based on heart sounds. The method combines classic Machine-Learning (ML) and end-to-end Deep Learning (DL). The classic ML learns from expert features, and the DL learns from a spectro-temporal representation of the signal. The method was evaluated on recordings from 947 subjects from six publicly available datasets and one CHF dataset that was collected for this study. Using the same evaluation method as a recent PhysoNet challenge, the proposed method achieved a score of 89.3, which is 9.1 higher than the challenge’s baseline method. The method’s aggregated accuracy is 92.9% (error of 7.1%); while the experimental results are not directly comparable, this error rate is relatively close to the percentage of recordings labeled as ‘‘unknown’’ by experts (9.7%). Finally, we identified 15 expert features that are useful for building ML models to differentiate between CHF phases (i.e., in the decompensated phase during hospitalization and in the recompensated phase) with an accuracy of 93.2%. The proposed method shows promising results both for the distinction of recordings between healthy subjects and patients and for the detection of different CHF phases. This may lead to the easier identification of new CHF patients and the development of home-based CHF monitors for avoiding hospitalizations

**EXISTING SYSTEM:**

Chronic heart failure (CHF) affects over 26 million of people worldwide, and its incidence is increasing by 2% annually. Despite the significant burden that CHF poses and despite the ubiquity of sensors in our lives, methods for automatically detecting CHF are surprisingly scarce, even in the research community

**DISADVANTAGES:**

* A soft first heart sound is present in congestive heart failure or with prolonged atrioventricular (AV) conduction.
* Less Accuracy

**PROPOSED SYSTEM:**

Chronic heart failure (CHF) is a chronic, progressive condition underscored by the heart’s inability to supply enough perfusion to target tissues and organs at the physiological filling pressures to meet their metabolic demands [1]. CHF has reached epidemic proportions in the population, as its incidence is increasing by 2% annually. In the developed world, CHF affects 1-2% of the total population and 10% of people older than 65 years. Currently, the diagnosis and treatment of CHF uses approximately 2% of the annual healthcare budget

**ADVANTAGES:**

* For emergency department patients with shortness of breath and a risk of heart failure, physicians usually grab one thing first: a stethoscope.
* It allows them to hear the S3, an abnormal third sound in the heart's rhythm strongly associated with cardiac disease and heart failure.
* High Accuracy

**SYSTEM REQUIREMENTS**

**HARDWARE REQUIREMENTS**:

Processor - intel i3 or i4

Speed - 1.1 GHz

RAM - 4 GB (min)

Hard Disk - 500 GB(min)

Key Board - Standard Windows Keyboard

Mouse - Two or Three Button Mouse

Monitor - SVGA

**SOFTWARE REQUIREMENTS:**

Operating System - Windows 10 or above

Programming Language - Python