**ABSTRACT**

**Title of the Project:**  
PULSECHECK – LIGHTWEIGHT ML-BASED CLASSIFICATION OF HEART SOUNDS USING PCG SIGNALS  
  
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**ABSTRACT:**

Cardiovascular diseases are one of the major causes of death worldwide, highlighting the need for accessible and affordable screening techniques. Traditional diagnostic methods using a stethoscope are often subjective and depend on clinical expertise, making early detection a challenge in rural and resource-limited areas.  
  
This project, PulseCheck – Lightweight ML-Based Classification of Heart Sounds Using PCG Signals, aims to provide a machine learning–based system capable of classifying heart sounds into categories such as Normal and Abnormal. The system uses publicly available Phonocardiogram (PCG) signal datasets that undergo a series of preprocessing steps, including resampling, noise reduction, and normalization, to ensure consistent, high-quality data.  
  
Feature extraction is performed on the processed signals, and the resulting feature set is passed through a lightweight ML pipeline that employs SMOTE for class balancing and XGBoost for classification. Experimental evaluation demonstrates that PulseCheck achieves high accuracy in detecting abnormal and normal heart sounds.  
  
The proposed system is efficient, lightweight, and suitable for integration into mobile applications, telemedicine platforms, and digital stethoscopes, making it a valuable screening tool for healthcare providers. By facilitating early diagnosis, PulseCheck contributes to the timely prevention and management of cardiac diseases.