



(<http://ipindia.nic.in/index.htm>)



(<http://ipindia.nic.in/inc>)

Patent Search

Invention Title	"SYSTEM AND METHOD FOR REVOLUTIONIZING CARDIAC CARE: HARNESSING ARTIFICIAL INTELLIGENCE FOR EARLY CARDIAC ARREST DETEC
Publication Number	10/2026
Publication Date	06/03/2026
Publication Type	INA
Application Number	202641023906
Application Filing Date	27/02/2026
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	BIO-MEDICAL ENGINEERING
Classification (IPC)	A61B 5/00, A61B 5/361, A61B 5/352, A61B 5/363, A61B 5/0205

Inventor

Name	Address	Country	Nat
Vellanki Chandra Sekhar,	Vellanki Chandra Sekhar, Associate Professor, YJR DMS College of Engineering, Pothealli, Machilipatnam 521002. vcsongole@gmail.com	India	Indi
Dr. Guntapalli Minni	Dr. Guntapalli Minni Professor, Department of CSE, Lakireddy Bali Reddy College of Engineering ,Mylavaram, NTR,AP-521230, minni.guntapalli@gmail.com	India	Indi
Durgada V L Prasanna	Durgada V L Prasanna Assistant Professor, Department of Mathematics, Aditya University, Surampalem,Andhra Pradesh-533437 , lakshmisreee.21@gmail.com	India	Indi
Pagalla Bhavani Shankar	Pagalla Bhavani Shankar Assistant Professor, Department of Computer Science and Engineering, University College of Engineering and Technology, Krishna University ,Machilipatnam,Andhra Pradesh-521 004 ,pagallabhavanishankar@gmail.com	India	Indi
Dr. Srinivasan Nagaraj,	Dr. Srinivasan Nagaraj, Professor, Department of CSE, CBIT, Proddatur, Pallavolu village, Chapad mandal,Andhra Pradesh -516360 . sri.mtech04@gmail.com	India	Indi
Dr.G.S.Jyothirmai	Dr.G.S.Jyothirmai Associate Professor, Department of Zoology, Government Degree College for Women, Begumpet, Hyderabad, Telangana-500016 drgjyothi@gmail.com	India	Indi
Dr. Lowlesh Nandkishor Yadav,	Dr. Lowlesh Nandkishor Yadav, Associate Professor, Department of Computer Engineering, Suryodaya College of Engineering & Technology, Vihirgaon, Umrer Road, Nagpur,Maharashtra-440034 Lowlesh.yadav@gmail.com	India	Indi
Dr.Ch. Asha Immanuel Raju	Dr.Ch. Asha Immanuel Raju Associate Professor, Andra University College of Engineering, Visakhaptnam, Andrapradesh, India- 530003 chairaju@andhrauniversity.edu.in	India	Indi

Applicant

Name	Address	Country	Nat
Vellanki Chandra Sekhar,	Vellanki Chandra Sekhar, Associate Professor, YJR DMS College of Engineering, Pothepalli, Machilipatnam 521002. vcsongole@gmail.com	India	Indi
Dr. Guntapalli Minni	Dr. Guntapalli Minni Professor, Department of CSE, Lakireddy Bali Reddy College of Engineering ,Mylavaram, NTR,AP-521230, minni.guntapalli@gmail.com	India	Indi
Durgada V L Prasanna	Durgada V L Prasanna Assistant Professor, Department of Mathematics, Aditya University, Surampalem,Andhra Pradesh-533437 , lakshmisreee.21@gmail.com	India	Indi
Pagalla Bhavani Shankar	Pagalla Bhavani Shankar Assistant Professor, Department of Computer Science and Engineering, University College of Engineering and Technology, Krishna University ,Machilipatnam,Andhra Pradesh-521 004 ,pagallabhavanishankar@gmail.com	India	Indi
Dr. Srinivasan Nagaraj,	Dr. Srinivasan Nagaraj, Professor, Department of CSE, CBIT, Proddatur, Pallavolu village, Chapad mandal,Andhra Pradesh -516360 . sri.mtech04@gmail.com	India	Indi
Dr.G.S.Jyothirmai	Dr.G.S.Jyothirmai Associate Professor, Department of Zoology, Government Degree College for Women, Begumpet, Hyderabad, Telangana-500016 drgjyothi@gmail.com	India	Indi
Dr. Lowlesh Nandkishor Yadav,	Dr. Lowlesh Nandkishor Yadav, Associate Professor, Department of Computer Engineering, Suryodaya College of Engineering & Technology, Vihirgaon, Umrer Road, Nagpur,Maharashtra-440034 Lowlesh.yadav@gmail.com	India	Indi
Dr.Ch. Asha Immanuel Raju	Dr.Ch. Asha Immanuel Raju Associate Professor, Andhra University College of Engineering, Visakhapatnam, Andrapradesh, India-530003 chairaju@andhrauniversity.edu.in	India	Indi

Abstract:

ABSTRACT OF THE INVENTION: The present invention provides a system and method for the early, proactive prediction of cardiac arrest utilizing a hybrid Artificial Intelligence engine. Traditional cardiac monitors are reactive, triggering alarms only after a life-threatening threshold is crossed, which often provides insufficient time for clinical intervention. This invention overcomes these limitations by analyzing real-time streams of physiological data, including ECG and PPG signals, to forecast an impending cardiac event before it occurs. The system comprises a data acquisition module, a signal preprocessing and feature extraction engine, and a novel hybrid AI prediction engine. The preprocessing engine filters noise and extracts a wide array of complex features, including time-domain, frequency-domain, and non-linear metrics such as Heart Rate Variability (HRV), Approximate Entropy, and Detrended Fluctuation Analysis, which capture the underlying stability of the cardiac system. The hybrid AI engine uniquely integrates three advanced computational models: a Long Short-Term Memory (LSTM) network to analyze temporal trends in the extracted features; a Convolutional Neural Network (CNN) to identify subtle, pre-cursory morphological changes directly from raw ECG waveforms; and a Gradient Boosting Machine (GBM) classifier that fuses the outputs of the LSTM and CNN to generate a dynamic Cardiac Arrest Risk Index (CARI). The CARI is a continuously updated numerical score representing the probability of a cardiac arrest event within a future window, configurable from 1 to 6 hours. When the CARI exceeds a critical threshold, an alert module generates tiered, audiovisual notifications on a clinical interface. Crucially, the system provides interpretability by displaying the key physiological contributors (e.g., "decreasing HRV," "elevated T-wave alternans") that led to the high-risk score, guiding clinicians towards specific patient derangements and enabling timely, targeted interventions. This proactive and interpretable approach significantly reduces false alarms, combats alert fatigue, and provides a crucial therapeutic window, thereby improving patient outcomes in critical care settings.

Complete Specification

Description: Summary of the invention:

The present invention provides a revolutionary system and method for the early detection and prediction of cardiac arrest by harnessing the power of Artificial Intelligence. The system is designed to overcome the limitations of reactive, threshold-based monitoring by providing a proactive, predictive, and clinically actionable early warning system.

At its core, the invention comprises a multi-layered architecture. First, a Data Acquisition Module interfaces with standard and non-standard patient monitoring equipment (e.g., ECG leads, pulse oximeters, blood pressure cuffs) to receive a continuous, real-time stream of physiological data. This data includes, but is not limited to, multi-lead Electrocardiogram (ECG) signals, Photoplethysmography (PPG) waveforms for heart rate and oxygen saturation (SpO2), invasive and non-invasive arterial blood pressure (BP) waveforms, and respiratory rate.

This raw data is fed into a Signal Preprocessing and Feature Extraction Engine. This engine performs critical functions such as noise filtering (removing motion artifacts and power-line interference), baseline wander correction, and signal quality indexing. Subsequently, it extracts a vast array of features. These features are not limited to simple statistics but include:

- Time-domain features of Heart Rate Variability (HRV): SDNN, RMSSD, pNN50.
- Frequency-domain features of HRV: Low Frequency (LF) and High Frequency (HF) power, LF/HF ratio.

[View Application Status](#)



Department of Industrial Policy and Promotion
Government of India

