A Heartbeat of Innovation: Safer ECG Devices Developed at IIT Indore

A team at IIT Indore, led by Principal Investigator **Prof. Anirban Sengupta** and including Ph.D. student Aditya Anshul, has developed groundbreaking technology that promises to enhance the safety and reliability of electrocardiogram (ECG) devices and cardiac pacemakers. This innovative technology, which has received a patent from the Indian Patent Office, focuses on the fields of VLSI semiconductors and biomedical engineering. The research findings have been published in the prestigious journal *'Nature Scientific Reports'*.

With the increasing rates of cardiac failure and cardiovascular diseases, accurate detection of these conditions has never been more crucial. However, unreliable ECG readings can pose serious risks to patients. ECG devices, essential for monitoring heart conditions, work by capturing electrical signals generated by the heart through various electrodes. These readings are then analyzed by healthcare professionals to assess a patient's heart health. Furthermore, ECG detectors play a vital role in cardiac pacemakers, which regulate heartbeats in patients.

The new technology developed by the team at IIT Indore is designed to create safe and secure chips for these ECG devices and pacemakers. It includes a crucial feature that distinguishes between genuine and counterfeit ECG detector chips before they are manufactured or integrated into devices. This capability is vital for ensuring the reliability of ECG devices and cardiac pacemakers, minimizing the risks of misdiagnosis and errors that can lead to inadequate treatment. Currently, many ECG devices and pacemakers face reliability issues, leading to numerous mistakes in medical diagnoses that often go unaddressed, ultimately harming patients.

This technology specifically aims to safeguard patients from the dangers posed by unreliable ECG devices that could result in misdiagnosis. It not only secures the chips used in ECG devices but also guarantees that these devices contain authentic chips marked with a unique fingerprint hallmark. Such innovations can revolutionize the medical sector by enabling the development of secure and trustworthy ECG devices.

Overall, technology promises to reshape the landscape of cardiovascular health monitoring by providing reliable ECG devices and cardiac pacemakers. The end goal is to protect patients by eliminating the shortcomings currently present in the diagnosis process, ensuring they receive the most accurate and effective medical care possible.



