SYSTEM AND METHOD FOR ELECTROPHYSIOLOGICAL MONITORING OF HEART USING DRY ELECTRODES

IITM Technology Available for Licensing

Problem Statement

- Current **standard ECG methods** have limitations in providing **accurate diagnostic inputs for heart failures**.
- **Invasive intracardiac ECG** mapping procedures are complex, time-consuming, uncomfortable, and risky.
- An improved system and method **for non-invasive electrophysiological** monitoring of the heart is required.
- The invention aims to accurately measure **electrical activity, including high potential areas, without invasive procedures.**
- The invention seeks to improve **heart failure diagnosis** and **catheter ablation planning, enhancing patient care.**

Technology Category/ Market

Category – Medical and Diagnostic Equipment
Applications -Electrophysiological Monitoring of the Heart, Heart Failure Diagnosis, Cardiac Research and Studies, Non-Invasive Heart Monitoring.
Industry - Healthcare and Medical Technology
Market - Global Medical Devices Market size was valued at USD 62.6 billion in 2021 and is poised to grow from USD 63.4 billion in 2022 to USD 134.56 billion by 2030, growing at a CAGR of 11.35% in the forecast period (2023-2030).

Intellectual Property

- **IITM IDF Ref. 1150**
- **IN 434703 (PATENT GRANTED)**

TRL (Technology Readiness Level)

TRL- 4, **Technology validated in lab.**

Research Lab

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Key Features / Value Proposition

- The invention offers a **Non-invasive method** using dry electrodes for monitoring **heart's electrical activity.**
- The system provides precise electrophysiological data enabling **accurate diagnostics for heart failures and arrhythmias.**
- Improved planning for **catheter ablation procedures**.
- **Cost-effective** and efficient alternative to invasive methods and **time-consuming invasive procedures**.
- The invention's detailed data is valuable for **cardiac research and advancing heart physiology** understanding.

Technology

1. **The invention utilizes 3D printing technology to design and fabricate Polymer- based dry electrodes. The dry electrodes are specifically designed to be non-invasive and comfortable for the patient.**
2. **The dry electrodes undergo a Preplating process including electroless nickel plating and gold plating, enhances electrode conductivity and biocompatibility.**
3. **The system incorporates an ultra-high channel jacket strategically positions electrodes on both conventional and high potential areas of the body.**
4. **The receiving unit in the system collects and maps the 3D information, amplifies and converts electrophysiological signals to digital data.**
5. **The processed data is then rendered on a digital or printable media, providing accurate diagnostics for heart failures and aiding in catheter ablation planning.**

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Image

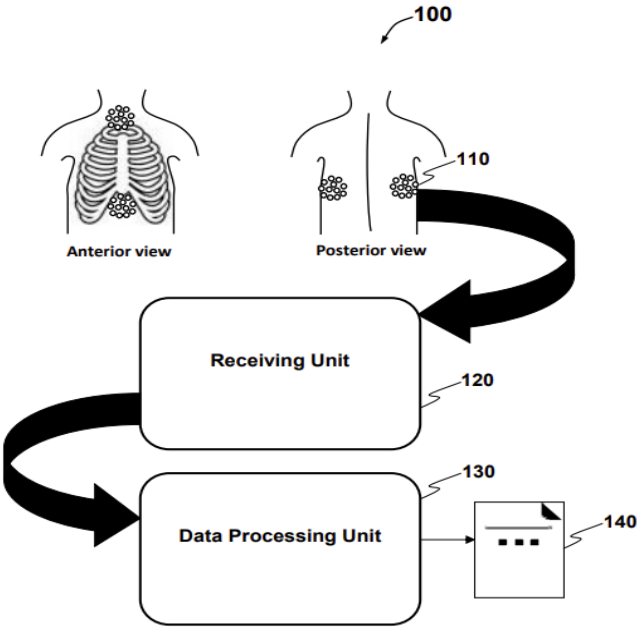

Fig.1 shows an improved system (100) using dry electrodes (110) for heart monitoring, providing alerts for detecting cardiac ailments.

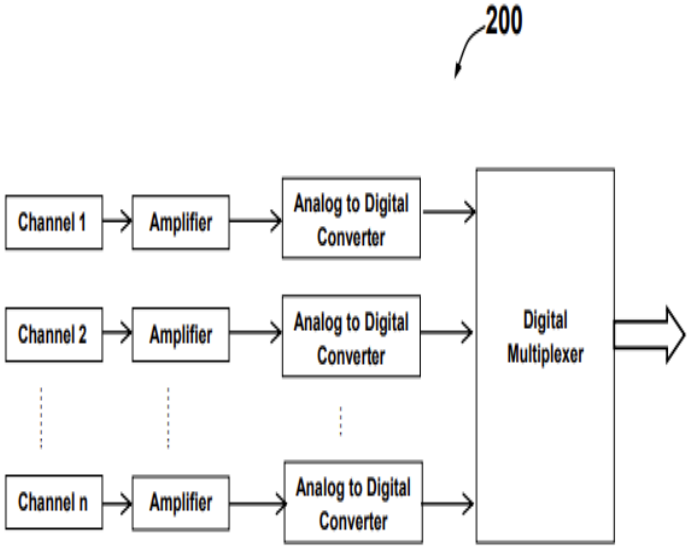

Fig.2 illustrates a multichannel data acquisition system (200) processing electrophysiological data from 3D-printed dry electrodes (110) for accurate heart monitoring and diagnosis.

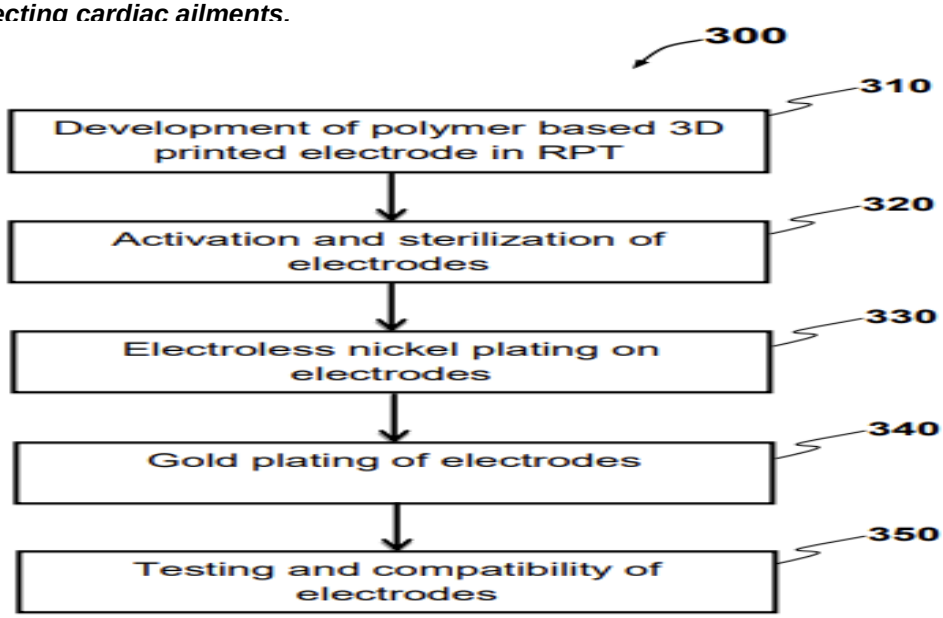

Fig.3 illustrates the method (300) for designing 3D printed dry electrodes, enabling their use in accurate heart monitoring for various heart failure instances.

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