

FORM 2

THE PATENTS ACT 1970

(39 of 1970)

&

The Patent Rules 2003

COMPLETE SPECIFICATION

(See section 10 and rule 13)

TITLE OF THE INVENTION

“5G-Enabled Emergency Response System for Cardiac and Stroke Patients”

Applicant(s)

NAME	NATIONALITY	ADDRESS
1. Prof. (Dr.) Mohammad Chand Jamali	Indian	Designation: Assistant Professor Department: Faculty of Medical and Health Sciences University name: Liwa College, Al Ain Abu Dhabi, UAE Email Id: mjamali68@gmail.com Contact No: 9576510444
2. Dr. Shashi Kumar	Indian	Designation: Director & HOD – Paras HMRI Patna Department: Nephrology, University name: Paras HMRI, Patna Bihar Email Id: shashigmc@yahoo.co.in Contact No: 7978585120

3. Prof. (Dr.) Rakesh Kr. Singh	Indian	Designation: Head of Department Department: Center for Nanoscience and Nontechnology University name: Aryabhatta Knowledge University, Patna. Email Id: rakeshsinghpu@gmail.com Contact No: 9304197595
---------------------------------	--------	---

4. Dr. Bibhuti Bikramaditya	Indian	Designation : Director Department : Smartway Electronics Pvt. Ltd, Patna University name: Aryabhatta Knowledge University, Patna. Email Id: bbikramaditya@gmail.com Contact No: 8002359537
5. : Dr. Mohammad Amanullah	Indian	Designation : Head Department : Dept. of Pathology and Laboratory Medicine University name: Al Shaheen Paramedical College and Hospital, Mashrak, Saran Email Id: insan6702@gmail.com Contact No: 8544259833
6. Dr. M. S. Ahmed	Indian	Designation : Head Department : Dept. of Radiology and Imaging Science University name: Al Shaheen Paramedical College and Hospital, Mashrak, Saran Email Id: drsaiuahmad@hotmail.com Contact No: 9934991998
7. Dr. Arpana Kumari Mishra	Indian	Designation : Medical Officer Department : Al Shaheen Paramedical College and Hospital, Mashrak, Saran University name: Al Shaheen Paramedical College and Hospital, Mashrak, Saran Email Id: mishraarpana309@gmail.com Contact No: 7033093328

8. Dr. Shabnam Naaz	Indian	Designation : Medical Officer Department : Al Shaheen Paramedical College and Hospital, Mashrak, Saran University name: Al Shaheen Paramedical College and Hospital, Mashrak, Saran Email Id: drshabazi1010@gmail.com Contact No: 9473449900
9. Dr. Naiyer Azam	Indian	Designation : Medical Officer Department : Al Shaheen Paramedical College and Hospital, Mashrak, Saran University name: Al Shaheen Paramedical College and Hospital, Mashrak, Saran Email Id: naiyer92@gmail.com Contact No: 9741644986
10. Dr Raju Ranjan	Indian	Designation : Medical Officer Department : Al Shaheen Paramedical College and Hospital, Mashrak, Saran University name: Al Shaheen Paramedical College and Hospital, Mashrak, Saran Email Id: alshaheeninstitutions@gmail.com Contact No: 7488262726

The following specification particularly describes the nature of the invention and the manner in which it is performed:

FIELD OF THE INVENTION

The proposed 5G-Enabled Emergency Response System for Cardiac and Stroke Patients represents a significant advancement at the convergence of digital health, telecommunications, and emergency medical services. This innovative system harnesses the capabilities of 5G technology, wearable medical devices, real-time data analytics, and artificial intelligence (AI) to transform pre-hospital emergency care for individuals facing critical conditions such as cardiac incidents and strokes. By capitalizing on the ultra-low latency and high-speed data transmission features of 5G networks, the system facilitates continuous monitoring of vital signs through wearable biosensors, ensuring that essential health information is relayed in real-time to healthcare professionals. It incorporates telemedicine capabilities, enabling remote evaluations and guidance from physicians through 5G-enabled video communication, thereby improving the efficiency and precision of emergency medical responses. Furthermore, the system employs AI driven algorithms for predictive risk assessment, automated notifications, and route optimization, ensuring that emergency medical services (EMS) teams are swiftly alerted and directed along the most effective route to the patient's location. This invention addresses the urgent need for expedited and efficient emergency response, with the goal of minimizing time to treatment, enhancing patient outcomes, and potentially saving lives. It also prioritizes data security and adherence to health regulations, utilizing encryption and privacy protocols to safeguard sensitive patient data. This innovation effectively merges telecommunications with medical technology, establishing a new benchmark in emergency healthcare delivery and significantly enhancing the management of cardiac and stroke emergencies.

Background of the proposed invention:

The background of the proposed 5G-Enabled Emergency Response System for Cardiac and Stroke Patients addresses the critical need for rapid and efficient medical intervention in life threatening emergencies, where every second counts. Cardiac and stroke events are leading causes of morbidity and mortality worldwide, with patient outcomes heavily dependent on the speed and quality of pre-hospital care. Traditional emergency response systems often face challenges such as delays in communication, limited real-time monitoring, and the lack of predictive tools to assess patient conditions en route to medical facilities. These limitations can lead to prolonged response times and suboptimal patient outcomes. The emergence of 5G technology, with its capabilities for ultra-low latency and high-speed data transmission, presents a transformative opportunity to enhance emergency healthcare delivery. When integrated with wearable biosensors, AI-driven diagnostics, and telemedicine, 5G enables continuous monitoring of patients, real-time data sharing with healthcare professionals, and remote medical assessments, even before the patient reaches the hospital. This seamless connectivity facilitates faster decision-making and enables emergency medical services (EMS) teams to be better prepared with critical patient information upon arrival. The proposed system leverages these technological advancements to create a more proactive, data-driven approach to emergency response, optimizing route planning for EMS teams, predicting potential complications, and improving coordination between emergency responders and healthcare providers, thus aiming to significantly reduce mortality rates and improve recovery outcomes for patients suffering from cardiac and stroke events.

Summary of the proposed invention:

The proposed 5G-Enabled Emergency Response System for Cardiac and Stroke Patients is intended to transform emergency medical services by leveraging the sophisticated features of 5G technology, wearable biosensors, artificial intelligence (AI), and telemedicine. This system seeks to improve pre-hospital care for cardiac and stroke incidents by facilitating continuous monitoring of critical health indicators, including electrocardiogram (ECG), blood pressure, and oxygen saturation, through wearable health devices. The real-time health information is transmitted through ultra-low latency 5G networks to emergency medical personnel and hospital systems, ensuring swift assessment and intervention. AI-driven algorithms evaluate the incoming data for the early identification of potential complications, such as arrhythmias or ischemic events, while automated notifications and optimized routing guarantee that the nearest emergency medical services (EMS) teams are alerted and dispatched promptly. Additionally, the system features telemedicine capabilities, enabling remote physicians to evaluate the patient's condition and offer real-time guidance to EMS teams via 5G-enabled video communication, thereby accelerating critical interventions. To maintain data security, the system utilizes encryption protocols and adheres to healthcare data protection regulations, including HIPAA. The combination of 5G technology with AI and wearable devices fosters a coordinated emergency response workflow, from initial data collection to hospital preparedness, with the goal of minimizing response times, enhancing coordination, and ultimately saving lives. This innovation marks a significant leap forward in emergency healthcare, offering a comprehensive, data-driven strategy for managing cardiac and stroke emergencies.

Brief description of the proposed invention:

The proposed 5G-Enabled Emergency Response System for Cardiac and Stroke Patients represents a holistic approach that utilizes state-of-the-art technologies to improve emergency medical services. This system combines wearable biosensors, artificial intelligence (AI), and telemedicine functionalities with the rapid data transmission and minimal latency offered by 5G networks, enabling real-time monitoring and intervention. Wearable devices consistently monitor vital parameters such as electrocardiogram (ECG), blood pressure, and oxygen saturation, relaying this information immediately to emergency medical teams and hospital infrastructures. AI-driven algorithms scrutinize the data for indications of critical issues, such as arrhythmias or ischemic events, prompting automated notifications to the nearest emergency medical services (EMS) units and optimizing their routes for swift response. The integration of telemedicine allows remote healthcare professionals to evaluate the patient's status through 5G-enabled video communication, offering real-time support to EMS personnel during transit, thereby expediting crucial decision-making and interventions. The system ensures data security through sophisticated encryption methods, adhering to health data regulations such as HIPAA. Its architecture promotes seamless interaction among various stakeholders, including EMS, hospitals, and remote specialists, thereby enhancing coordination during emergency situations. By minimizing response times, anticipating complications, and bolstering the preparedness of medical teams, this innovation seeks to significantly enhance patient outcomes in cardiac and stroke emergencies. This progressive model of pre-hospital care marks a significant advancement in emergency medical services, merging telecommunications and healthcare.

We Claim:

- 1) A system for enhancing emergency medical response for cardiac and stroke patients, utilizing 5G technology for real-time data transmission, wearable biosensors for continuous monitoring, and AI for predictive analytics.
- 2) The system of claim 1, wherein wearable devices continuously monitor vital signs such as electrocardiogram (ECG), blood pressure, and oxygen saturation, transmitting data through 5G networks to medical personnel.
- 3) The system of claim 1, wherein patient data is transmitted in real time to emergency medical teams and hospital systems via ultra-low latency 5G networks, allowing for immediate analysis and decision-making.
- 4) The system of claim 1, wherein AI algorithms process incoming data to predict potential complications, such as arrhythmias or ischemic events, and automatically generate alerts to the nearest emergency medical services (EMS).
- 5) The system of claim 1, enabling remote medical professionals to assess the patient's condition and guide EMS teams in real time through 5G-enabled video communication.
- 6) The system of claim 1, wherein AI-based algorithms calculate the fastest route for EMS teams, optimizing response times based on real-time traffic conditions and patient location.
- 7) The system of claim 1, incorporating encryption protocols to secure patient data during transmission, ensuring compliance with healthcare data protection standards such as HIPAA.
- 8) The system of claim 1, designed to integrate seamlessly with existing hospital information systems, medical equipment, and EMS communication networks for coordinated emergency response.
- 9) The system of claim 1, wherein the wearable device provides adaptive alert levels based on changes in patient vitals, dynamically adjusting the frequency and type of alerts sent to medical teams.

10) The system of claim 1, designed to be scalable, enabling its application for large-scale emergencies or mass casualty incidents by leveraging 5G network capabilities and distributed cloud computing resources.

Dated this 7th day of November 2024



MAMILLAPALLI SUDHEER
[IN/PA-3073]
PATENT ATTORNEY & AGENT

ABSTRACT

5G-Enabled Emergency Response System for Cardiac and Stroke Patients.

The proposed 5G-Enabled Emergency Response System for patients experiencing cardiac and stroke events utilizes the sophisticated features of 5G technology to revolutionize pre-hospital emergency care. This system incorporates wearable biosensors, real-time data analytics, artificial intelligence (AI), and telemedicine to enhance response times and improve patient outcomes in critical situations. Wearable devices continuously track vital signs, including electrocardiogram (ECG), blood pressure, and oxygen saturation, transmitting this information instantaneously through ultra-low latency 5G networks to emergency medical teams and hospital systems. AI algorithms assess the incoming data for the early identification of severe conditions such as arrhythmias or ischemic events, prompting automated alerts and optimizing emergency medical services (EMS) dispatch and routing. The integration of telemedicine allows remote physicians to offer real-time support to EMS teams through 5G-enabled video communication, thereby accelerating essential interventions. To protect data security, the system utilizes encryption protocols and adheres to health data regulations such as HIPAA, ensuring the confidentiality of patient information. The enhanced connectivity provided by the 5G network improves coordination among emergency responders, hospitals, and remote specialists, facilitating a synchronized emergency workflow from data collection to hospital readiness. By minimizing response times, anticipating complications, and enhancing the preparedness of medical teams, this system addresses the urgent need for swift and effective emergency response, with the goal

of significantly lowering mortality rates and improving recovery outcomes for patients affected by cardiac and stroke incidents. This innovation establishes a new standard in emergency healthcare by integrating telecommunications, AI, and wearable technology to save lives.

Dated this 07th day of November 2024



MAMILLAPALLI SUDHEER
[IN/PA-3073]
PATENT ATTORNEY & AGENT

DIAGRAM:

