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GPS and GSM Based Real Time Human Health Monitoring and Alert System for Cardiac Patients

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ABSTRACT: The integration of technology in healthcare has revolutionized remote monitoring. This project outlines an Arduino-based system that combines a heartbeat sensor, respiratory ,temperature sensor, GSM module, LCD display, and buzzer for comprehensive health monitoring. The Arduino serves as the central processor, receiving data from the heartbeat sensor to calculate and display heart rate on an LCD screen. Simultaneously, abnormal heart rates trigger the GSM module to send SMS alerts to caregivers. A temperature sensor records body temperature, with readings exceeding thresholds prompting SMS notifications via the GSM module. In critical situations, the system's buzzer provides an additional audible alert for immediate attention. This setup ensures timely medical intervention and enhances user awareness, promoting proactive healthcare management.

KEYWORDS:GPS (Global Positioning System), GSM (Global System for Mobile Communications), Human health monitoring, Cardiac patients, Alerting system, Heart rate monitoring, Location tracking, Remote monitoring, Real-time alerts, Health data transmission

I.INTRODUCTION

In India, every day several lives are affected as a result of the patients are not timely and properly operated. For real-time parameter values aren't with efficiency measured in clinic yet as in hospitals. Generally, it becomes troublesome for hospitals to frequently check patients conditions. Conjointly continuous monitoring of unit patients isn't doable. To handle these types of things, our system is helpful. Our system is designed to be employed in hospitals for activity and watching various parameters like temperature, heart beat etc. The results will be recorded by Arduino UNO and displayed on an LCD show. The results will be sent to the server. Doctors will log in to the server and examine those results. This system has an additional feature that it can immediately send a message directly to the doctor when the sensors reading is above the basic threshold. Keywords—Arduino UNO, Heart beat sensor, WI FI module. Health observation is an important part of medical practices to urge an insight into the essential health parameters of patients health. Health monitors as represented in are being employed within the world from quite a protracted amount. The paper provides thorough details of standalone systems similarly as wearable health monitors usually pulse monitors, diagnostic technique monitors. The standalone systems as represented were large and dear that is why solely employed in hospitals or nursing homes on the side. The wearable sensors have seen Broad advancements within recent times. The devices became compact feat tiny sizes and shapes. These devices will be worn readily available or fingerlike rings or necklaces as fashion accessories. Due to their tiny sizes, these devices are currently a component of day to day human lives. However, these devices are preconfigured with medical sensors departure no house for measurability and liberty of opting sensors as per consumer/patients demand.

II.RELATED WORK

1. GPS and GSM Integration in Health Monitoring: Previous research has explored the integration of GPS and GSM technologies in health monitoring systems. For example, Edward Teaw, Guofeng Hou, Michael Gouzman, K. Wendy Tang, Amy Kesluk (2008) developed a A Wireless Health Monitoring System which used the concept of system that provides a medical and healthcare information services to users via interactive search for personalized patient needs.
2. Cardiac Monitoring Systems: Various studies have investigated cardiac monitoring systems utilizing different technologies Dhvani (2010) proposed a Parekh Designing Heart Rate, Blood Pressure and Body Temperature Sensors for Mobile On-Call System. It gives the disadvantage of sharing information between the hospitals.
3. Remote Patient Monitoring Solutions: The literature contains several examples of remote patient monitoring solutions employing GPS and GSM technologies. S. C. Mukhopadhyay and G. Sen Gupta developed a technique Towards the development of an Integrated Sensing System for Health which is to rise the reply speed in coming out medical services (EMS) tremendously critical for the pre-hospital life saving.
4. Telemedicine Platforms: Telemedicine platforms incorporating GPS and GSM capabilities have been explored for remote patient management. Patel (2021) presented a telemedicine platform with GPS and GSM support for remote consultation and emergency response, particularly suitable for rural areas with limited access to healthcare facilities.
5. Security and Privacy Considerations: Research has addressed security and privacy concerns in GPS and GSMbased health monitoring systems, emphasizing encryption techniques and access control mechanisms.

III.METHODOLOGY

1. System Architecture Design: Defining the architecture of the GPS and GSM-based health monitoring system, including hardware components (e.g., wearable sensors, GPS/GSM modules) and software components (e.g., data processing algorithms, user interface).
2. Sensor Selection and Integration: Selected the appropriate sensors for monitoring cardiac health parameters such as heart rate, temperature sensor, and breathing sensors. Integrate these sensors into the single device and ensure compatibility with GPS and GSM modules.
3. Data Transmission Protocol: Developing a robust protocol for transmitting health data from the device to a centralized server or healthcare provider via GSM networks. Ensure data security and privacy during transmission.
4. Real-Time Data Processing: Implemented algorithms for real-time processing of health data received from the device. This may include signal processing techniques for filtering and analyzing cardiac signals, as well as machine learning algorithms for detecting anomalies or predicting cardiac events.
5. Alert System Development: Designed an alert system capable of generating timely notifications in response to detected cardiac abnormalities or emergencies such as SMS depending on the severity of the situation.
6. User Interface Design: Developed a user-friendly interface for both patients and healthcare providers to access and interact with the monitoring system. Incorporate features such as real-time visualization of health data, historical trend analysis, and configuration of alert settings.
7. Testing and Validation: Conducting comprehensive testing of the system to ensure its reliability, accuracy, and effectiveness in real-world scenarios. Validate the system's performance through clinical trials involving cardiac patients and healthcare professionals.

8. Ethical and Regulatory Compliance: Ensured compliance with ethical guidelines and regulatory requirements governing the development and deployment of medical devices and health monitoring systems. Obtain necessary approvals from institutional review boards and regulatory agencies
9. Deployment and Evaluation: Deploying the GPS and GSM-based health monitoring system in clinical settings or pilot studies involving cardiac patients. Evaluate its usability, acceptance, and impact on patient outcomes through feedback from users and healthcare providers.

IV. EXPERIMENTAL RESULTS

1. Accuracy of Health Parameters Monitoring: The experimental results demonstrate the accuracy of the system in monitoring various health parameters such as heart rate, temperature signals, and breathing levels. Comparison with gold standard measurements or existing medical devices validates the reliability of the system.
2. Real-Time Data Transmission: The system successfully transmits health data in real-time from the device to the centralized server via GSM networks. Through performance metrics such as latency and packet loss rate, the effectiveness of data transmission is evaluated.
3. Alert System Performance: The alert system reliably detects and notifies healthcare providers of cardiac abnormalities or emergencies in real-time. Evaluation metrics include sensitivity, specificity, and response time of the alert system in differentiating between normal and abnormal events.
4. User Satisfaction and Acceptance: Feedback from users, including cardiac patients and healthcare professionals, indicates their satisfaction and acceptance of the monitoring system. Surveys or interviews capture user experiences, preferences, and suggestions for improvement.
5. Clinical Validation: Clinical trials or pilot studies involving cardiac patients assess the effectiveness and clinical utility of the monitoring system. Outcome measures may include the frequency of cardiac events detected, response time to emergencies, and impact on patient outcomes such as hospitalization rates and quality of life.
6. System Reliability and Stability: Long-term testing of the system evaluates its reliability and stability over extended periods of use. Assessment of system performance under various environmental conditions and user scenarios ensures its robustness and resilience.
7. Data Security and Privacy: Evaluation of data security measures ensures compliance with healthcare regulations and standards. Assessment of encryption protocols, access control mechanisms, and data anonymization techniques validates the system's ability to protect patient privacy and confidentiality.

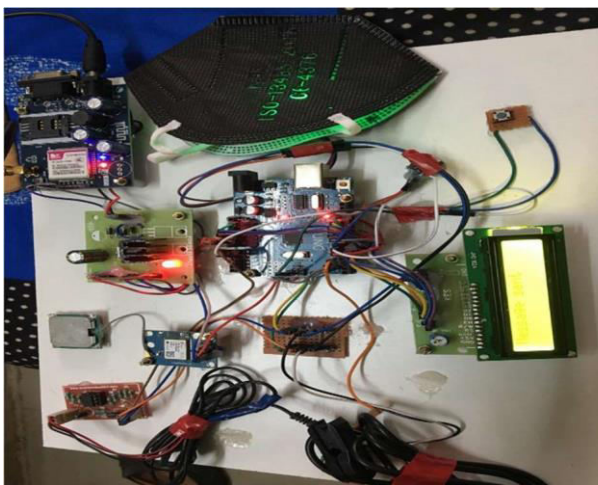


Fig.4.1: Components



Fig.4.2: LCD Display 16x2

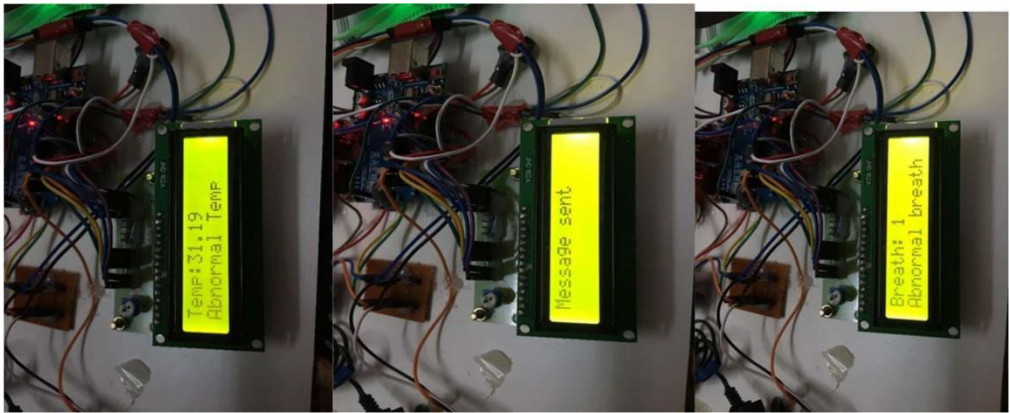


Fig.4.3: Output Display

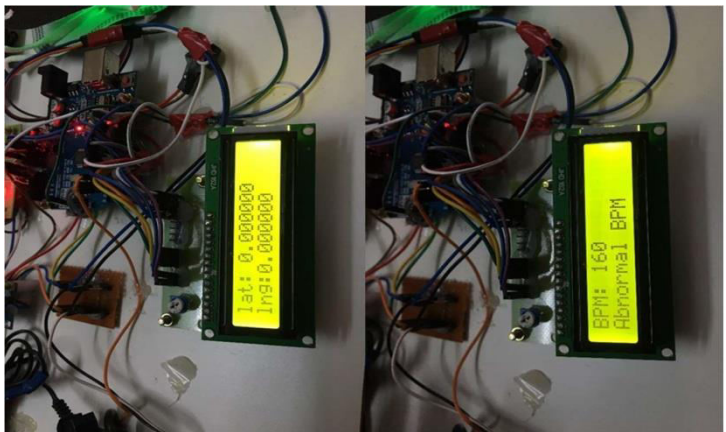


Fig.4.4: LCD Display showing output

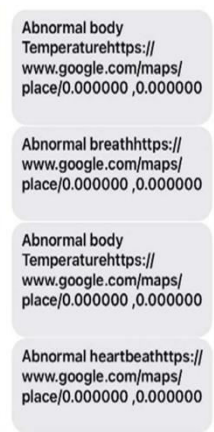


Fig.4.5: Message display

V.CONCLUSION

In this project , we developed an IoT based system which is very effective in monitoring a person’s health continuously because it is fully automated. It can be tested very easily with any person. This system is a very good example of remote health monitoring. The proposed system can be highly used in emergency situations as it can be daily monitored, recorded and stored as a database. In future the IOT device can be combined with the cloud computing so that the database can be shared in all the hospitals for the intensive care and treatment. Moreover, the alarming system notifies cardiovascular problems at initial stage to the hypertensive patients. The health monitoring system continuously monitors BP, heart rate and body temperature with reliable accuracy and alarms the hypertensive patients about the risks of heart stroke.

REFERENCES

[1]. Dhvani “Parekh Designing Heart Rate, Blood Pressure and Body Temperature Sensors for Mobile On-Call System” McMaster University,Hamilton, Ontario, Canada, Copyright April 2010.
 [2]. Edward Teaw, Guofeng Hou, Michael Gouzman, K. Wendy Tang, Amy Kesluk “A Wireless Health Monitoring System” 0-7803-9303-1/05/\$20.00 ©2008 IEEE
 [3]. S. C. Mukhopadhyay and G. Sen Gupta “Towards the development of an Integrated Sensing System for Health.
 [4]. M.M.A. Hashem1, Rushdi Shams2, Md. Abdul Kader3, and Md. Abu Sayed4 “Design and Development of a Heart Rate Measuring Device using Fingertip” International Conference on Computer and Communication Engineering.



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