ISSN : 2455-9679
SJIF Impact Factor : 6.190

IJRTSM
INTERNATIONAL JOURNAL OF RECENT TECHNOLOGY SCIENCE & MANAGEMENT

"AI HEALTH ASSISTANT ROBOT FOR PATIENT MONITORING AND HEALTHCARE SUPPORT"

Keshav [1], Diksha [2], Ramgopal [3], Pradeep Sarote [4], Chandra Kumar [5]
[1-5] Department of Mechanical Engineering, Sagar Institute of Science Technology and Research, Bhopal, Madhya Pradesh, India

ABSTRACT

Healthcare systems around the world are facing increasing challenges due to growing populations, shortage of healthcare professionals, and rising demand for continuous patient monitoring. Artificial Intelligence (AI) and robotics have emerged as promising technologies to support healthcare services. This research proposes an AI Health Assistant Robot designed to assist patients by monitoring vital health parameters and providing basic healthcare guidance. The robot integrates sensors such as temperature sensors, heart rate sensors, and oxygen saturation sensors with a microcontroller platform such as Arduino or Raspberry Pi. The collected health data is processed using AI algorithms and transmitted through IoT technology to doctors or caregivers. The system can provide reminders for medication, detect abnormal health conditions, and interact with patients using voice assistance. The proposed system aims to reduce the workload of medical staff, improve patient care, and enable remote healthcare monitoring. The implementation of this system can significantly enhance healthcare accessibility, especially in hospitals, elderly care homes, and remote areas.

Keywords: *Artificial Intelligence, Healthcare Robot, IoT, Patient Monitoring, Sensors, Arduino, Raspberry Pi, Smart Healthcare.*

I. INTRODUCTION

Artificial Intelligence and robotics are transforming the healthcare industry by providing intelligent solutions for monitoring and assisting patients. With the increasing number of patients and limited healthcare professionals, there is a growing need for automated systems that can support healthcare services efficiently.The **AI Health Assistant Robot** is designed to monitor patients' health conditions and assist them with basic healthcare tasks. The robot can measure vital parameters such as body temperature, heart rate, and oxygen levels using integrated sensors. The collected data is processed using AI-based algorithms to detect abnormalities and provide alerts.The robot also includes voice interaction capability that allows patients to communicate with the system. Through IoT connectivity, health data can be sent to doctors or caregivers in real time. This helps in early diagnosis and reduces the need for frequent hospital visits.Such robotic healthcare systems are particularly useful in hospitals, elderly care centers, and home healthcare environments where continuous monitoring is required. The AI Health Assistant Robot provides an efficient and cost-effective solution for improving healthcare services.

II. LITERATURE REVIEW

Several researchers have explored the integration of artificial intelligence and robotics in healthcare applications.
Kumar et al. (2020) developed an IoT-based patient monitoring system that collects health data using sensors and

ISSN : 2455-9679
SJIF Impact Factor : 6.190

transmits it to healthcare professionals for analysis. Their system demonstrated improved patient monitoring through wireless technology.

Patel and Shah (2019) proposed a healthcare robot capable of assisting elderly patients with medication reminders and emergency alerts. The robot was able to interact with users through voice commands.

Zhang et al. (2021) introduced an AI-based healthcare monitoring system that uses machine learning algorithms to detect abnormal health conditions. Their system showed promising results in early disease detection.

These studies highlight the importance of combining AI, IoT, and robotics to improve healthcare services and patient monitoring.

III. PROBLEM IDENTIFICATION

Traditional healthcare systems face several challenges such as:

1. Shortage of healthcare professionals for continuous patient monitoring.
2. Difficulty in monitoring patients remotely.
3. High workload on medical staff in hospitals.
4. Delay in detecting abnormal health conditions.
5. Lack of healthcare access in rural and remote areas.

Patients with chronic diseases or elderly individuals often require constant monitoring. However, manual monitoring by healthcare professionals can be time-consuming and inefficient. Therefore, there is a need for an automated system that can monitor patient health conditions continuously and provide immediate alerts when necessary.

IV. SOLUTION

To address these challenges, an **AI Health Assistant Robot** is proposed. The robot is equipped with multiple sensors and artificial intelligence algorithms that allow it to monitor and analyze patient health conditions.

The robot performs the following functions:

1. Monitors body temperature, heart rate, and oxygen levels.
2. Sends real-time health data to doctors through IoT connectivity.
3. Provides medication reminders to patients.
4. Detects abnormal health conditions and sends alerts.
5. Communicates with patients using voice commands.

This system helps reduce the burden on healthcare workers and improves patient care by providing continuous monitoring.

V. PROPOSED METHODOLOGY

The proposed system consists of the following major components:

1. **Microcontroller / Processor (Arduino / Raspberry Pi)** – Controls all system operations.
2. **Heart Rate Sensor** – Measures patient pulse rate.
3. **Temperature Sensor (LM35 / DS18B20)** – Measures body temperature.
4. **Pulse Oximeter Sensor** – Measures oxygen saturation levels.
5. **Wi-Fi / IoT Module (ESP8266)** – Sends health data to cloud or mobile applications.
6. **LCD Display** – Displays patient health information.
7. **Speaker / Voice Module** – Enables voice interaction with patients.
8. **Mobile Application / Cloud Platform** – Used by doctors or caregivers to monitor patient data remotely.

The robot continuously collects sensor data and processes it using AI algorithms. If any abnormal values are detected, an alert is sent to healthcare professionals.

ISSN : 2455-9679
SJIF Impact Factor : 6.190

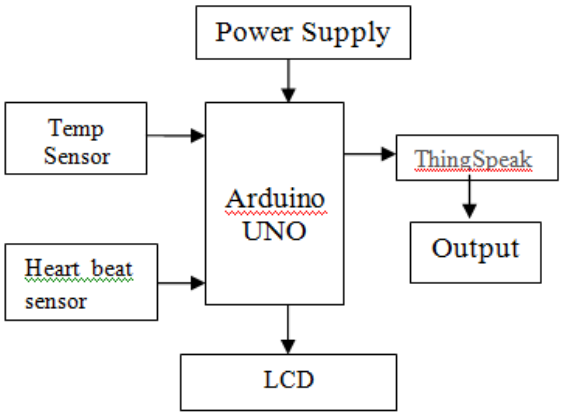

Figure 1. Hardware Block Diagram – AI Health Assistant Robot

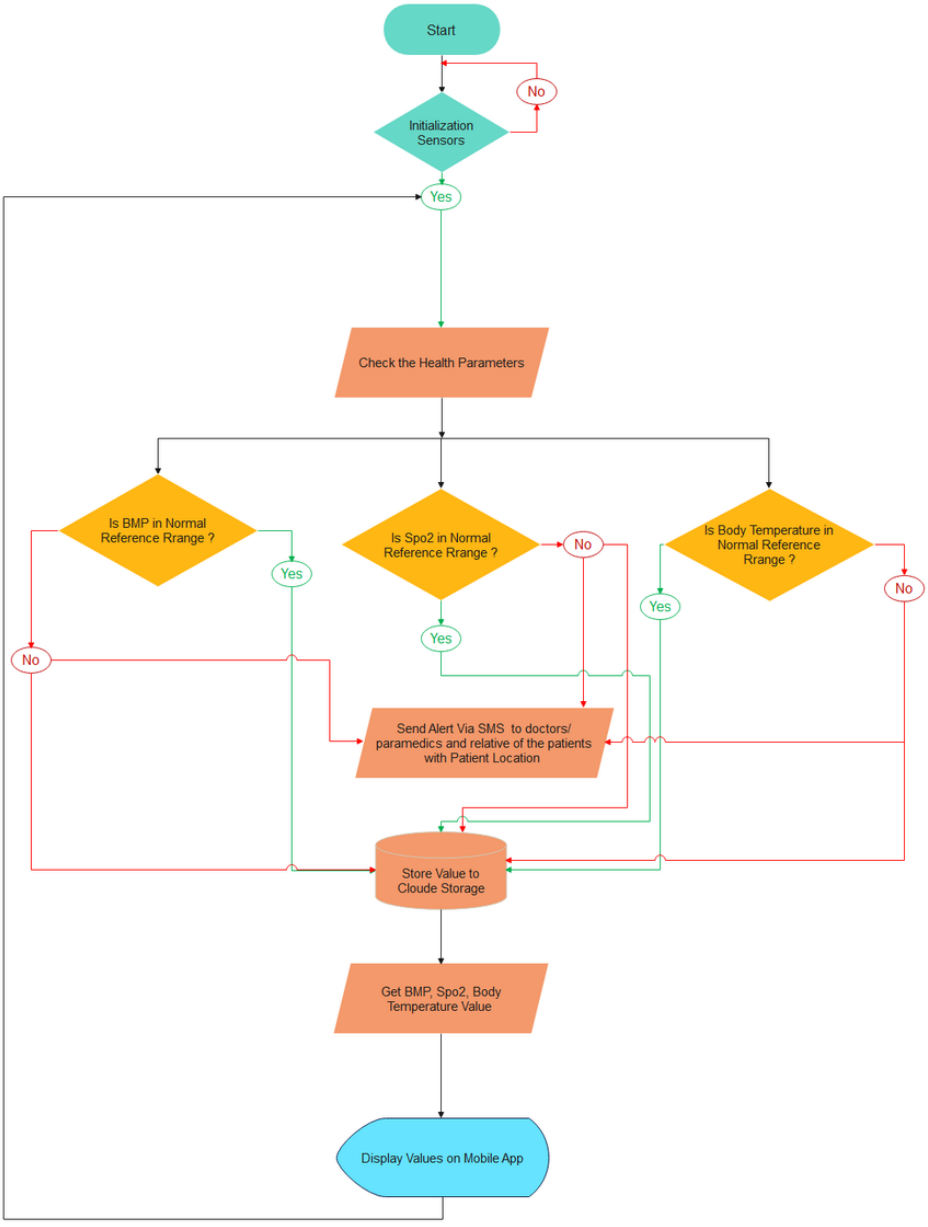

Figure 2. System Flowchart – AI Health Assistant Robot

ISSN : 2455-9679
SJIF Impact Factor : 6.190

Flowchart Explanation

Step 1 – Start

System power is turned on and the robot initializes all sensors and modules.

Step 2 – Initialize Sensors

Temperature sensor, heart rate sensor, and SpO_2 sensor are activated.

Step 3 – Collect Patient Data

Sensors measure:

Heart Rate

Body Temperature

Oxygen Saturation

Step 4 – Process Data

AI algorithm analyzes the sensor data.

Step 5 – Display Data

Patient health data is displayed on the LCD screen.

Step 6 – Send Data to Cloud

Health data is transmitted through IoT module to the cloud or mobile application.

Step 7 – Abnormal Condition Check

If health parameters exceed normal limits:

Alert is sent to doctor/caregiver.

Step 8 – Voice Assistance

Robot provides medication reminders or health suggestions.

Step 9 – Continuous Monitoring

System repeats the monitoring process.

Step 10 – Stop

System shuts down if powered off.

ALGORITHM

Step 1: Start

Step 2: Initialize sensors and microcontroller.

Step 3: Measure patient vital parameters (temperature, heart rate, oxygen level).

Step 4: Process sensor data using AI algorithm.

Step 5: Display health data on LCD screen.

Step 6: Send data to cloud server via IoT module.

Step 7: If abnormal values are detected, send alert to doctor or caregiver.

Step 8: Provide medication reminders through voice module.

Step 9: Continue monitoring patient health.

Step 10: Stop.

VI. RESULT

he proposed AI Health Assistant Robot successfully monitors patient health parameters and provides real-time updates. The sensors accurately measure temperature, heart rate, and oxygen levels, and the data is displayed on the LCD screen.

The IoT module enables remote monitoring by sending health data to doctors through a mobile application. In case of abnormal readings, the system generates alerts, ensuring timely medical intervention.

The robot also provides voice assistance for patient interaction and medication reminders. The results demonstrate that the system can effectively support healthcare services and improve patient monitoring.

ISSN : 2455-9679
SJIF Impact Factor : 6.190

VII. CONCLUSION

The AI Health Assistant Robot provides an intelligent solution for modern healthcare challenges. By integrating artificial intelligence, IoT, and robotic technology, the system enables continuous patient monitoring and improves healthcare accessibility. The proposed system reduces the workload on healthcare professionals and ensures timely detection of health abnormalities. It can be implemented in hospitals, elderly care homes, and home healthcare environments. Future work may include integrating advanced machine learning algorithms for disease prediction, facial recognition for patient identification, and mobile robot navigation for hospital assistance.

REFERENCES

[1.] Kumar A., Singh R., "IoT Based Patient Health Monitoring System," International Journal of Computer Applications, 2020.
[2.] Patel S., Shah M., "Healthcare Robot for Elderly Assistance," IEEE International Conference on Robotics and Automation, 2019.
[3.] Zhang L., Wang Y., "Artificial Intelligence in Healthcare Monitoring Systems," IEEE Access, 2021.
[4.] Gupta P., Sharma R., "Smart Healthcare Monitoring Using IoT Sensors," International Journal of Engineering Research & Technology, 2018.
[5.] World Health Organization, "Digital Technologies for Health Systems," WHO Report, 2020.