VISION ENABLED CONTAGIOUS WARD ROBOTIC NURSE

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Abstract— **The objective of the project is to develop a wireless robotic vehicle, which has vision using high resolution web-cam, capable of delivering medicines and monitoring patient health in contagious ward. It can provide indication alarm at every patient's bed for monitoring body temperature and medicine delivery. The approach is to use low-cost solution for robotic nurse, with high efficiency. Android application is also developed for controlling the robot and vision monitoring. Project is developed using 8-bit Atmega328p microcontroller.**

Keywords— **Robotic Nurse, Bluetooth, Medicine Delivery, Temperature monitoring in contagious ward, Android Application.**

I. INTRODUCTION

Now a days, cases of contagious diseases are increasing rapidly, which are demanding large number of contagious wards in the hospitals. Medical professionals serving in these wards are getting infected, leading medical emergency situations. The available solutions are very costly, due which we came us with this low-cost solution for patient monitoring and medicine delivery. We have designed a robotic vehicle which can be controlled wirelessly from android app. It has 360-degree motion capability. It has sound alarm to make indication to patient, also has led light-based indication to guide patient for taking medicine. The model is purely electronic for least error probability and high capabilities.

II. COSTRUCTION OF PROJECT

The design of the project is aims to develop a low-cost wireless robotic vehicle that can deliver medication and monitor patient health status in contagious wards. The vehicle is equipped with several features, including an Atmega328p microcontroller, an HC-05 Bluetooth module, an MLX90614 temperature sensor, an IP camera, DC motors, a battery, and an alarm and LED system. The communication between the microcontroller and the Android application is achieved using the HC-05 Bluetooth module, and the vehicle's movement is controlled by the Atmega328p microcontroller. The MLX90614 temperature sensor is used to monitor the patient's body temperature, and the data is transmitted wirelessly to the Android application for real-time monitoring. The vehicle is also equipped with an IP camera, which provides a visual monitoring system for healthcare professionals. The vehicle's movement is controlled by DC motors, allowing it to move in a 360-degree motion to access all patients in the ward. When medication is required, the vehicle delivers it to the patient's bedside, and an LED light-based indication guides the patient to take the medicine. The project also includes an alarm system that provides indications at each patient's bed for monitoring body temperature and medicine delivery. In summary, the project provides a cost-effective and efficient solution for patient monitoring and medication delivery in contagious wards, using a wireless robotic vehicle and an MIT App Inventor-based Android application.
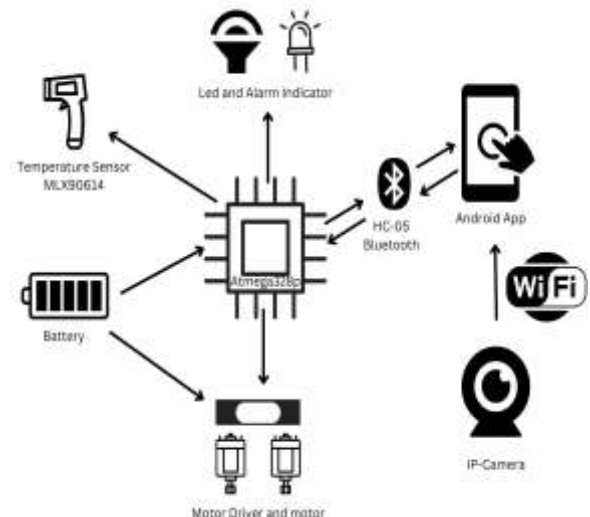

Fig 1: Line-diagram of robotic vehicle

II. WORKING OF PROJECT

The workflow, as explained in fig 1, begins with the HC-05 Bluetooth module establishing wireless communication between the Atmega328p microcontroller and the Android application. The MLX90614 temperature sensor monitors the

patient's body temperature and transmits the data wirelessly to the Android application. The IP camera provides visual monitoring for healthcare professionals, enabling them to remotely monitor the patient's condition.

The DC motors enable the vehicle to move in a 360-degree motion, which allows it to access all patients in the ward. The alarm and LED system provide indications at each patient's bed for monitoring body temperature and medicine delivery, guiding patients to take their medication when required.

III. COMPONENT DESCRIPTION

Microcontroller: The Atmega328p microcontroller is a powerful and low power-consuming device with a high processing power of up to 20 MHz. It has on-chip memory, 23 programmable I/O pins, and a range of peripherals, making it compatible with various development tools and libraries. As an open-source technology, it allows for easy customization and modification.

HC-05 Bluetooth MODULE: It is a wireless communication module that enables communication between the robotic vehicle and the Android app.

MIT APP INVENTOR BASED ANDROID APP: The Android app is designed using the MIT App Inventor platform, allowing for easy and intuitive control of the robotic vehicle.

Fig 2: Actual image of Application created.

IP Camera: The IP camera provides real-time visual feedback to the user via the Android app, allowing for remote monitoring of patients. Project uses android mobile camera as IP camera using 3rd party application IP Cam.

DC Motor: The DC motor is used to provide motion to the robotic vehicle and enable movement in various directions. Here we have used 12 V motors and H-bridge driver to operate.

MLX90614 TEMPERATURE SENSOR: The MLX90614 sensor is used to monitor the body temperature of patients and provide feedback to the robotic vehicle.
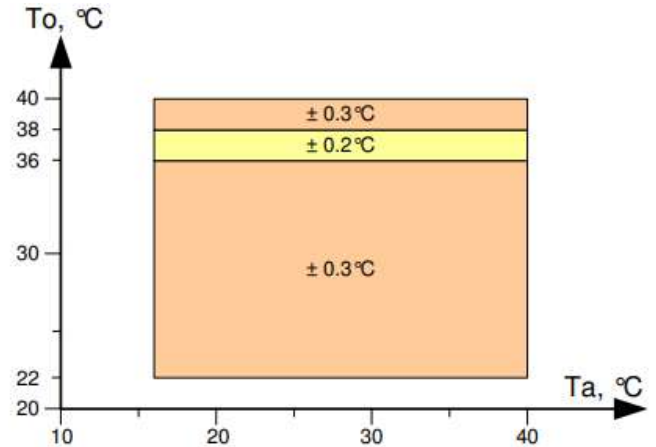

Fig 3: Medical Accuracy of MLX90614

Alarm and LED: The alarm and LED lights are used to provide indication and alerts to patients when it is time to take medicine or when their body temperature is outside of the normal range.

Fig 4: Actual images of robotic vehicle prototype

IV. FUTURE SCOPE

The future scope of the project includes expanding its capabilities to include other monitoring systems, such as heart rate monitoring and oxygen level monitoring, as well as incorporating artificial intelligence (AI) for more advanced diagnosis and monitoring of patients. Additionally, the system's performance and reliability can be further optimized. The vehicle's design can also be improved to make it more compact and user-friendly.

V.CONCLUSION

The wireless robotic vehicle with high-resolution web camera technology and Bluetooth connectivity offers a low-cost solution for patient monitoring and medicine delivery in contagious wards. The robotic nurse is designed to minimize human contact, reducing the risk of infection for healthcare professionals working in contagious wards. The alarm system installed in the robotic vehicle ensures that the patient receives timely medication and monitoring, and the 360-degree motion capability allows for easy access to every patient in the ward. The project's use of low-cost solutions, with high efficiency, and an Android application for controlling the robot and vision monitoring ensures a cost-effective solution for patient monitoring and medicine delivery in contagious wards. The robotic nurse offers a promising solution for healthcare professionals serving in contagious wards, enabling them to provide better patient care while reducing the risk of infection.

VI. REFERENCE

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