DEVELOPMENT OF ROBOTIC NURSE FOR OLD AGE AND PHYSICALLY CHALLENGED GROUPS, USING HYBRID ULTRA-CAPACITOR BATTERY POWERED BY SOLAR PV

Project Reference No.:46S_BE_5298

SRI SIDDARTHA INSTITUTE OF TECHNOLOGY, TUMKUR

ELECTRICAL AND ELECTRONICS ENGENEERING

Guide Name: Mr. PRAVEEN KUMAR C M.Tech.,(Ph.D).,MISTE.,

Assistance professor

Dept. of Electrical & Electronics Engineering

SSIT-TUMKUR

Students Name:

1. Amruthavani N   (20EE402)

2. Abhishek M   (20EE400)

3. Anusha N   (20EE403)

4. Abdul gaffar ulla khan (19EE001)

INTRODUCTION

- An increase in the aging population, combined with the shortage of nursing staff, makes the increasing need for care one of the main humanitarian challenges of the future.
- To provide Health Monitoring System to old aged people for better treatment of patients, particularly in the event of a pandemic situation and other situation also.

- The robots possibilities for human replacement and remote operation in risky environments and tasks, as well as in proxying social interaction, have gained interest and value for potential help in the pandemic.

- To develop Solar Powered Hybrid Ultra-Capacitor Battery for Robotic Nurse .

OBJECTIVES

➢ Robotic nursing care is an emerging field, which helps global attention in various research projects and some commercial systems.

➢ The objective is to identify robots that can be implemented in the healthcare sector which can be used easily and improve the quality of treatment.

➢ To provide Health Monitoring System to old aged people for better treatment of patients, particularly in the event of a pandemic situation and other situation also.

➢ To implement body parameter measurement system which will help remote diagnosis of the patients over IOT.

➢ To implement non-contact temperature measurement to prevent spread of infection.

➢ To implement oxygen measurement system

➢ To implement video streaming system which will stream the live video of the patient to the doctors IOT panel

➢ To implement telemedicine which will deliver the exact medicines suggested by the doctors to the patients after diagnosis

➢ To add automatic hand sanitizer dispenser which can help the patients to sanitize their hands

➢ To add a sugar sensor which can be used to measure blood sugar.

➢ To make the system easy to operate.

- To develop Solar Powered Hybrid Ultra-Capacitor Battery for Robotic Nurse (Human programmed) to provide multi health assistance such as Temperature of Human body, Oxygen Level, Blood Glucose level, Blood Pressure level especially for the old age group and physical challenged groups.

METHODOLOGY

- The proposed project consists of autonomous robotic vehicle to monitor and treat old age patients using IOT.

- The wireless controlled relay system is used to interface components such as IR sensor, relay driven motors, Pulse sensor and Temperature Sensor module. The robot waits in its home position till the time arrives to Check the patients

- The wireless controlled relay driven motor is remotely controlled by the doctor/nurse.

- The robotic nurse is equipped with thermal sensor that can map the temperature reading of the patient and the temperature is detected, and can displayed on the monitor.

- The BeatO glucometer is included in robotic vehicle to check the sugar level of the patient. Its operation can be managed through a mobile application. The data about the patient will be displayed on the monitor via wireless camera.

- After the monitoring of the patient, the doctor/nurse suggests the required medicine through wireless speaker which is fixed on the robotic vehicle.

BLOCK DIAGRAM
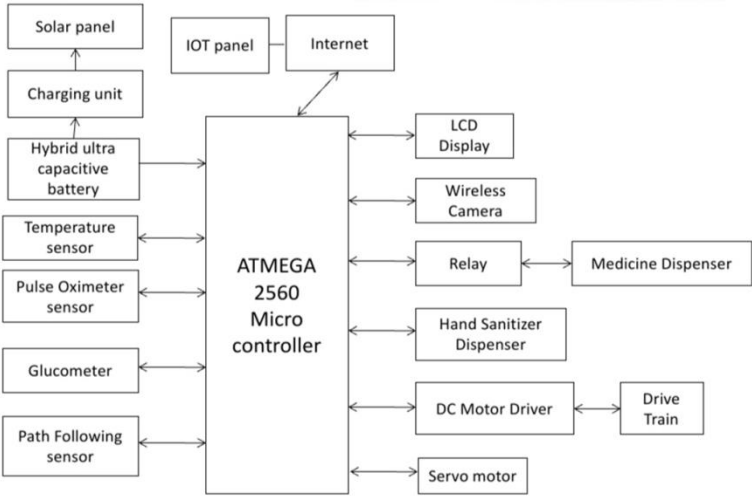
HARDWARES USED

1. Hybrid ultra capacitor battery

Lithium solar battery

Volthage 12.8V

Capacity Rating 154WH

Capacity 12Ah

2. Temperature sensor

- ➢ It provides fast reading in less than 1 sec measurement time. Maximum allowable tolerance 32°C-42°C ± 0.3°C.
- ➢ The digital thermometers are designed for all ages: adults, infants and the elderly.
- ➢ Features large-screen LCD display with different backlight colour for different temperature

3.Oximeter

➢ Bright OLED multi colour and multi direction.

➢ The large and rotatable multidirectional display allows you to view your results in any direction easily

➢ One button operation design makes our oxygen saturation monitor simple and convenient to use.

4. Sugar sensor

➢ Compact, easy to carry and connects to your smart phone via the 3.5 mm audio jack. Clinically approved accuracy.

➢ Gluco meter is CE and ISO Certified.

➢ Constant monitoring of your readings by our team of diabetes experts, who then guide you to better health choices

5. Wireless camera

- ➢ CP plus 1080p full HD swart wifi camera with 360 with pan & tilt

- ➢ view and talk , motion alert with alexa and google support.

6. Solar panel
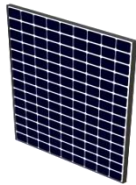
- ➢ 40 watt 12volts polycrystalline solar panel

- ➢ Maximum power (Wp) is 40 W

- ➢ Maximum voltage (V) is 22.00 V

- ➢ Open circuit voltage is 18.50v

- ➢ Short circuit current Isc is 2.16
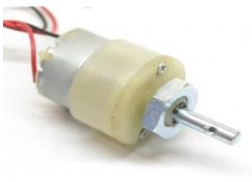
- ➢ Module Efficiency is 14.00%

7. Atmega328 Microcontroller

➢ ATmega328 supports 8-bit data processing.

➢ It has 28 pins.

➢ It has 32KB of Flash memory.

➢ It has 2KB of Static Random-access memory.

8. DC geared motors

60 RPM, 12 volts DC geared motor is used for forward and reverse moment of robot vehicle.

3.5 RPM ,12 volts DC geared motors is used for steering.

9. Servo motor

➢ Tiny and lightweight with high output power.

➢ Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller.

➢ You can use any servo code, hardware or library to control these servos. It will fit in small places.

➢ It comes with 3 horns(arms) and hardware.

WORKING

The project consists of autonomous robotic vehicle to monitor and treat old age and physically challenged people using IOT. The wireless controlled relay system is developed which will be handle by the doctors/care givers which will be present to monitor and treat patients.

In doctors/nurses monitoring room, the health status of a patient is displayed on the monitor. The robotic nurse is operated by remote control system which is controlled by doctors/nurses from the monitoring room.

The Robotic nurse is directed to the patient's room remotely. The patient will be instructed through voice-over system to view the health status.

The patient will get his/her hands sanitized through the sanitizer pump which is attached on the top of robotic nurse.

The thermal scanner is included in the robot vehicle to measure the temperature level of the patient.

The pulse oximeter is connected to check the pulse rate or oxygen level of the patient and the beatO

glucometer is placed in the robot vehicle to check the sugar level of the patient. These will carry our

preliminary diagnosis and the same will be informed to the doctor using monitoring system. The

doctors can recommend the medicine after monitored remotely using telemedicine system.

ADVANTAGES

- ➢ Can be used for treatment of patients without getting in touch with them.

- ➢ Autonomous hence no manual intervention required.

- ➢ Telemedicine delivery over IOT makes sure that the patients get correct medicines in time.

- ➢ Robotic nurse can address congnitive decline issues by reminding care –receiver when eat , drink or take medication.

- ➢ Can stop spread of infection from one person to another person.

- ➢ Use of Robotic nurse will Increase productivity, use equipment effectively, Reduce working costs, Flexibility at work. Get the job done in the shortest time, better accuracy in performance, ability to work in risky ways and make it safer, multi functioning in pandemic situation.

CONCLUSION

This concept is used to monitor and treat the old age and physically challenged people without getting in touch withpatients. This proposed system, allows doctors or nurses and care givers personal to monitor the patient in real-time. This concept improves the efficiency and service. This concept may utilize in the treatment of geriatric people and physically challenged people. also doctor/nurse can see the patient activity through computer or system effectively. So, it can keep doctors and medical staff safe and also it can stop spreading of infection from one person to another.