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ROBOT DOCTOR IN WAR FIELD

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Abstract: Task level robot systems have long been a goal of robotics research. This paper discusses a project to design and develop a humanoid robotic doctor which could reach at war field and sense the temperature and heart beat of injured soldier. The developed prototype provides multiple degrees of freedom within the robotic arm. A manual over-ride control is also provided in which the movement of the robotic arm and vehicle can be controlled using a manual control panel. It is dangerous to approach the injured soldier in war field by a living being to consult. Robotic doctor is an intelligent doctor who is capable of reaching at war field and consults the injured soldier by measuring the heart beat with the help of robotic arm and vehicle. And the sensed details are sending to the control station. This system is composed of a vehicle, robotic arm, microcontrollers, sensors and its controller. Here the controlling section is a PC with wi-fi connection

Index Terms—*IR sensor, ARDIUNO BASED ATMEGA 328,RASPBERRY PI*

1 INTRODUCTION

The latest trends in the robotics research field have been denominated by service robotics because of their general goal of getting robots closer to humans. Since the introduction of industrial robots in the automotive industry, robotics research has evolved over time towards the development of robotic systems to help the humans in dangerous, risky or unpleasant tasks. In this project, we propose an intelligent Robotic Doctor which can be used in any hazardous situation, search and rescue. In hazardous environments, it is dangerous to check whether an injured person is dead or not by other human by approaching the injured personnel. In such situations the Robotic doctor can be send to the field. It will check the injured person‟s heart pulse to check whether the person is alive or not. The heart pulse is measured with the help of sensing unit. The measured details are processed and send to the control unit. Control unit give advices regarding the motion of the robot. If the person is not dead control station give controls to the robot to take the person from the field to a safe place. The entire movement of the robot can be controlled from the remote control station with the help of video cameras. Image of the injured person can be send to the control station. The controller can see the motion of the robot through the display screen in the control station.

Fig. 1.Robotic vehicle

2RELATED WORKS

Dr S Bhargavi proposed a system to minimize human casualties in terrorist attack . The combat robot has been designed to tackle such a cruel terror attacks. This robot is radio operated, self- powered,

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and has all the controls like a normal car. A wireless camera has been installed on it, so that it can monitor enemy remotely when required. It can silently enter into enemy area and send us all the information through its' tiny Camera eyes.

Jigneshpatolayaproposed for the surveillance of human activities in the war field or border regions in order to reduce infiltrations from the enemy side. The robot consists of night vision wireless camera which can transmit videos of the war field in order to prevent any damage and loss to human life. Military people have a huge risk on their lives while entering an unknown territory.

3.COMPONENTS USED IN THE PROPOSED SYSTEM

The various components of war field robot are

Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

Raspbe1rry Pi is a series of credit card–sized single-board computers developed in the United Kingdom by the Raspberry Pi Foundation with the intent to promote the teaching of basic computer science in schools and developing countries. The original Raspberry Pi and Raspberry Pi 2 are manufactured in several board configurations through licensed manufacturing agreements with Newark element14 (Premier Farnell), RS Components and Egoman. The hardware is the same across all manufacturers.

TSOP1738 is a member of IR remote control receiver series. This IR sensor module consists of PIN diode and a pre-amplifier which are embedded into a single package. The output of TSOP is active low and it gives 5V on its off state. When IR waves from a source with a center frequency of 38 KHz incident on it, its output goes low. TSOP module has an inbuilt control circuit for amplifying the coded pulse from the IR transmitter. A signal is generated when PIN photodiode receives the signal.

100RPM 12V DC geared motors for robotics applications. Very easy to use and available in standard size . Nut and threads on shaft is to connect easily and internal threaded shaft is for easily connecting it to wheel.

4. ARCHITECTURE AND IMPLEMENTATION

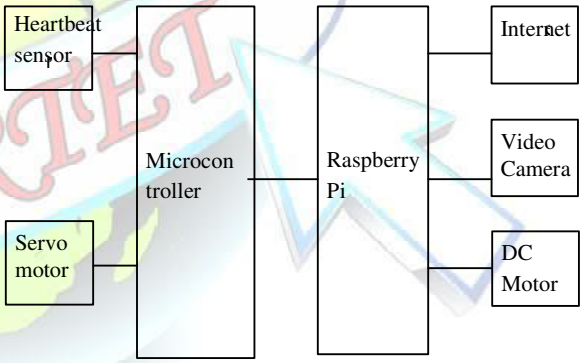

Fig. 2 Architecture of proposed system

Figure.2 shows the architecture of proposed system mainly consists of Raspberry Pi, microcontroller, heartbeat sensor, servo motor, DC motor and video camera.

Raspberry pi development board is the main heart of the system. It controls the entire system. The system implemented on the Robot module. The DC motors are controls the movement of the robotic vehicle. DC motor driver L293D is connected to drive the

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DC motor. One 12V DC battery mounted Robot to provide supply to system. Video capturing unit is connected to pi board to send the image of the field. These connections are done at the pi board directly. Raspberry communicates with the control station by internet.

Microcontroller ATMEGA328 interfaced with raspberry pi is used to control the servo motor and heart beat sensor. Servo motor controls the robotic arm movement continuously. Heart beat sensor senses the pulse rate of the injured person. After sensing the heart beat it will send a normal or abnormal signal along with the pulse rate. So the person can be rescued

ROBOTIC SECTION:

Robotic Section includes Microcontroller, robotic arm, robotic vehicle and pulse sensing unit. The controllers that we are using are raspberry pi and ATMEGA328.There are two servo motors for the robotic arm section. Each servo motor increases the moving capability of the arm. Two DC motors are responsible for the movement in the vehicle section. The wireless video transmitter helps us to get live video from the war field. The movement of the robotic vehicle is controlled by the instructions from control station. In order to sense the pulse, we have a sensing circuit of IR sensor TSOP. The details from the robotic section have to be send to the control station. So we are using wireless internet technology for the data exchange.

ROBOTIC VEHICLE:

The robotic vehicle consists of two dc motors along with two tiers in the front portion and two supportingwheels in the back portion. In order to drive the DC motors we are using driver IC L293D as DC motor drives. The motion of the vehicle is depend on the direction of rotation of the DC motors. The instructions are sent from the control station through internet. Robotic vehicle consists of raspberry pi module for interfacing with microcontroller and the control station. The pulse rate sensing unit IR sensor is placed on the robotic vehicle. The wireless video camera is placed at the vehicle for sending the image of the field. Wi-Fi adapter is used for internet connection with the control station.

Fig.3 Workflow of mobile application

DC MOTOR INTERFACING

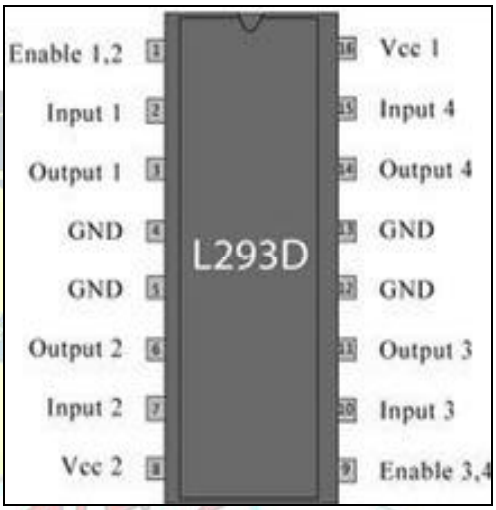
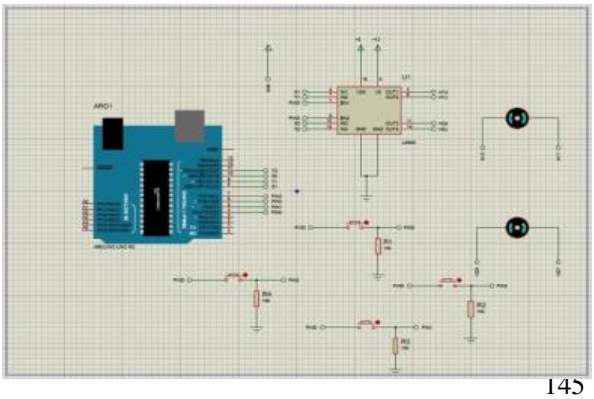


Fig.4 L293DRIVER IC

The DC motors are connected with the L293D IC through pins 3 and 6 and other motor through pins 11 and 14. The input pins are connected with the arduino board. The Figure shown below is the Proteus implementation of connection of arduino with L923D along with the motor interfacing for driving the robot.



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5.EXPERIMENTAL RESULTS

The experimental result consist of a wep page which will be received at the control station.Alive video from the war field will be received at the base station.Thevechicle can be controlled from the base station.Vehicle will be moved forward and backwardaccording to the control signal given from the station.Robot will check the pulse rate of the victim.If the pulse rate is normal it will be displayed at the station.In the abnormal cases an alarm will be heard shows that the person is dead.Thus the injured person will be carried to the base station by the vehicle itself and can be rescued.

ROBODOCTOR

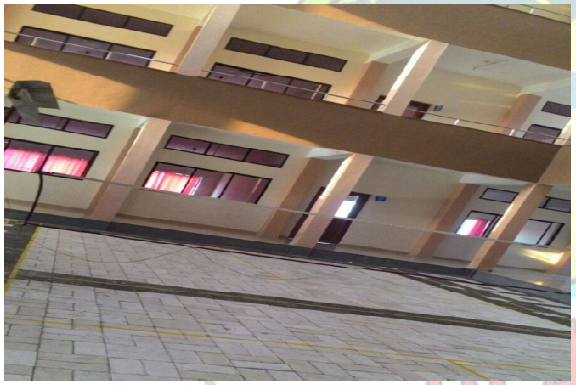

Fig.message receive at control station

6. RESULTS AND DISCUSSION

. Robot keeps on moving in two modes i.e., Manual mode and self-mode. It's brought under user's control in the case of manual mode. In self-mode, robot starts moving over surface and takes action according to the scenario. To detect the obstacles, we have deployed Infrared sensors (left sensor and right sensor) in the front portion of the module. While moving on the surface, if the left sensor is detected, robot takes back the position for a moment and moves right. If the right sensor is detected, robot gets back and moves left.

7. CONCLUSION

In this project we have illustrated a Robotic doctor which can check the pulse of the injured people in hazardous environment especially in war field.Therobot is contolled from base station.The robotic vehicle consist of a robotic arm which helps to pick up the injured one and bring back to the safe place.A camera is also provided with the vehicle so we get a live video from the war field at the control station.The main components of the system are Ardiunouno and Raspberry pi.The vehicle is controlled by dc motor and the arm movement controlled by servo motor. Robotics is a technology with a future, and is a technology for the future. If present trends continue, and if some of the laboratory research currently underway is ultimately converted into practicable technology, robots of future will be mobile units with one or more arms, multiple sensor capabilities and the computational and data processing power of today‟s mainframe computers. They will be able to respond to human voice command. They will be able to receive general instructions and will translate those instructions using artificial intelligence into a specific set of actions required to carry them out. In short, future robots will have many of the attributes of human beings.

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complete this first phase project report successfully on time.

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