Humanoid ROBOT For Security Purpose

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Abstract - The key use of intelligent robotic systems is to provide remote surveillance using a security robot. An essential requirement in security is the capability to automatically detect trespasser & inform nearby control unit and to empower security personnel to track the trespasser. The security system suffers from intensive human involvement. Recently security system consist of high tech devices, like unmanned aerial vehicles, unattended ground sensors, and surveillance towers equipped with wireless camera. This project intends to stop the infiltrators with the help of a simple mechatronic robot. Security System watches intruders by using sensor nodes with communication function. The detection of some intruders and the use of a long-term operation system are required in this system. Infiltrators are detected by the use of PIR motion sensor. Difference between the security person and intruder is done by the password spoken. The robot is equipped with a camera that would keep the control unit informed about it's activities and the surrounding. The robot is in communication with the control unit through WI-FI.

Keywords — PIR Motion Sensor, Buzzer, Camera, Bluetooth, Wi-Fi, Dc Motor.

I. INTRODUCTION

HUMANOID ROBOT: A humanoid robot is a robot with its body shape built to resemble the human body.

PURPOSE: This project can be helpful for tasks like spying, monitoring, guarding etc without the fear of being seen or noted by others. Robots can be utilized for tasks in the hazardous environments where human is not capable of doing it.

GENERAL IDEA OF PROJECT: In this project general idea of security robot is wireless sensor network architecture for patrol system. Security robot utilizes a PIR sensor for human detection and a wireless camera for monitoring the scenario continuously at the remote station. This project intends to stop the infiltrators. With the help of password it would differentiate between an intruder and the security personnel

II. LITERATURE SURVEY

Military robots must have accurate sensing of their environment, allowing the robotic system to perceive its surroundings thus allowing the controlled movement. Visualization and offset sensing and measurement are key sensory inputs. Consider the case of visualizing in smoke (by unmanned ground vehicle) or in clouds (by unmanned air vehicle) and all other outdoor environment conditions with better recognition of objects. As most of the time the environment is highly unpredictable during the war[1].

Human functions become more sophisticated, and include supervision of ABC machines, resolving situations which require high-level judgment, and making decisions in critical situations such as attacks on the A-machine. These problems just started to emerge recently, because of the relevant infancy of the underlying technologies. However, the third generation of the A-machines will bring the human-machine "partnership" to a new level, including potential conflicts of the human and machine. Hence, the border service personnel should be well trained in order to use the machines of a new generation[2].

In military operations the main reasons of using robots are: To reduce exposure of personnel to extreme danger in battle. To reduced workload for skilled manpower categories. To improve decision-making under tactical stress conditions. Easiness in the exact duplication of robots of high intelligence. Less cost for generation of army of robots as compare to training manpower. No threats to robots in case of biological attacks. If captured, a robot can simply self-destruct, thus improving the security of a combat mission.[1].

In the high priority, all sensor nodes in the Small cluster change to active mode. Because a hall does not exist in a Small cluster, they can detect intruders quickly and chase moving course of them correctly. However, in the high priority, the sensor nodes in the Small cluster waste power consumption because they always operate a sensing function. Hence, the high priority is not suitable for long-term system operation. When there is no intruder, lower priority setting to reduce power consumption is necessary[3].

The arms were designed based on a concept that the arms of the robot can hold the robot's weight while it leans on a walk-assist machine. Since the robot can lean on a walk- assist machine, most of its weight will be distributed on both its forearms. In order to determine the suitable actuators of the arms, a software simulation was conducted. In this simulation, the robot leans on a walk- assist machine using its forearms; further, the elbow angle is separated by 15 degrees from a posture bent at a right angle when the arm supports half the weight (30 kg) of the robot (the two arms equally support the entire weight (60 kg) of the robot)[4].

III. PROPOSED SYSTEM

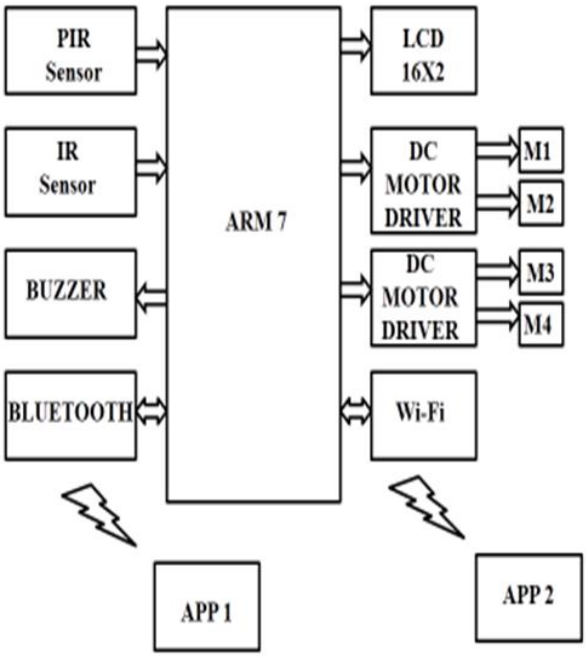


Fig. 1 Proposed System.

INPUT SECTION

PIR SENSOR

PIR sensor-passive infrared sensor. It is also called as PID(passive infrared detector). It is used to sense movement of people, animals, or other objects. An individual PIR sensor detects changes in the amount of infrared radiation impinging upon it, which varies depending on the temperature and surface characteristics of the objects in front of the sensor.

IR SENSOR

Infrared energy is emitted or absorbed by molecules when they change their rotational- vibrational movements. Infrared energy excites vibrational modes in a molecule through a change in the dipole moment, making it a useful frequency range for study of these energy states for molecules of the proper symmetry. Infrared spectroscopy examines absorption and transmission of photons in the infrared energy range.

BLUETOOTH

Bluetooth is a wireless technology standard for exchanging data over short distances from fixed and mobile devices, and building personal area networks (PANs).

OUTPUT SECTION

BUZZER

Buzzer is used in a system to indicate or to grab the attention regarding an emergency situation occurred. Typical uses of buzzers and beepers include alarm devices, timer and confirmation of user input.

LCD

LCD is used in a project to visualize the output of the application.

WIFI Module

The ESP82XX WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP82XX is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. This module comes with AT commands firmware which allows you to get functionality like arduino wifi shield, however you can load different firmwares to make your own application on the modules' memory and processor. Its a very economic module and has a huge and growing community support.

DC Motor

A DC motor is an electric motor that runs on direct current (DC) electricity. DC motors were used to run machinery. The dc motor works on 12v.To drive a dc motor, we need a dc motor driver called L293D.

ARM 7

The µC is the final decision making body on the system. The logic is developed and then the program is burned inside the microcontroller and the other peripherals are accessed via microcontroller only. The ARM7TDMI-S is a general purpose 32-bit microprocessor, which offers high-

performance and very low power consumption.ARM7 has 37 registers (31 GPR and 6 SPR). All these designs use a Von Neumann architecture. The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles, and the instruction set and related decode mechanism are much simpler than those of micro programmed Complex Instruction Set Computers (CISC). Pipeline techniques are employed so that all parts of the processing and memory systems can operate continuously. This processor architecture is capable of up to 130 MIPS on a typical 0.13 µm process. The processor supports both 32-bit and 16-bit instructions via the ARM and Thumb instruction sets. Here we have used LPC2138.

IV. METHODOLOGY

PIR (passive infrared) sensor is a motion based detector & used to sense movement of people, animals, or other objects.

By PIR, robot will detect humans and then the buzzer starts buzzing. The buzzing means the robot is asking for password. If the detected password is correct then it would continue with its work. But if not so then it will take action accordingly .Bluetooth is used for communication purpose with the base station

Here in the project we have two Android APPs.

The First App(Mobile) is on board Robot which is connected via Bluetooth. This App has the Password recognition as soon as the PIR detects the human presence the microcontroller will send indications to App via Bluetooth. The app will start the GOOGLE based password recognition, if the password matches or not, both indication are given to microcontroller using Bluetooth modem.

The Second App (Laptop) is used to control the buggy which is connected via wi-fi modem.

The camera is used for surveillance. It displays the messages and performed functions on LCD.

The gun mechanism is used to shoot an intruder.

V. RESULT

The Robot patrols the area and it is controlled through the controlling app. It detects obstacles using IR sensor. It detects the person using PIR sensor. When person is detected Buzzer buzzes , which means the password is to be spoken. The LCD screen displays the message about the robots current activities. The password is detected through voice recognition app. If the detected password is correct LCD screen and controller app displays message as “valid person”, else “Invalid person”. This is how the robot identifies the human as a security personnel or intruder. If the identified person is invalid or an intruder it will either shoot the human or take actions according to the command given by the base station. It would shoot through the gun mechanism. If the password is not spoken soon then the LCD screen and controller app displays the message as “No Response”.

Working model:

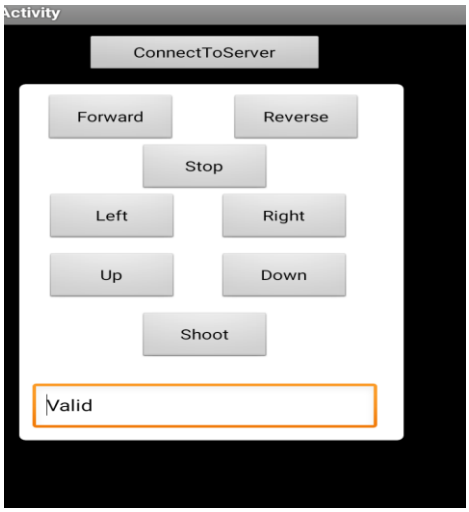
Object Detected

Person detected by PIR

IF Correct Password spoken:

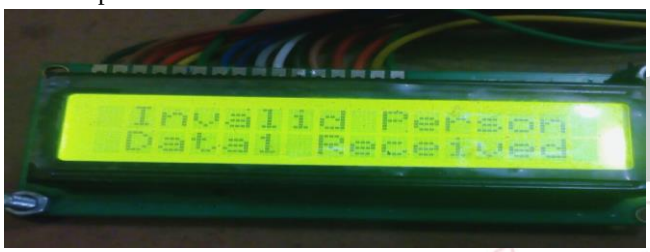
LCD output:

Controller app output:

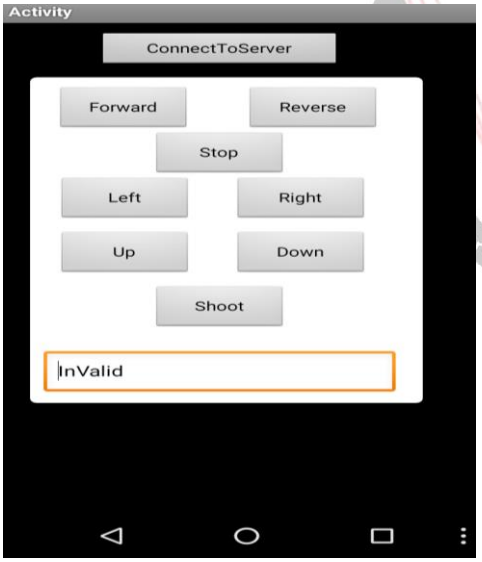


If Incorrect Password Spoken:

LCD output:



Controller app output:



If no response is given:

LCD output:

Controller app output:

VI. IMPLEMENTATION

The specification of hardware and software implementation is given below-

A. Software specification

1. Keil 3 Software
2. Proteus_vsm_7.4_professional Software
3. Flash magic Software
4. Basics for Android

B. **Hardware specification**

Circuit specifications :

1. ARM7 LPC2138 microcontroller
2. 16X2 LCD
3. PIR sensor :5-6 m
4. IR sensor : 15cm-150cm
5. Bluetooth : 10 meters
6. Wifi : 32 meters

Electrical specifications :

1. Step down transformer - 230V to 15V
2. Voltage regulator IC 7805
3. Output voltage -5V
4. Output current-500mA

VII. CONCLUSION

A Security interface is obtained to Android mobile device. This is a short range system and can be extended to long range by choosing proper PIR motion sensor and it is simple in its operation. The range and security features were achieved through the use of the internet in the mobile device. we introduce security robot, a hybrid wireless sensor network architecture for security to reduce the human involvement and

used to improve the detection accuracy of current patrol systems. PIR motion sensor is connected to one of the pin on the input port of LPC2138 and depending on sensor signal status; when it is high, LPC2138 sends the control signal to Android app. video streaming would also be done by using web cam app in android mobile. In case of Android, Users have a control of services accessed by Android application so they regulate their security and privacy.

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