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Robot control bye accelerometer based hand gesture

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CHAPTER-1

INTRODUCTION

During the last few decades we have seen the emergence of robots capable of performing complex tasks in the human environment. This project makes us advance in the path of making robots in such a way that makes them according to the gestures of the instructor .

The aim of this project work is to implement a robot able to act according to the hand gestures of the instructor and to sketch the main challenges and future directions . Designing such kind of robot one needs to consider the following aspects.

- Understanding the gesture recognition technology and implementing it in a robot.
- designing a proper mechanism.
- Selection of actuators and sensors.
- Developing an embedded system to properly manipulate all the actuators.

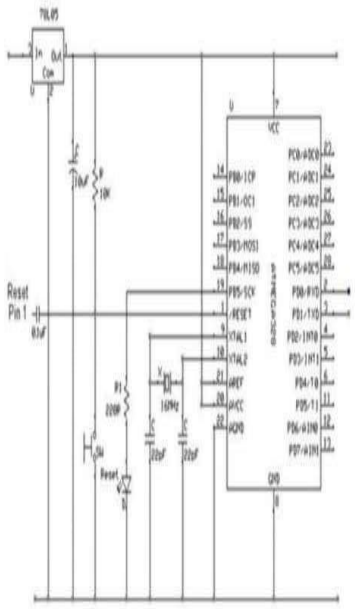

Figure 3.3: Block diagram of Arduino

This robot shall be capable to work on receiving instructions wirelessly. Developing such kind of robots needs:

- Proper mechanical arrangement.
- Actuators (motors) of desired speed and power.
- Power supply.
- Appropriate control system with interface for manual instruction feed.
- Programming and logics

Writing low will disable the pull-up. The pull-up resistor is enough to light an led dimly, so if LEDs appear to work, but very dimly, this is a likely cause. The remedy is to set the pin to an output with the pin Mode () function.

Digital Read () :Reads the value from a specified digital pin, either high or low.

Analog I/O :In analog i/o there are also three functions to take input from accelerometer which are

Analog Reference (): Configures the reference voltage used for analog input (i.e. the value used as the top of the input range).

The options are: Default :The default analog reference of 5 volts (on 5V Arduino boards) or 3.3 volts (on 3.3V Arduino boards) Internal: An built-in reference, equal to 1.1 volts on the ATmega168 or ATmega328 and 2.56 volts on theATmega8 (not available on the Arduino Mega)

\Internal 1V1 :A built-in 1.1V reference (Arduino Mega only)

Internal 2V56 :A built-in 2.56V reference (Arduino Mega only)

External : The voltage applied to the AREF pin (0 to 5V only) is used as the reference.

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TEST AND PROCEDURE

Because of transmitter device wearing on hand and receiver on the robot, the robot starts moving according to the movement of hand gestures. In this paper, we have explained about the 5 different hand gesture or movement positions i.e. stop condition, forward movement, backward movement, moves towards right and moves towards left.

5.1. Stop Condition:-

Figure 5.1 stop condition

The robot can be stopped by making the accelerometer parallel to the horizontal plane; this makes all the output pins of decoder (13, 12, 11, and 10) set to high.

5.2 Forward Movement:-

Figure 5.2 forward movement

EXPERIMENTAL ANALYSIS

6.1 RESULT:-

Fig 6.1 Real view of the robot control by accelerometer based hand gesture using arduino micro controller

The sign transmission through the radio recurrence segment which has better capacity contrast with IR (infrared) .And primary favorable position of utilizing RF, which can transmit the sign through longer separations this aches extend application, and furthermore sign can travel if there any obstacle between TX and RX. The working recurrence of transmitter and beneficiary is 433MHz and Radio transmitter recipient through the receiving wire stick. The sequential information is transmitted through radio wire and recipient gets the information and changes over to unique type of sign and move to engine driver and engine driver works the engine according to the client hand movement.

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CONCLUSION, LIMITATIONS AND FUTURE WORK

7.1. CONCLUSION:-

In our project we have added special features by which our robot can overcome so many problems in industry. If it is further developed then it can be used for military application. A Gesture Controlled robot with Arduino Uno microcontroller has been designed in this work, which can be controlled by human hand gestures. This requires to wear a small transmiting device on our hand included an accelerometer, which transmits particular commands to the robot to move according to the users hand gesture and one receiver at the robot.

7.2. Future Work:-

This project can be enhanced using voice circuit in this for deaf and dumb people. Voice circuit converts gestures into voice. With voice circuit implemented this will be useful for Animal Planet, Discovery people for their studies on animals by playing different sounds & for their exploration. Further we can add GPRS and GPS modules for place location. We can add video camera for live streaming. We can add bomb and metal detectors and can send to place, harmful for a person to go. This type of hand gesture system can be developed for whole body and can be used in military operations.

- The on-board batteries occupy a lot of space and are also quite heavy. We can either use some alternate power source for the batteries or replace the current DC Motors with ones which require less power.
- Secondly, as we are using RF for wireless transmission, the range is quite limited; nearly 50-80m. This problem can be solved by utilizing a GSM module for wireless transmission. The GSM infrastructure is installed almost all over the world. GSM will not only provide wireless connectivity but also quite a large range.
- Thirdly, an on-board camera can be installed for monitoring the robot from faraway places.

Chapter 8

FEASIBILITY OF THE PROJECT

During the development of the project we researched the feasibility in different fields, especially software and hardware. The feasibility study is shown below.

8.1. Software:-

We targeted to choose a language that is easy to understand and program. So we chose assembly language for our project. Assembly language is the basic language of microcontrollers. Although its not user friendly in terms of programming but still one can learn it quickly.

8.2. Hardware:-

We chose accelerometer as the sensing device because it records even the minute movements. We could also have completed our project using Arduino but chose microcontroller instead because its cost is low and is easily available everywhere. There are a number of dc geared motors available but the ones we chose are capable of supporting loads up to 6kgs.

8.3. Economic:-

This project is quite cost effective. The components used are easily available in the market apart from accelerometer, RF modules and the motors. These components are quite cheap as compared to the motors which are the only expensive part in our whole project. But these particular motors are capable of providing support to loads up to 6kgs which is what we wanted.

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