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Hand Gesture Controlled Pick and Placed Robot

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Abstract

Today's interaction between human and machine is moving far away from mouse and pen thus making it pervasive and much more compatible with the present physical world. With the introduction of new technologies the gap between human beings and machine is thus being reduced and gestures have played a vital role in diminishing this abyss. The project basically makes an attempt to build a robot which would be totally controlled by hand gestures. There are two types of gestures, static gesture and dynamic gesture. Here we are working on static gesture-it's a particular hand gesture or configuration and poses in single image.

Keywords: *Hand Gesture, Pick and Placed Robot, Accelerometer, RF module.*

1. Introduction

Human beings are continuously working hard to find new and new ways to interact with the machines. In this path a major breakthrough was observed when gestures were been used to interact with the machines. Now gestures are nothing but a non-verbal mode of communication in which particular messages are communicating by visible bodily actions. Now there are various types of gesture viz. various types of tilts, sound produced, various body movements etc. Thus causing the motion technology to be successful in drawing attention of the people all around the world.

A robotic arm is a robot which controls skillfully and performs similar to the human arm. Nowadays, a robotic arm are playing vital role in industrial sector. Still most of the industrial robots are programmed such that they are tedious and time-consuming requiring technical expertise. So there is a need of a new and easy way of programming robots.

2. System Design

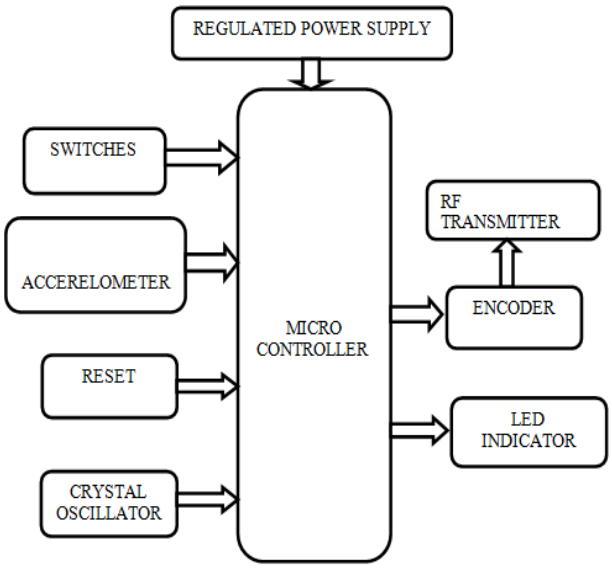

Fig. 1 Transmitter block diagram

The accelerometer module is integrated along with the transmitter circuit. Whenever a tilt is done with hand accordingly it is sensed by the accelerometer module and corresponding voltage is generated by it. This value is further feed into the ADC port of the microcontroller. A program is dumped into the controller to generate a digital equivalent of the analog value obtain from the accelerometer. This digital value is further than encoded and passed on to the RF transmitter which than transmits the signal.

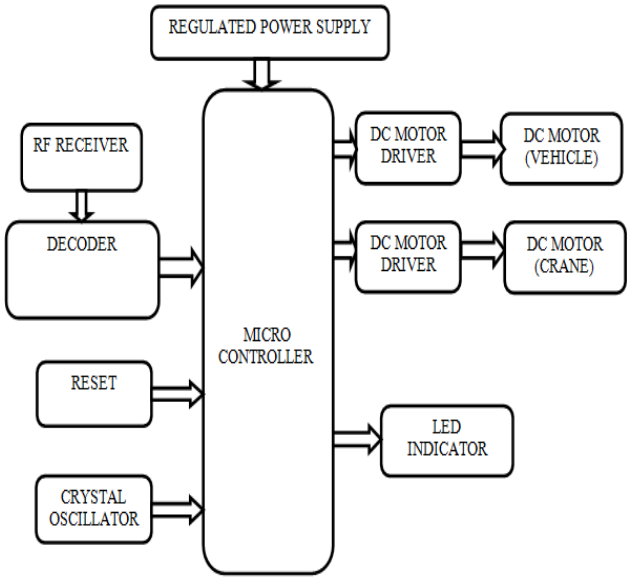

Fig. 2 Receiver block diagram

The signal is than received by the receiver section of the RF module which is fitted on to the robot. The data thus received is further decoded and then after fed into the microcontroller i.e. ATMEGA16. The controller has two motor drivers interfaced with it which controlled in total 4 motors (two motors of wheels and two of the fitted mechanism) .

According to the decoded data received by the controller the further motion of the robot takes place viz. the forward/backward motion of robot and the closing/opening of gripper and up/down motion of channel. The robot is supplied continuously with a power supply.

3. System Operation

The tilt done by the hand is sensed by the accelerometer module. Then the transmitter generates its analog voltage value and converts it to the digital value. The signal is send to the receiver circuit which moves either in forward/backward direction. Simultaneously the closing of gripper takes place. According to the position of the object placed it moves in right/left direction. Further the movement of robot is performed as per the command of the hand gesture. Then it performs the downward motion of the arm and release the gripper to place the object at particular place

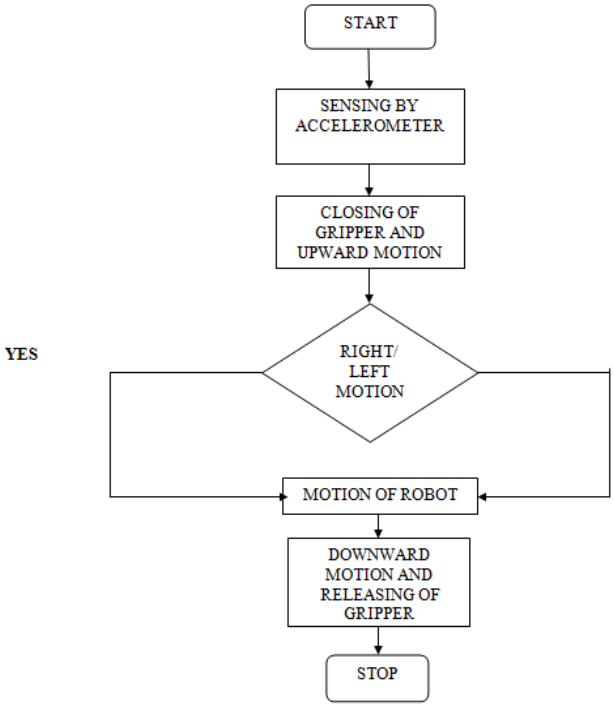

Fig. 3 Flow chart

4. Result

The robot that we have designed is easy to implement. Firstly, it doesn't require any sort of remote to operate or any communication module. It's a wireless robot and self-activated, which drivers according to the user infront of it. It simply copies all the movement of hand as the one who stands infront of it.

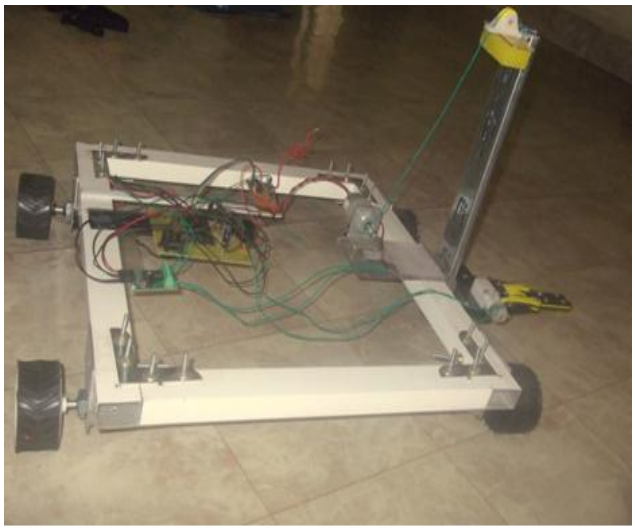

Fig. 4 Final Robot

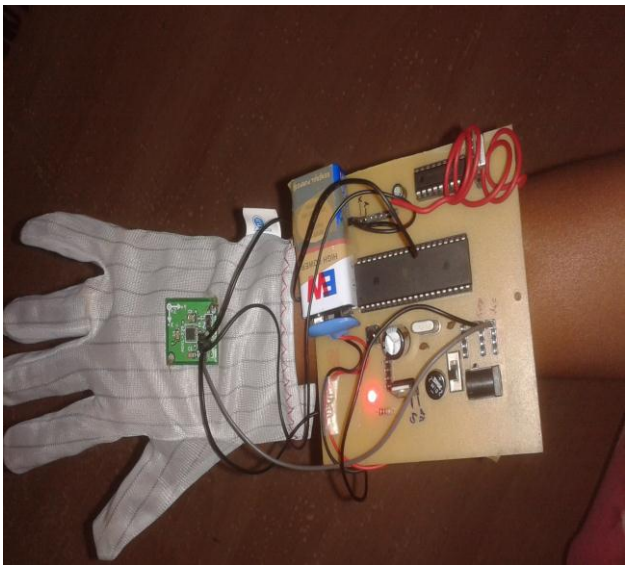

Fig. 3 The Transmitter Section

5. Benefits

[1] We generally find people working in chemical and hazardous areas in industrial sector. Thus this people face skin and lung problems and even severe. So this robot can be used in those place as it performs the instant action of humans.

[2] As it's a wireless robot it can be used by the physically handicapped person too in the industries.

[3] Nowadays most of the computer games are using motion detection remote technology.

6. Future Scope

We can further extend the topic in such way that voice information can be produced and displayed on LCD of the hand gesture of the user. This will help specially challenged people to communicate.

We can also use speech as a mode of interaction so that a perceptual user interface(PUI) can be created. It can be used then for augmented reality or virtual reality systems.

7. Conclusion

A gesture controlled robot is a kind of robot that can be controlled by hand gestures and not need to use the old buttons system. You just have to wear a transmitting device in your hand having a acceleration meter. This will transmit the command and work as per that. The transmitting device requires a comparator IC to convert analog to digital value and an encoder to transmit the data which will encode the four bit data and send it to the RF transmitting module. At the receiver end , the RF receiver module receives the data and the decoder decodes it further.

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