

# Wireless Flex Sensor Based Robot

**Prof. M. R. Gaikar**

*Assistant Professor*

*Department of Electronics & Telecommunication  
Engineering*

*Sir Visveswaraya Institute of Technology, Chincholi, Nasik  
(M.S), India*

**Kiran Khade**

*PG Student*

*Department of Electronics & Telecommunication  
Engineering*

*Sir Visveswaraya Institute of Technology, Chincholi, Nasik  
(M.S), India*

**Pooja Rajole**

*PG Student*

*Department of Electronics & Telecommunication  
Engineering*

*Sir Visveswaraya Institute of Technology, Chincholi, Nasik  
(M.S), India*

**Priti Fargade**

*PG Student*

*Department of Electronics & Telecommunication  
Engineering*

*Sir Visveswaraya Institute of Technology, Chincholi, Nasik  
(M.S), India*

## Abstract

This research paper is based on the glove based flex sensors. Hand movement data acquisition technique is used here. Sensors play an very important role in robotics. The role of sensor here is used to recognize and determine the current state of robo system. Flex sensor is a device that accomplishes the given task to it with greater accuracy. The designed robo is an exciting concept with high challenge research work. The goal of this designed project is to create wearable glove which recognizes the hand gestures and sends to controller for the further desired applications to get completed. DC motors are being used here for the movement of the robot.

**Keywords: Flex Sensor, Wireless Flex Sensor Based Robot**

## I. INTRODUCTION

We have designed a flex sensor based robot with PIC microcontroller. The flex sensor is used here because it senses the resistance of human hand and transmits the signal to robot with the help of the transmitter. For the robot to work accordingly we are using pic16 and L293D for driving the motors which are of 45rpm. In actual working of robot, initially the sensors are sensing the hand gestures and accordingly the signals are given to the ADC of pic microcontroller. Here the received analog signal is converted to digital signal and these values are further read by the L293D IC. The values are further given to the DC motor and the robot works according to the hand gestures.

## II. LITERATURE SURVEY

- 1) The history of hand gesture recognition for computer control started with the invention of glove based control interfaces. Researches also realized that the gestures which are inspired by the sign language can be used to offer simple commands for a computer interfacing.
- 2) Some of the developments in the glove based systems eventually offered the ability to realize and recognize computer vision based recognition without any sensors being attached to the glove. These are the colored gloves or that also offer unique and different colors for finger tracing based on gesture recognition.
- 3) This report will not get developed and complete without the historical development of hand gesture recognition based on that of the computer vision. Data glove is a wired interference with certain sensory units that are attached to the glove that the user is wearing. The sensors measure the bending of the joints and converts it into equivalent signal. The advantage of such device was that there was no requirement of any preprocessing requirement.

## III. EXISTING SYSTEM

Today there exists gloves that are wireless and easy to use. By looking into the history of the data glove there emerged two distinct categories these years. 1. Active data glove that consist of few variety of sensors to measure flexing joints. It can be wired or wireless technology. 2. Passive data glove consists only colors for fingers detection by any of the external device such as camera etc.

#### IV. PROBLEM STATEMENT

In previous project, we have used the technique with the wired robot. This limits the use of the robot and its application. The application of the system gets reduced due to this. Hence, to avoid these problems the system is made wireless which makes it more easy and convenient to use. Due to the reduced complexity of the overall system the application of the system also increases. The hand gestures are recognized by the sensor and the signal is sent to the system for its actual working.

#### V. PROPOSED OF SYSTEM

The increasing need of the flex sensor and the less complexity makes its use more known. The wireless sensor and the technology used makes it more user friendly. The wireless system makes the use of the transmitter and receiver to transmit and receive the signals respectively. The system then becomes wireless and more convenient to use. This will also increase its application in various sectors.

#### VI. OVERVIEW OF SYSTEM

The Flex sensors basically are the sensors which change their resistance based on the amount of the bending. The flex sensors are basically in the form of a thin strip. They are often used in the gloves to sense finger movement. Here in the system the flex sensors are used to recognize the hand gestures and the signal is driven to the PIC microcontroller. This controller converts the analog signal into the digital one and gives it to the DC motor. DC motor then works according to the applied signals. The motors here used are three. One is used for forward and reverse direction, second motor is used for the left and right direction and the third motor is used for the camera rotation or any other application. The DC motor used here is of 45rpm. The transceiver is used in this for the transmission and reception of data from the sensors. The encoder and the decoder are used to encode and decode the data and the applied signal. The PIC microcontroller is used to recognize the signal and convert it. This controller is used to read the analog signal read them and convert it into the digital form for the further conversions. In such a way the motors work according to the given input.

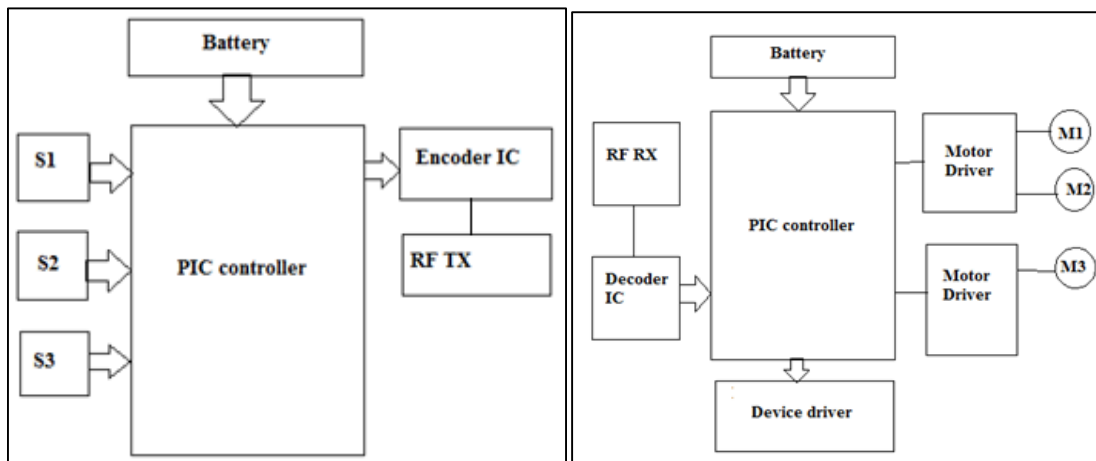


Fig. 1: Block Diagram of the System

#### VII. FLEX SENSOR

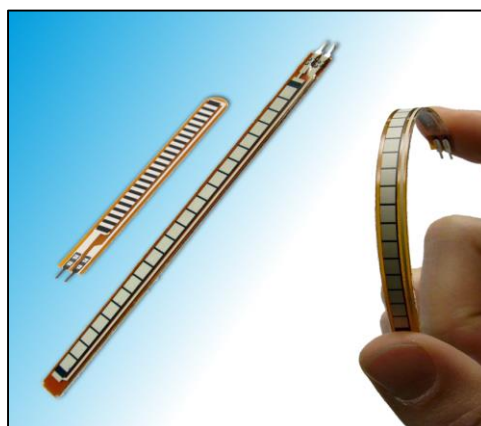


Fig. 2: Flex Sensors

The flex sensors basically are of two types i.e. unidirectional and bidirectional. The three most common types of flexion sensors are conductive ink based, fiber optic, conductive fabric thread polymer based. Bending of the sensor at a specific angle is the most effective use of sensor. The of the sensor more than 90 degree angle may permanently damage the sensor. Instead, bend the sensor around the radius of the curvature. Smaller the radius of the curvature greater is the resistance achieved if the sensor is fixed at one end and bend the resistance of the flex sensor changes when the metal pads above it are outside the bend. It can be used within the range of -35 degree Celsius to +80 degree Celsius.

### VIII. FLOW CHART

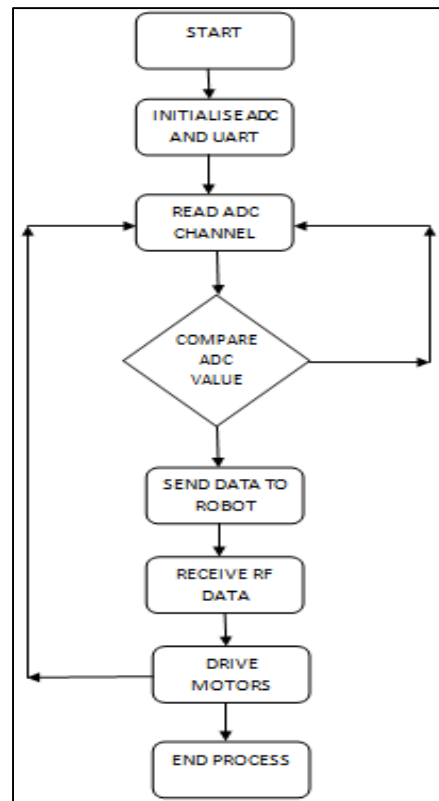


Fig. 3: Flowchart of system

### IX. APPLICATION

- Robotics.
- Biometrics.
- Gaming gloves.
- Military applications.
- Joysticks, musical instruments etc.
- Handicapped people.

### X. CHALLENGES TO OVERCOME

After numerous studies have done project based on flex sensors we have done the system wireless and more convenient. The system is reliable and easy for application. Due to the convenient and user friendliness its applications gets increased. System can be used for the different applications like camera, laser, and also the different types of sensors. We are implementing the robot with the camera that can be used in the military applications and the mine areas where human being cannot reach. Also it can be used in the hazardous areas where working of the human being is risky.

### XI. CONCLUSION

The main motive of this project is to reduce the human efforts. We are studied how to make robo with the help of the flex sensor and implement it into our day to day life. Gesture recognition technology is gaining popularity in almost every area that uses smart machines.

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