

What is Flex Sensor?



A flex sensor is a variable resistor that changes with angle of bend. flexible potentiometer. Generally, it is found to be unidirectional i.e. change in resistance occur in response to the bend or the particles motion in one particular direction.

Scientific Fact and Applications

The sensor has a conductive layer depending on its type like conductive ink flex sensor, fiber optic flex sensor, capacitive flex sensor and velostat flex sensor. As the strip is bent, the particles experiences a resistance in their movement, leading to the increased resistance.

Applications:

Goniometer Gloves

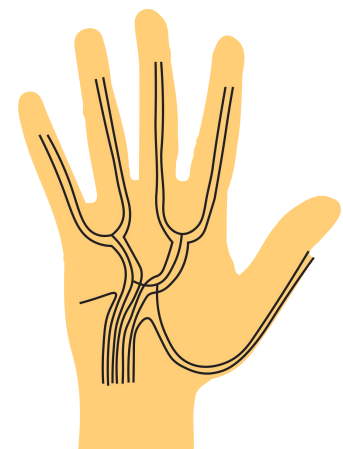
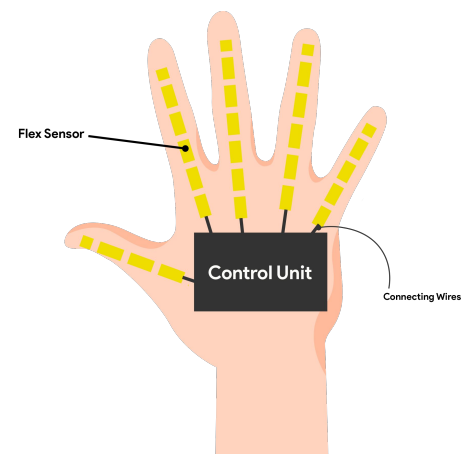
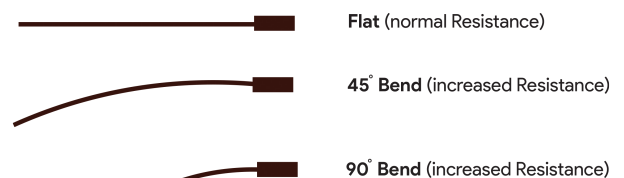
A glove equipped with flex sensor at specific positions can be used for precise measurements of the angles between the different facets of a crystal or a substance.

Medical Instruments

Sensitive flex sensors are integrated into the complex medical instruments so as to use them for differently-abled citizens.

Damage detection

Flex sensors in an array form can be used to identify damages, such as a dent, and damage severity by checking the level of the surface proportionality with resistance. Appropriate treatment can then be provided.



Industrial Grade Sensor attachment

Project

To check the relative deflection or bend using the flex sensor and Arduino UNO.

Procedure

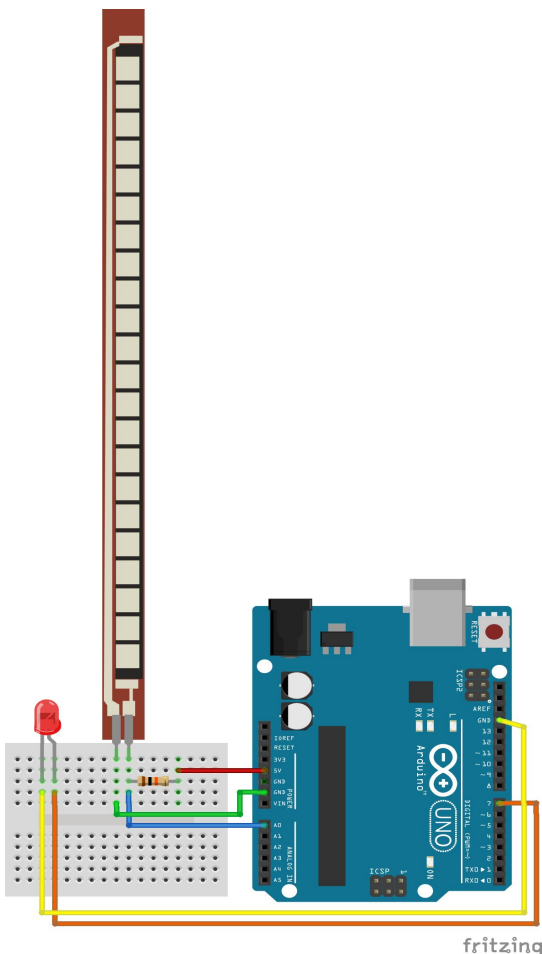
Flex Sensor:

- Connect **1st** pin of sensor to **A0** of Arduino.
- Connect **1st** pin of sensor to a 10k **resistor**.
- Connect other end of resistor to **5V** of Arduino
- Connect **GND** of sensor to **GND** of Arduino
- Bend the sensor and determine the analog values for angle 0 (eg. 700) and 180 (eg. 900) and update in map function

LED:

- Connect **Cathode (shorter leg)** to **GND** of Arduino
- Connect **Anode (longer leg)** to resistor. Other leg of resistor to pin 1 of Arduino.

Schematic



Challenge Yourself

1. Make a glove that shows deflection of your fingers
2. Design a model of a smart chair that alerts you whenever you relaxes or bends beyond a certain limit.

Components Required

Component	Part No.	Qty
Arduino UNO	EMX-00001-A	1
RED LED	EDD-00002-A	1
10k Resistor	EDR-00001-10K0	1
Flex Sensor	EDT-00007-A	1

Code

```
#define led_Pin 7/*Connecting led to pin
7 of Arduino*/
#define sensor A0/*Connecting flex sensor
to pin A0 of Arduino*/
int analog_value;/*Variable to store the
read analog value*/
int angle_value;/*Variable to store angle
of bending*/
void setup() {
    pinMode(led_Pin, OUTPUT);
    Serial.begin(9600);/*Setting the baud
rate of serial communication to be 9600*/
}
void loop()
{
    /*Getting angle of bending of the flex
sensor*/
    analog_value = analogRead(sensor);
    /*Reading the analog value from sensor*/
    angle_value = map(analog_value, 700,
900, 0, 180);/*Mapping the analog value
from 700-900 scale to 0-180 scale*/
    /*Printing the value to the serial
monitor*/
    Serial.print("Analog: ");
    Serial.println(analog_value);
    Serial.print("Angle: ");
    Serial.println(angle_value);
    /*Setting led according to the recorded
angle*/
    if(angle_value > 90)
        digitalWrite(led_Pin, HIGH);
    else
        digitalWrite(led_Pin, LOW);
    delay(1000);
}
```