

EXPERIMENT NO: 9

Roll No:**Class: BE****Division: A****Date:**

TITLE: Understanding the connectivity of Raspberry-Pi circuit with ultrasonic sensor. Write an application program of for measurement of distance.

AIM: To understand the connectivity of a Raspberry Pi circuit with an ultrasonic sensor and write an application program to measure distance.

Task: Measurement of distance using ultrasonic sensor.

Source Code:

```
import RPi.GPIO as GPIO
import time

#GPIO Mode (BOARD / BCM)
GPIO.setmode(GPIO.BCM)

#set GPIO Pins
GPIO_TRIGGER = 19
GPIO_ECHO = 22

#set GPIO direction (IN / OUT)
GPIO.setup(GPIO_TRIGGER, GPIO.OUT)
GPIO.setup(GPIO_ECHO, GPIO.IN)

def distance():
    # set Trigger to HIGH
    GPIO.output(GPIO_TRIGGER, True)

    # set Trigger after 0.01ms to LOW
    time.sleep(0.00001)
    GPIO.output(GPIO_TRIGGER, False)

    StartTime = time.time()
    StopTime = time.time()

    # save StartTime
    while GPIO.input(GPIO_ECHO) == 0:
        StartTime = time.time()

    # save time of arrival
    while GPIO.input(GPIO_ECHO) == 1:
        StopTime = time.time()

    # time difference between start and arrival
    TimeElapsed = StopTime - StartTime
```

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```
# multiply with the sonic speed (34300 cm/s)
# and divide by 2, because there and back
distance = (TimeElapsed * 34300) / 2
```

```
return distance
```

```
if __name__ == '__main__':
    try:
        while True:
            dist = distance()
            print ("Measured Distance = %.1f cm" % dist)
            time.sleep(1)
```

```
# Reset by pressing CTRL + C
except KeyboardInterrupt:
    print("Measurement stopped by User")
    GPIO.cleanup()
```

Output:

```
root@raspberrypi:~# python3 ultrasonic.py
Measured Distance = 8.8 cm
Measured Distance = 2227.2 cm
Measured Distance = 2226.8 cm
Measured Distance = 2227.2 cm
Measured Distance = 2222.1 cm
Measured Distance = 2225.9 cm
Measured Distance = 2226.5 cm
Measured Distance = 2226.7 cm
Measured Distance = 44.7 cm
Measured Distance = 43.4 cm
Measured Distance = 40.0 cm
Measured Distance = 42.8 cm
```

Observations: