# Experiment no :- 7

Aim :- write an application using Raspberry - Pi / Beagle board to control the operation of stepper motor.

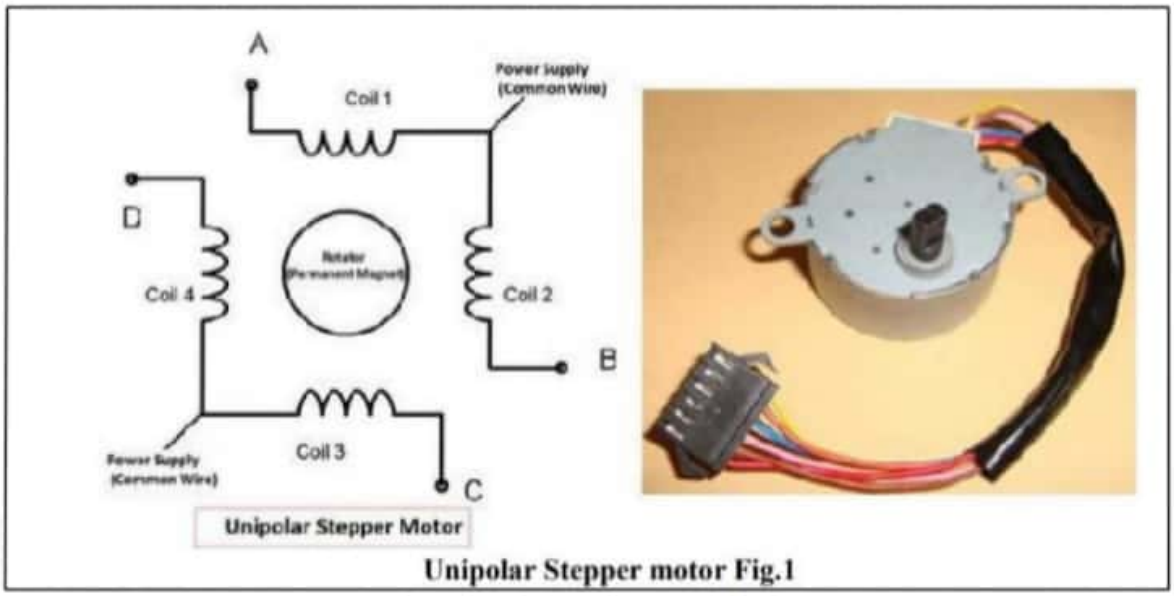
Theory :-

stepper motor :-

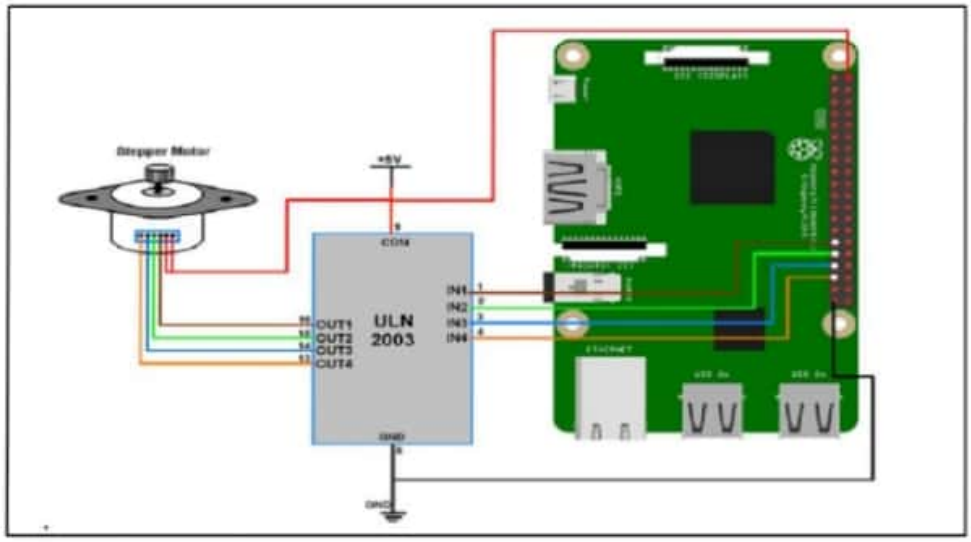
In stepper motor, as name itself says, rotation of shaft is in step form. There are different types of stepper motor, in here we will be using most popular one that is unipolar stepper motor. Unlike DC motor, we can rotate stepper motor to any particular angle by giving it proper instructions.

There are 40 GPIO o/p pins in Raspberry Pi 2 but out of 40 only 26 GPIO pins can be programmed. some of these pins perform some special functions. with special GPIO put aside, we have only 17 GPIO remaining. Each of these 17 GPIO pin can deliver a maximum 15mA current. And sum of currents from all GPIO pins cannot exceed 50mA

There are +5V power o/p pins on board for connecting other modules & sensors. These power rails cannot be used to drive the stepper motor, because we need more power to rotate it. so we have to deliver power to stepper motor from another power source my stepper motor has a voltage rating of 9V so I am using 9V battery as my second power source




Unipolar Stepper motor Fig.1



Sample progeam :-
stepper motor interfacing with Raspberry Pi

```
import RPi.GPIO as GPIO
from time import sleep
import sys

# assign GPIO pins for motor
motor_Channel = (29,31,33,35)
GPIO.setwarnings(False)
GPIO.setmode(GPIO.BOARD)
# for defining more than 1 GPIO channel as I/P use
GPIO.setup(motor_Channel, GPIO.OUT)

motor_dir = input('Select motor dir a = anticlockwise, c= clockwise :')
while True:
try:
if (motor_dir = 'c'):
print('motor running clockwise')
GPIO.output(motor_Channel, (GPIO.HIGH, GPIO.Low, GPIO.Low, GPIO.High))
sleep(0.02)
GPIO.output(motor_Channel, (GPIO.HIGH, GPIO.HIGH, GPIO.Low, GPIO.Low))
sleeep(0.02)
GPIO.output(motor_Channel, (GPIO.low, GPIO.HIGH, GPIO.HIGH, GPIO.Low))
sleep(0.02)
GPIO.output(motor_Channel, (GPIO.low, GPIO.Low, GPIO.HIGH, GPIO.HIGH))
sleep(0.02)

elif (motor_dir = 'a'):
print('motor running anti-clockwise')
```

```
GPIO.output (motor_channel, (GPIO.HIGH, GPIO.Low, GPIO.Low, GPIO.HIGH))
sleep (0.02)
GPIO.output (motor_channel, (GPIO.Low, GPIO.Low, GPIO.HIGH, GPIO.HIGH))
sleep (0.02)
GPIO.output (motor_channel, (GPIO.Low, GPIO.HIGH, GPIO.HIGH, GPIO.Low))
sleep (0.02)
GPIO.output (motor_channel, (GPIO.HIGH, GPIO.HIGH, GPIO.Low, GPIO.Low))
sleep (0.02)

#pass
except KeyboardInterrupt:
motor_dir = input ('Select motor_dir a= anticlockwise, c=clockwise
                    or q=exit:')
if (motor_dir = 'q'):
print ('motor stopped')
sys.exit (0)
```

Conclusion :-

Thus, we have studied implemented application of stepper motors using python with Raspberry Pi.