

Experiment No - 07

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Date	

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Aim: Write an application using Raspberry Pi / Beagle board to control the operation of Stepper motor

Theory: Stepper Motor

In Stepper Motor as the name itself says the rotation of shaft in the step form. there are different types of Stepper motors. In here we will be using the 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.

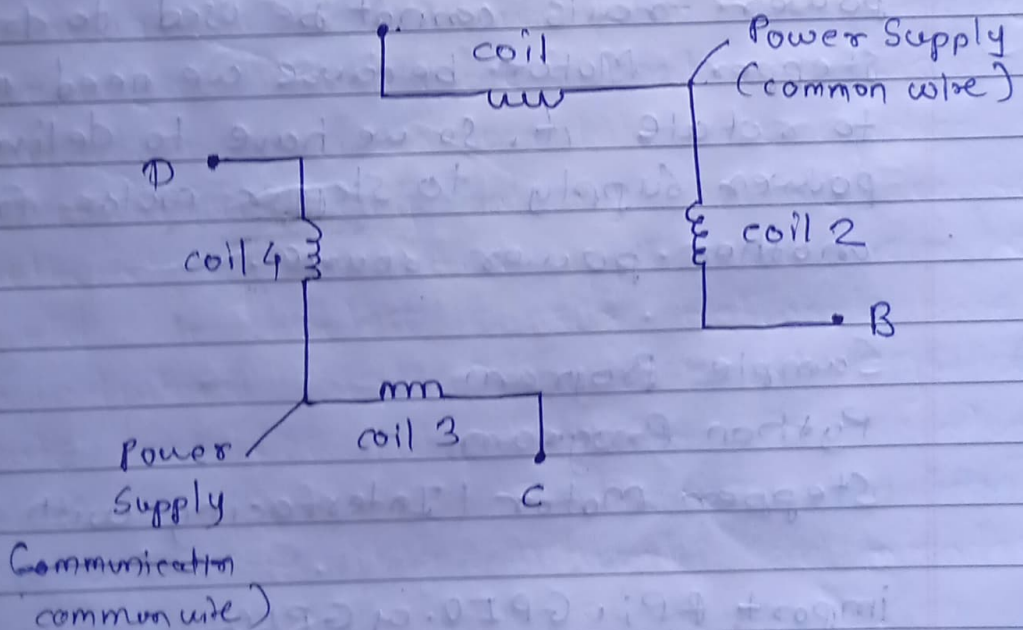


Fig unipolar Stepper motor.

To rotate this Stepper motor we will deliver power pulses by using stepper motor driver circuit

the driver circuit takes logic circuit trigger from Pi. If we control the logic trigger we control the power pulses and hence the speed of stepper motor.

There are 40 GPIO o/p pins in Raspberry Pi2. But not of 40 only 26 GPIO pins (GPIO0 to GPIO25) 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 can deliver a maximum of 15mA current. And the sum of currents from all GPIO pins cannot exceed 80mA.

There are +5V (pin 2 & 4) and +3.3V (pin 1 & 17) power o/p pins on the board for connecting other modules and 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 the power supply to stepper motor from another power source.

Sample Program

Python Program

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 o/p use

GPIO.setup (motor = channel, GPIO.OUT)

motor = direction = input ('Select motor direction

a = on / clockwise, c = clockwise')

while True:

try:

if (motor - direction == 'c'):

Print (motor ~~direction~~ - running (clockwise/n'))

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))

Sleep (0.02)

elif (motor - direction == 'a'):

print ('motor running anti clockwise/n')

GPIO.output (motor = channel, (GPIO.HIGH, GPIO

LOW, GPIO.LOW, GPIO.HIGH)

GPIO.output (motor = channel, (GPIO.LOW, GPIO.LOW,

GPIO.HIGH, GPIO.LOW))

Sleep (0.02)

GPIO.output (motor = channel, (GPIO.LOW,

GPIO.HIGH, GPIO.HIGH, GPIO.LOW))

Sleep (0.02)

Press ctrl+C for Keyboard interrupt/
except keyboard Interrupt:

query for setting motor direction or exit
motor - direction = input ('select motor
direction a = anticlockwise, c = clockwise
or q = exit')

check for exit

if (motor - direction == 'q'):

print ('motor stopped')

sys.exit(0)

Conclusion: Thus we have implemented
application of Stepper motors using
python with Raspberry Pi.