Lesson 5 Use of Accelerometer
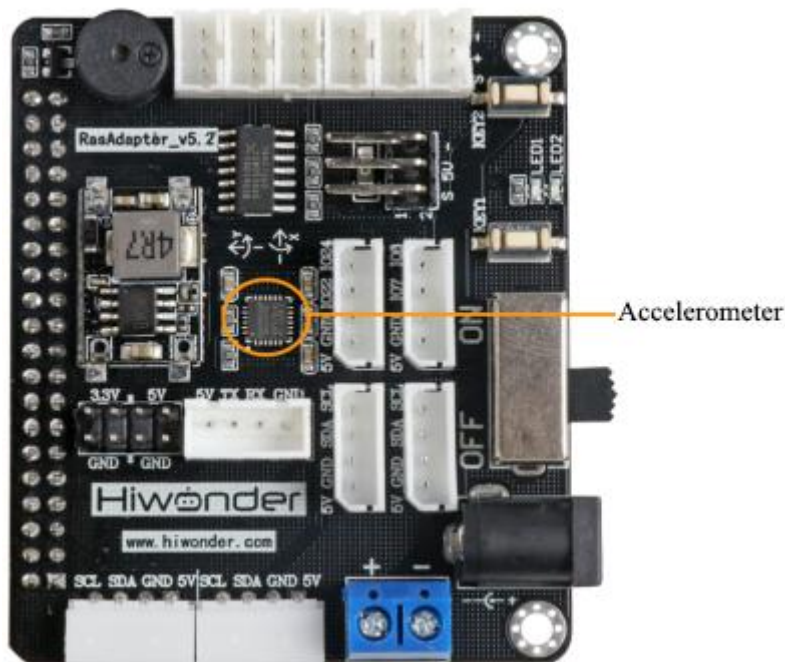
1. Preparation

There is a accelerometer on the Raspberry Pi expansion board, as shown in the figure below:

Note: 4PIN wire adopts anti-back insert design. Please pay attention to the plug direction.

2. Working Principle

Accelerometer composed of mass blocks, dampers, elastic elements, sensitive elements, and debugging circuits is a tool that measures acceleration. During the acceleration process of the sensor, the acceleration value can be obtained according to Newton's second law by measuring the inertial force on the mass block.

The source code of program is located in

/home/pi/TonyPi/HiwonderSDK/Mpu6050.py

```python
248  if __name__ == "__main__":
249      mpu = mpu6050(0x68)
250      mpu.set_gyro_range(mpu.GYRO_RANGE_2000DEG)
251      mpu.set_accel_range(mpu.ACCEL_RANGE_2G)
252      while True:
253          try:
254              accel_date = mpu.get_accel_data(g=True)
255
256              ax = accel_date['x']
257              ay = accel_date['y']
258              az = accel_date['z']
259
260              angle_x = math.degrees(math.atan2(ax, az))
261              angle_y = math.degrees(math.atan2(ay, az))
262              print(angle_x, angle_y)
263              time.sleep(0.1)
264          except KeyboardInterrupt:
265              break
266          except BaseException as e:
267              print('error: ', e)
```

"ax", "ay", "az" are the values of X, Y, Z axes respectively.

Before obtaining the data of accelerometer, the atan2() function in the math library can be used to obtain the inverse tangent of the given coordinate value, and use the degrees() function to convert it to an angle value.

3. Operation Steps

1) Click the icon shown below to enter the LX terminal command line.

2) Enter the command "**cd TonyPi/HiwonderSDK/hiwonder/**" in the interface and press "Enter" to switch to the directory where the routine is located.

```
pi@raspberrypi:~ $ cd TonyPi/HiwonderSDK/hiwonder/
pi@raspberrypi:~/TonyPi/HiwonderSDK/hiwonder $
```
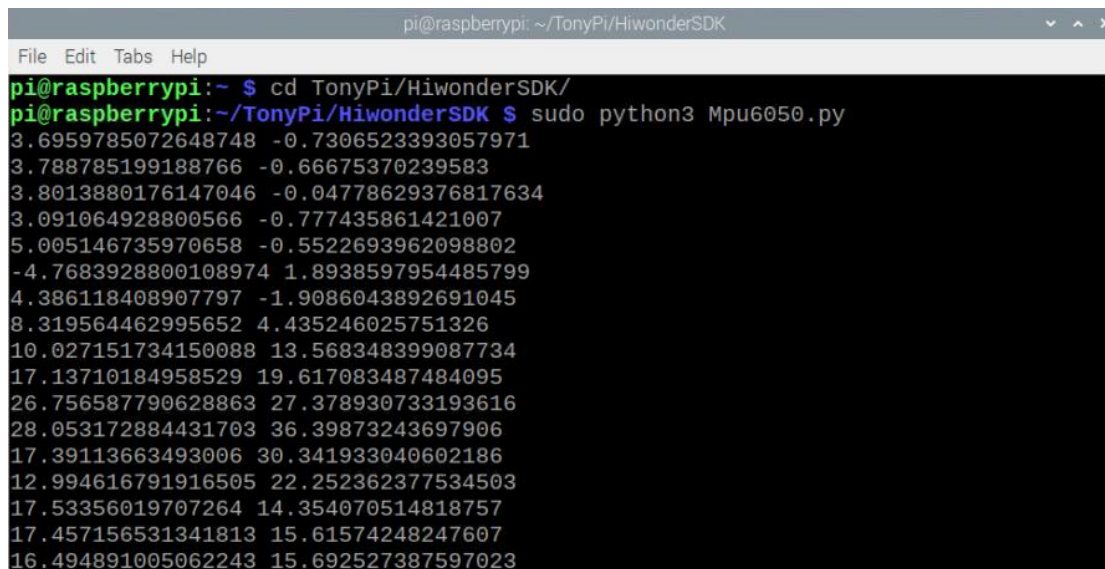
3) Input the command "**sudo python3 mpu6050.py**" to start the

accelerometer program, and press "Enter".

```
pi@raspberrypi:~ $ cd TonyPi/HiwonderSDK/hiwonder/
pi@raspberrypi:~/TonyPi/HiwonderSDK/hiwonder $ sudo python3 Mpu6050.py
```

4) Press "**Ctrl+C**" to close the program.

4. Project outcome

Starting the program, the tilt angle will be displayed on the interface.