Crash Detection Module

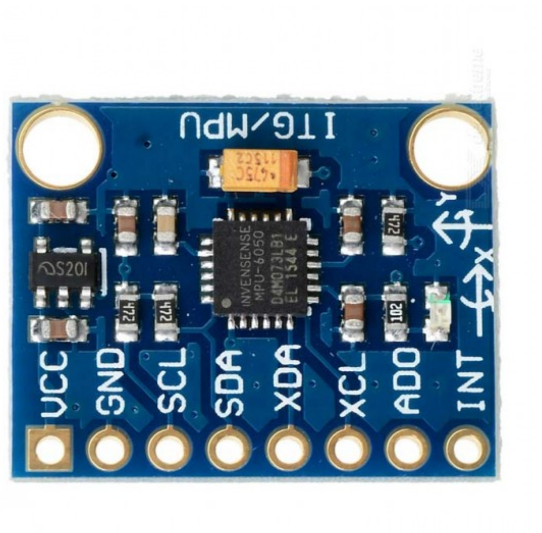
Aim

To develop a crash detection module to sense and alert user in case of crash

Apparatus Used

- Raspberry pi Pico
- MPU 6050 Module
- Wires
- Breadboard
- Buzzer
- Micro USB cable

Theory



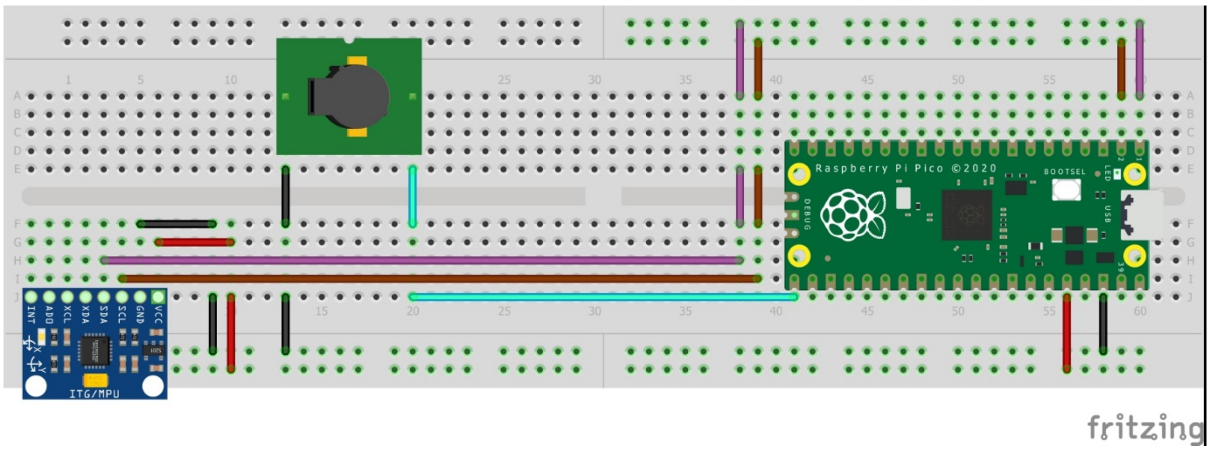
MPU 6050

MPU 6050 is a MEMS (micro electro mechanical system) is a process technology used to create tiny integrated devices or systems that combine mechanical and electrical components. They are fabricated using integrated circuit (IC) batch processing techniques and can range in size from a few micrometres to millimetres.

Raspberry Pi Pico

We are using Raspberry pi Pico to control the whole module and its workings. Raspberry pi Pico is a microcontroller which we can code and use to interact with hardware and perform computations

Here we are continuously getting acceleration data and if the difference in consecutive acceleration is greater than threshold value the buzzer alerts the user.



Schematic of the whole circuit

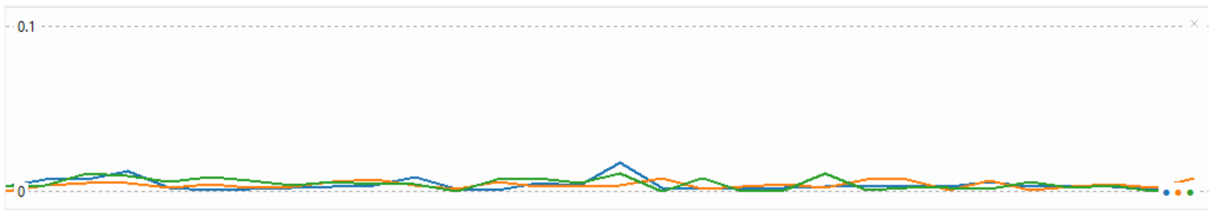
Limitations

- Cannot alert police of the crash
- Is not battery operated so we need to connect it to a laptop
- Cannot transmit data wirelessly

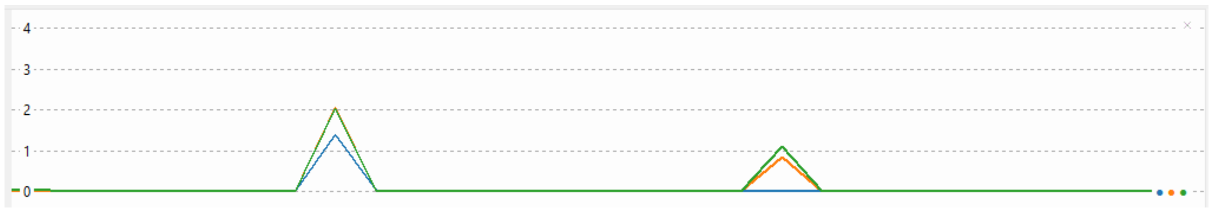
Code

```
from imu import MPU6050
import time
from machine import Pin, I2C
i2c = I2C (0, sda=Pin (0), scl=Pin (1), freq=400000)
imu = MPU6050(i2c)
buzzer = Pin(16, Pin.OUT)

ax=[0,0]
ay= [0,0]
az=  [0,0]

while True:

    ax [0] = (imu.accel.x)
    ay [0] =(imu.accel.y)
    az[0]=(imu.accel.z)
    ax[1]=(imu.accel.x)
    ay[1]=(imu.accel.y)
    az[1]=(imu.accel.z)

    if abs(ax[0]-ax[1])>1 or abs(ay[0]-ay[1])>1 or abs(az[0]-az[1])>1 :
      buzzer.toggle()
      time.sleep(0.1)
      buzzer.toggle()
    print(abs(ax[0]-ax[1]), abs(ay[0]-ay[1]),abs(az[0]-az[1]))
```

Graphs Showing Acceleration data



This graph shows normal accelerations



This graph shows When the crash happens. The peaks represents the crash