**Arduino Code (Written Version)**

#include <Wire.h>

#include <FastLED.h>

#define LED\_PIN 7

#define NUM\_LEDS 60

CRGB leds[NUM\_LEDS];

long accelX, accelY, accelZ;

float gForceX1, gForceY1, gForceZ1, gForceX2, gForceY2, gForceZ2, Xdiff, Ydiff, Zdiff;

int play = 11 ;

int crash = 0;

int j=0;

void setup() {

Serial.begin(9600);

Wire.begin();

setupMPU();

FastLED.addLeds<WS2812, LED\_PIN, GRB>(leds, NUM\_LEDS);

}

void loop() {

recordAccelRegisters();

Xdiff = abs(gForceX2-gForceX1);

Ydiff = abs(gForceY2-gForceY1);

Zdiff = abs(gForceZ2-gForceZ1);

for(j; j<1; j++)

{

Xdiff = 0;

Ydiff = 0;

Zdiff = 0;

}

gForceX2=gForceX1;

gForceY2=gForceY1;

gForceZ2=gForceZ1;

printData();

if(crash == 0)

{

if (Xdiff>=10 || Ydiff>=10 ||Zdiff>=10)

{

digitalWrite(play, HIGH);

digitalWrite(play, LOW);

for (int i = 0; i <= 59; i++)

{

leds[i] = CRGB ( 255, 0, 0);

FastLED.show();

delay(5);

}

Serial.println("Red ON");

crash = 1;

}

else

{

for (int i = 59; i >= 0; i--)

{

leds[i] = CRGB ( 0, 255, 0);

FastLED.show();

}

Serial.println("Green ON");

}

}

if (crash ==1)

{

digitalWrite(play, HIGH);

digitalWrite(play, LOW);

for (int i = 0; i <= 59; i++)

{

leds[i] = CRGB ( 255, 0, 0);

FastLED.show();

}

for (int i = 0; i <= 59; i++)

{

leds[i] = CRGB ( 0, 0, 0);

FastLED.show();

}

Serial.println("Red ON");

}

delay(500);

}

void setupMPU(){

Wire.beginTransmission(0b1101000); //This is the I2C address of the MPU (b1101000/b1101001 for AC0 low/high datasheet sec. 9.2)

Wire.write(0x6B); //Accessing the register 6B - Power Management (Sec. 4.28)

Wire.write(0b00000000); //Setting SLEEP register to 0. (Required; see Note on p. 9)

Wire.endTransmission();

Wire.beginTransmission(0b1101000); //I2C address of the MPU

Wire.write(0x1C); //Accessing the register 1C - Acccelerometer Configuration (Sec. 4.5)

Wire.write(0b00000000); //Setting the accel to +/- 2g

Wire.endTransmission();

}

void recordAccelRegisters() {

Wire.beginTransmission(0b1101000); //I2C address of the MPU

Wire.write(0x3B); //Starting register for Accel Readings

Wire.endTransmission();

Wire.requestFrom(0b1101000,6); //Request Accel Registers (3B - 40)

while(Wire.available() < 6);

accelX = Wire.read()<<8|Wire.read(); //Store first two bytes into accelX

accelY = Wire.read()<<8|Wire.read(); //Store middle two bytes into accelY

accelZ = Wire.read()<<8|Wire.read(); //Store last two bytes into accelZ

processAccelData();

}

void processAccelData(){

gForceX1 = accelX \*9.81 / 16384.0;

gForceY1 = accelY \*9.81 / 16384.0;

gForceZ1 = accelZ \*9.81 / 16384.0;

}

void printData() {

Serial.print(" Accel (m/s2)");

Serial.print(" X=");

Serial.print(gForceX1);

Serial.print(" Xdiff=");

Serial.print(Xdiff);

Serial.print(" Y=");

Serial.print(gForceY1);

Serial.print(" Ydiff=");

Serial.print(Ydiff);

Serial.print(" Z=");

Serial.print(gForceZ1);

Serial.print(" Zdiff=");

Serial.println(Xdiff);

}