**附录 Code**

**AndroidManifest.xml**

<?xml version="1.0" encoding="utf-8"?>

<manifest xmlns:android="http://schemas.android.com/apk/res/android"

package="com.example.tri\_axial\_accelerometers">

<uses-permission android:name="android.permission.VIBRATE"></uses-permission>

<application

android:allowBackup="true"

android:icon="@drawable/logo"

android:label="@string/app\_name"

android:roundIcon="@drawable/logo"

android:supportsRtl="true"

android:theme="@style/AppTheme">

<activity android:name=".TriAxialSensorActivity"></activity>

<activity android:name=".MainActivity">

<intent-filter>

<action android:name="android.intent.action.MAIN" />

<category android:name="android.intent.category.LAUNCHER" />

</intent-filter>

</activity>

</application>

</manifest>

**Activity\_main.xml**

<?xml version="1.0" encoding="utf-8"?>

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"

xmlns:app="http://schemas.android.com/apk/res-auto"

xmlns:tools="http://schemas.android.com/tools"

android:orientation="vertical"

android:layout\_width="fill\_parent"

android:layout\_height="fill\_parent"

android:background="@drawable/main\_background"

tools:context="com.example.asus.gary\_01.MainActivity">

<TextView

android:layout\_width="fill\_parent"

android:layout\_height="wrap\_content"

android:text="传感器操作！"

android:textSize="10pt" />

<Button

android:id="@+id/button1"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:background="#08FFFFFF"

android:text="三轴加速度传感器" />

<Button

android:id="@+id/button2"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:background="#07FFFFFF"

android:text="获取手机传感器信息" />

<TextView

android:id="@+id/textView"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:scrollbars="vertical"

android:textSize="8pt" />

</LinearLayout>

**MainActivity.java**

package com.example.tri\_axial\_accelerometers;

import android.content.Context;

import android.content.Intent;

import android.hardware.Sensor;

import android.hardware.SensorManager;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

import android.text.method.ScrollingMovementMethod;

import android.view.View;

import android.widget.Button;

import android.widget.TextView;

import java.util.List;

public class MainActivity extends AppCompatActivity {

private TextView tx1;

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_main);

Button bt1 = (Button) findViewById(R.id.button1);

bt1.setOnClickListener(new View.OnClickListener() {

@Override

public void onClick(View v) {

Intent intent = new Intent(MainActivity.this, TriAxialSensorActivity.class);

startActivity(intent);

}

});

Button bt2 = (Button) findViewById(R.id.button2);

tx1 = (TextView) findViewById(R.id.textView);//Text view添加滚动条设置

//从系统获得传感器管理器

final SensorManager sm = (SensorManager) getSystemService(Context.SENSOR\_SERVICE);

bt2.setOnClickListener(new View.OnClickListener() {

@Override

public void onClick(View v) {

String str;

//从传感器管理器中获得全部的传感器列表

List<Sensor> allSensors = sm.getSensorList(Sensor.TYPE\_ALL);

int i;

//给ViewText添加滚动条

tx1.setMovementMethod(ScrollingMovementMethod.getInstance());

//显示有多少个传感器

tx1.setText("经检测该手机有" + allSensors.size() + "个传感器，它们分别是:");

Sensor s;

//显示每个传感器的具体信息

for (i = 0; i < allSensors.size(); i++) {

s = allSensors.get(i);

str = "设备名称：" + s.getName();

switch (s.getType()) {

//加速传感器 Sensor.TYPE\_ACCELEROMETER

case Sensor.TYPE\_ACCELEROMETER:

tx1.setText(tx1.getText() + "\n" + i + "加速传感器accelerometer:\n" + str);

break;

//陀螺仪传感器 Sensor.TYPE\_GYROSCOPE

case Sensor.TYPE\_GYROSCOPE:

tx1.setText(tx1.getText() + "\n" + i + "陀螺仪传感器gyroscope:\n" + str);

break;

//环境光仪传感器 Sensor.TYPE\_LIGHT

case Sensor.TYPE\_LIGHT:

tx1.setText(tx1.getText() + "\n" + i + "环境光仪传感器light:\n" + str);

break;

//电磁场传感器 Sensor.TYPE\_MAGNETIC\_FIELD

case Sensor.TYPE\_MAGNETIC\_FIELD:

tx1.setText(tx1.getText() + "\n" + i + "电磁场传感器magnetic:\n" + str);

break;

//方向传感器 Sensor.TYPE\_ORIENTATION:

case Sensor.TYPE\_ORIENTATION:

tx1.setText(tx1.getText() + "\n" + i + "方向传感器orientation:\n" + str);

break;

//压力传感器 Sensor.TYPE\_PRESSURE:

case Sensor.TYPE\_PRESSURE:

tx1.setText(tx1.getText() + "\n" + i + "压力传感器pressure:\n" + str);

break;

//距离传感器 Sensor.TYPE\_PROXIMITY:

case Sensor.TYPE\_PROXIMITY:

tx1.setText(tx1.getText() + "\n" + i + "距离传感器proximity:\n" + str);

break;

//温度传感器 Sensor.TYPE\_TEMPERATURE:

case Sensor.TYPE\_TEMPERATURE:

tx1.setText(tx1.getText() + "\n" + i + "温度传感器temperature:\n" + str);

break;

default:

tx1.setText(tx1.getText() + "\n" + i + "未知传感器:\n" + str);

break;

}

}

}

});

}

}

**Activity\_tri\_axial\_sensor.xml**

<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"

xmlns:app="http://schemas.android.com/apk/res-auto"

xmlns:tools="http://schemas.android.com/tools"

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

tools:context=".TriAxialSensorActivity">

<LinearLayout

android:layout\_width="match\_parent"

android:layout\_height="match\_parent"

android:orientation="vertical"

android:layout\_gravity="center"

android:background="@drawable/beijing"

tools:layout\_editor\_absoluteX="402dp">

<TextView

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_gravity="center"

android:text="摇动更新加速度传感器数据！"

android:textSize="10pt" />

<LinearLayout

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:orientation="horizontal">

<TextView

android:id="@+id/textView3"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_weight="1"

android:text="输入手机质量(g)" />

<EditText

android:id="@+id/mPhoneText"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_weight="1"

android:ems="10"

android:hint="156(默认SonyXZ1)"

android:inputType="numberDecimal" />

<Button

android:id="@+id/button2"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_gravity="right"

android:background="#002196F3"

android:text="返回上一页" />

</LinearLayout>

<Button

android:id="@+id/button1"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_gravity="center"

android:background="#BDB9BD"

android:text="显示合成加速度" />

<Button

android:id="@+id/gapButton"

android:layout\_width="match\_parent"

android:layout\_height="124dp"

android:background="#00FFFFFF" />

<Button

android:id="@+id/button3"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_gravity="center"

android:background="#AEB8B4"

android:text="注销监控传感器" />

<TextView

android:id="@+id/txt\_value"

android:layout\_width="match\_parent"

android:layout\_height="wrap\_content"

android:text="TextView" />

</LinearLayout>

</androidx.constraintlayout.widget.ConstraintLayout>

**TriAxialsensorActivity.java**

package com.example.tri\_axial\_accelerometers;

import androidx.appcompat.app.AppCompatActivity;

import android.hardware.Sensor;

import android.hardware.SensorEvent;

import android.hardware.SensorManager;

import android.os.Bundle;

import android.os.Vibrator;

import android.text.Editable;

import android.text.TextWatcher;

import android.util.Log;

import android.view.View;

import android.widget.Button;

import android.widget.EditText;

import android.widget.TextView;

import android.widget.Toast;

import android.app.Service;

import android.content.Context;

import android.hardware.SensorEventListener;

import java.math.BigDecimal;

public class TriAxialSensorActivity extends AppCompatActivity implements SensorEventListener {

private SensorManager sensorManager;//定义传感器管理器

private Vibrator vibrator;//振动器

private int mPhone=156;//Sony XZ1手机默认质量156克，如果客户输入重量则更新复制，否则用默认重量

//private String number="156";

private double maxValue=0;//初始化合加速度

private TextView mTxtValue;

private EditText etmPhone;

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.activity\_tri\_axial\_sensor);

mTxtValue = (TextView) findViewById(R.id.txt\_value);//实时更新数据mTxtValue

Button bt2 = (Button) findViewById(R.id.button2);

bt2.setOnClickListener(new View.OnClickListener() {

@Override

public void onClick(View v) {

finish();

}

});

sensorManager = (SensorManager) getSystemService(Context.SENSOR\_SERVICE);//获取传感器管理器

vibrator= (Vibrator) getSystemService(Service.VIBRATOR\_SERVICE);//括号强制类型转换，获取振动器

}

@Override

protected void onResume() {

super.onResume();//重写onResume方法

sensorManager.registerListener(this,sensorManager.getDefaultSensor(Sensor.TYPE\_ACCELEROMETER),sensorManager.SENSOR\_DELAY\_GAME);// 微传感器加速度注册监听器

etmPhone = (EditText) findViewById(R.id.mPhoneText);//

etmPhone.addTextChangedListener(new TextWatcher() {

@Override

public void beforeTextChanged(CharSequence s, int start, int count, int after) {

}

@Override

public void onTextChanged(CharSequence s, int start, int before, int count) {

Log.d("mPhone\_editText",s.toString());

mPhone = Integer.parseInt(s.toString().trim());

Toast.makeText(TriAxialSensorActivity.this, "更新手机重量"+mPhone+"g", Toast.LENGTH\_SHORT).show();

}

@Override

public void afterTextChanged(Editable s) {

}

});

Button bt1 = (Button) findViewById(R.id.button1);

bt1.setOnClickListener(new View.OnClickListener() {

@Override

public void onClick(View v) {

Toast.makeText(TriAxialSensorActivity.this, "手机"+mPhone+"g,受力(N)："+maxValue\*mPhone, Toast.LENGTH\_SHORT).show();

}

});

Button bt3 = (Button) findViewById(R.id.button3);

bt3.setOnClickListener(new View.OnClickListener() {

@Override

public void onClick(View v) {

vibrator.vibrate(500);//设置振动器的频率,要先Manifest.xml设置使用权限<uses-permission android:name="android.permission.VIBRATE"></uses-permission>，否则报错不能用

sensorManager.unregisterListener(TriAxialSensorActivity.this);//取消注册的监听器

Toast.makeText(TriAxialSensorActivity.this, "手机"+mPhone+"g,受力(N)："+maxValue\*mPhone, Toast.LENGTH\_SHORT).show();

}

});

}

@Override

protected void onStop() {

super.onStop();

// 取消监听,如果没有点击button3取消注册，则在停止Activity的时候注销

sensorManager.unregisterListener(this);

}

@Override

public void onSensorChanged(SensorEvent event) {//传感器值改变时触发的方法

int sensorType = event.sensor.getType();//获取传感器的类型保存到int

if(sensorType== Sensor.TYPE\_ACCELEROMETER){

float[] values=event.values;//获取传感器的值

StringBuilder sb = new StringBuilder();

sb.append("X方向的加速度：");

sb.append(values[0]);

sb.append("\nY方向的加速度：");

sb.append(values[1]);

sb.append("\nZ方向的加速度：");

sb.append(values[2]);

mTxtValue.setText(sb.toString());//实时更新数据mTxtValue

BigDecimal b0 = new BigDecimal(String.valueOf(values[0]));

double d0 = b0.doubleValue();

BigDecimal b1 = new BigDecimal(String.valueOf(values[0]));

double d1 = b1.doubleValue();

BigDecimal b2 = new BigDecimal(String.valueOf(values[0]));

double d2 = b2.doubleValue();//float精确转型doble需要先转为BigDecimal

double newMaxValue = 0.001\*Math.sqrt(Math.pow(d0,2)+Math.pow(d1,2)+Math.pow(d2,2));//合加速度

if(newMaxValue>=maxValue){maxValue=newMaxValue;}//更新maxValues

}//判断是否是加速度传感器的类型是否对应加速度传感器的常量,更新合加速度maxValues

}

@Override

public void onAccuracyChanged(Sensor sensor, int accuracy) {//传感器精度改变时触发的方法

}

}