

Accelerometer Sensor Application

Overview

This Android application utilizes the accelerometer sensor available on Android devices to detect device movement along the X, Y, and Z axes. It displays real-time accelerometer data on the screen, allowing users to monitor changes in device orientation and movement.

1. MainActivity

Purpose: The MainActivity serves as the entry point and the main screen of the Accelerometer Sensor application. It provides users with real-time data readings along the X, Y, and Z axes of the device's accelerometer.

Key Features:

- **Real-time Data Display:** The MainActivity continuously updates and displays accelerometer data along the X, Y, and Z axes, and the miles per hour as the device moves.
- **Permission Handling:** The application requests the necessary permissions to access the accelerometer sensor on the device. It prompts users to grant permission if it's not already granted. However, for emulator permissions, this code is commented out.
- **Error Handling:** The application provides informative messages in case the accelerometer sensor is not available on the device or if permission to access the sensor is denied by the user.

2. ProceduresActivity

Purpose: The MainActivity serves as the entry point and the main screen of the Accelerometer Sensor application. It displays real-time accelerometer data readings along the X, Y, and Z axes, and speed.

Key Features:

- **Real-time Data Display:** The MainActivity continuously updates and displays accelerometer data along the X, Y, and Z axes as the device moves.
- **Start and Stop Functionality:** Users can start and stop the accelerometer sensor data collection at their convenience using dedicated buttons.

- **Permission Handling:** The application requests the necessary permissions to access the accelerometer sensor on the device. It prompts users to grant permission if it's not already granted.
- **Error Handling:** The application provides informative messages in case the accelerometer sensor is not available on the device or if permission to access the sensor is denied by the user.

Getting Started

To run the application, follow these steps:

1. Clone the repository.
2. Open the project in Android Studio.
3. Build and run the application on an Android emulator or a physical device.

Features

- **Real-time Data Display:** Users can monitor real-time accelerometer data along the X, Y, Z axes, and speed of the device.
- **Start and Stop Functionality:** Users can start and stop the accelerometer sensor data collection using dedicated buttons.
- **Permission Handling:** The application requests necessary permissions to access the accelerometer sensor on the device.
- **Error Handling:** Informative messages are displayed if the accelerometer sensor is not available or if permission is denied.

Libraries Used

The application uses the following libraries:

- **android.Manifest:** Provides access to Android permissions for requesting necessary permissions.
- **android.content.Context:** Provides access to application-specific resources and classes.
- **android.content.pm.PackageManager:** Provides access to information about installed packages on the device.
- **android.hardware.Sensor:** Represents a sensor on the device, such as the accelerometer.
- **android.hardware.SensorEvent:** Represents a sensor event, providing information such as sensor type and sensor data.
- **android.hardware.SensorEventListener:** Interface for receiving notifications about sensor events.
- **android.hardware.SensorManager:** Manages sensors, including registering and unregistering sensor listeners.

- **android.os.Build:** Provides information about the current build, including device characteristics.
- **android.os.Bundle:** Provides a data container for passing information between activities.
- **android.widget.Button:** Provides a user interface element for triggering actions or events.
- **android.widget.TextView:** Displays text to the user.
- **android.widget.Toast:** Provides feedback to the user through a small pop-up message.
- **androidx.appcompat.app.AppCompatActivity:** Base class for activities that use the support library action bar features.
- **androidx.core.app.ActivityCompat:** Provides compatibility for requesting permissions in older Android versions.
- **androidx.core.content.ContextCompat:** Provides access to resources and contexts in a backwards-compatible way.
- **kotlin.math.pow:** Provides mathematical functions, including exponentiation.
- **kotlin.math.sqrt:** Provides mathematical functions, including square root.

References

<https://kotlinlang.org/api/latest/jvm/stdlib/kotlin.math/>

<https://developer.android.com/guide/topics/ui/notifiers/toasts>