Controlling and Operating Mobile Device through Sensors

Saurabh Malpure[1] Niraj Solanke[2] Kaushal Girme[3] Manisha Singh[4]
[1,2,3]Student [4]Professor
[1,2,3,4]Department of Computer Engineering
[1,2,3,4]DPCOE College of Engineering, Pune-412 217

Abstract— Last years have been characterized by an incredible growth in mobile computing capabilities and sensing technologies, which can leverage the deployment of many location-based applications, ranging from pedometers to navigation system. This work deals with an Inertial Navigation System (INS) able to support users in the navigation in an unknown indoor environment by continuously calculating their motions and their position. The proposed solution is based on integrated use of movement and position sensors. Unfortunately, applications that rely on the use of measures coming from orientation sensors, such accelerometers and digital compasses, are affected by external magnetic interferences thus resulting in inaccurate directional information. This paper focuses on this problem by investigating the use of the gyroscope as the primary determinant of better orientation information. Nowadays, modern mobile devices, such as smartphones come to the market already equipped with sensors able to track them as they move, both in outdoor and in indoor environment. Taking advantage of the present hardware in the smartphone, we aim to create an application that can perform certain task or procedures which can be set by the user and it will trigger that operation by the movement the smartphone device in the specific pattern which is determined by the sensors from the smartphone.

Key words: Sensors, Mobile Device

I. INTRODUCTION

As of January 2015, 58 percent of Indian over the age of 18 own a smart phone. Of these smart phones, Android devices provide some security by requiring that third- party application developers declare to users which components and features their applications will access. However, the real- time environmental sensors on devices that are supported by the Android API are exempt from this requirement. We evaluate the possibility of exploiting the freedom to discretely use these sensors and expand on previous work by developing an application that can use the gyroscope and accelerometer to interpret what the user has written, even if trace input is used. Trace input is a feature available on Samsung default keyboard as well as in many popular third-party keyboard applications. The inclusion of trace input in a key logger application increases the amount of personal information that can be captured since users may choose to use the time-saving trace-based input as opposed to the traditional tap-based input. In this work, we demonstrate that it is indeed possible to recover both tap and trace inputted text using only motion sensor data. Traditional mobile sensing-based applications use extra equipment which are unrealistic for most users. Smartphones develop in a rapid speed in recent years, and they are becoming indispensable carry-on of daily life. The sensors embedded in them provide various possibilities for mobile applications, and these applications are helping and changing the way of our living. This project aims in developing an android based application whose main use is to control your phone and to perform various operation on the phone without any actual onscreen operation on the phone, rather executing the certain task using the devices inbuilt sensors and triggering the certain given tasks, which can be modified and given by the user.

II. EXISTING SYSTEM

The current system doesn't completely use these gyroscope sensors to its complete use. It just uses the sensor to detect the change during recording or during the video viewing for the user. Some other OEM manufacturers also tends to use these sensor for extra activities such as:-

Ex: Micromax and Sony devices when the call is coming, if the device is flipped and faced down the phone goes silent mode.

When you are watching a video in the portrait mode and if you turn your phone in landscape mode the video also goes in landscape mode. All these working are powered by the Gyroscope sensor.

III. PROPOSED SYSTEM

The main aim is to create an application which reduces the user task for operation such as performing repetitive task and also for doing operations. This can be achieved by the use of our application which work is to trigger other application or to perform task which it has right to perform. Performing the system level trigger calls will be the next goal of this project. First, user has to give the specific sequence of pattern and its corresponding triggering work, as currently the android system doesn't give permission for non-system application the authority to perform those tasks. As this method of triggering the application is new and haven't being implemented in any other OEM manufacturer or also not by any other software in the mobile operating system there are no any earlier implementations.

IV. PROBLEM DEFINITION AND SCOPE

A. Problem Definition

The proposed reference paper was published in 2015 at Information technology new generations (ITNG) Using unrestricted mobile sensors to infer tapped and traced user inputs by Trang Nguyen. These paper shows the uses of the sensors discretely and by developing the application that uses gyroscope and accelerometer to interpret what the user has written on the device. The inclusion of the trace input in the application increases the amount of personal information from the device from the movement captures from the sensors. Thus in the paper concluded by showing a new view in obtaining the data from the users without knowing and directly affecting their privacy.

B. Purpose and Scope

Earlier for performing certain task or accessing the application user needs to go through the normal procedure. This creates an constant same routine for doing repeated task which was taking more time. What are we doing to do in project ? Beside from the normal approach for accessing the application and doing the same repeated task to access we are going to implement an different approach Here we will create an application which does the background task and it triggers those application through the moving the device through the use of Gyroscope sensor.

C. Goals and Objectives

Most mobile navigation systems rely on the use of the hardware sensors which are embedded in the smartphone. It is proved that those sensors are Ambient Light Sensor, Barometer, Gyroscope, Accelerometer, and Magnetometer. The uses of those sensors are Ambient light sensor is use to automatically calibrate screen brightness of mobile device so that dose create the strain on the eyes of the device user. Barometer is there to help the GPS chip inside the device get a faster lock by instantly delivering altitude data. Gyroscope allows the device to rotate the screen from portrait to landscape when you turn your phone as well as use the device orientation as a controller for games. Accelerometer detects changes in motion and is useful for apps that require a shake to perform an action. Measures the ambient geomagnetic field for all three physical axes (x, y, z). Nowadays, modern mobile devices, such as smartphones come to the market already equipped with sensors able to track them as they move, both in outdoor and in indoor environment. Taking advantage of the present hardware in the smartphone, we aim to create an application that can perform certain task or procedures which can be set by the user and it will trigger that operation by the movement the smartphone device in the specific pattern which is determined by the sensors from the smartphone.

1) Gyroscope:

A gyroscope is a device for measuring or maintaining orientation, based on the principles of conservation of angular momentum. Its used primarily for navigation and measurement of angular Velocity up to 3 directions: 3-axis gyroscopes are often implemented with a 3-axis accelerometer to provide a full 6 degree-of- freedom (DoF) motion tracking system. There are three basic types of gyroscope:

- Rotary gyroscopes
- Vibrating Structure Gyroscope or Micro Electro-Mechanical Sys- tem (MEMS)
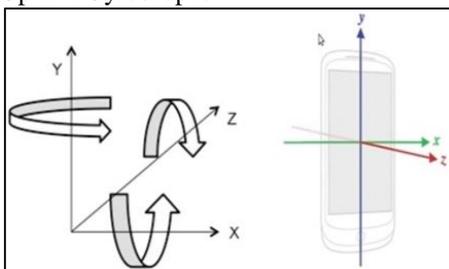- Optical Gyroscopes

Fig. 1: Gyroscope Sensor

The main working is done through the use of the gyroscope sensor which calculates through the rotation and triggering the change of direction in the device thus changing the of axis values as shown in the figure below.
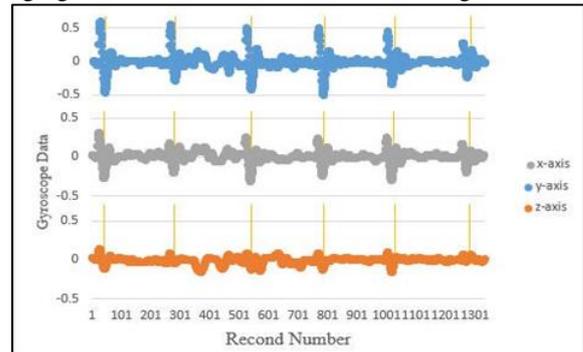

Fig. 2: Change in the z-axis

Above figure shows that the change in the z-axis thus shows that the device rotated in the z-axis.

V. CONCLUSION

This project aims in developing an android based application whose main use is to control your phone and to perform various operation on the phone without any actual onscreen operation on the phone, rather executing the certain task using the devices inbuilt sensors and triggering the certain given tasks, which can be modified and given by the user. We aim to create an application that can perform certain task or procedures which can be set by the user and it will trigger that operation by the movement the smartphone device in the specific pattern which is determined by the sensors from the smartphone. So the future work will be to implement the application to perform the system level call to be handled by the application as per the current development the application is limited by non- system calls.

REFERENCES

[1] Trang Nguyen "Using Unrestricted Mobile Sensors to Infer Tapped and Traced User Inputs." Information Technology - New Generations (ITNG), 2015 12th International Conference.

[2] Valentina Marotto, Alberto Serra, Davide Carboni,Mariella Sole, Tiziana Dessi, Andrea Manchinu "Orientation Analysis through a Gyroscope Sensor for Indoor Navigation Systems" The Fourth International Conference on Sensor Device Technologies and Applications.

[3] Lszl Kundraa, Pter Ekler "Bias Compensation of Gyroscopes in Mobiles with Optical Flow" 2014 AASRI Conference on Circuit and Signal Processing (CSP 2014)

[4] Z. Xu, K. Bai, and S. Zhu. "TapLogger: Inferring User Inputs on Smartphone Touchscreens Using On-board Motion Sensors." Conference on Security and Privacy in Wireless and Mobile Networks, 2012.

[5] Miluzzo, E., Lane, N. D., Fodor, K., Peterson, R., Lu, H., Musolesi, M. "Sensing meets mobile social networks: the design, implementation and evaluation of the cenceme application." Proceedings of the 6th ACM Conference on Embedded Network Sensor Systems, 2008, pp. 337-350.

[6] Shahid Ayub,Alireza Bahraminisaab,Bahram Honary "A Sensor Fusion Method for Smart phone Orientation Estimation" 13th Annual Post Graduate Symposium.