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Micro-Environment Sensing For Smartphone's

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Abstract— Context-awareness is getting increasingly important for a range of mobile and pervasive applications on nowadays smart phones. Whereas human-centric contexts (e.g., indoor/ outdoor, at home/in office, driving/walking) have been extensively researched, few attempts have studied from phones perspective (e.g., on table/sofa, in pocket/bag/hand). We refer to such immediate urroundings as micro environment, usually several to a dozen of centimetres, around a phone.
In this study, we design and implement micro-environment sensing platform that automatically records sensor hints and characterizes the micro-environment of smart phones. The platform runs as a daemon process on a Smart phone and provides finer-grained environment information to upper layer applications via programming interfaces. It is a unified framework covering the major cases of phone usage, placement, attitude, and interaction in practical uses with complicated user habits. As a long-term running middleware, it considers both energy consumption and user friendship. The preliminary results show that it achieves low energy cost, rapid system deployment, and competitive sensing accuracy. We are going to make use of that data by reading and converting it into ASCII format.
We will be developing various applications using that data for security as well as for saving the battery of mobile. The sensors which we are going to use in our project are Accelerometer, Light, Pressure, Proximity etc.
Keywords— accelerometer, vibrator, touch screen, camera, proximity sensor

I. INTRODUCTION

In our mobile all the sensors are continuously broadcasting the data. We are going to make use of that data by reading and converting it into ASCII format. We will be developing various applications using that data for security as well as for saving the battery of mobile. The sensors which we are going to use in our project are Accelerometer, Light, Pressure, Proximity etc.

For example, if a mobile phone is in a bag or pocket, it is useless to light up the screen when a phone call is coming. In addition, if a phone is placed on a sofa rather than on a desk, it is better to turn up ring volume to avoid missing calls.
Given accurate micro-environment information, a phone can adapt its behaviour automatically and properly. To use the data broadcasted by the sensors in order to make useful applications in security and optimization domain.

1. To read the data broadcasted by sensors
2. To store that data in SqlLite
3. To convert that data into ASCII format
4. To write logic for events we need perform by captured data
5. To design GUI for configurable parameters in application

II.LITERATURE SURVEY

In C. Qin, X. Bao, R. Roy Choudhury, and S. Nelakuditi, Tagsense: a smartphone-based approach to automatic image tagging. 2011 paper we can clearly see that all the papers target application on a single sensor. They are making one application by making the use of data broadcasted by sensor. This application will consume more battery as it has to run continuously. They have not made any

supportive application to save the battery. In our paper, we are developing many applications which come under security and optimization domain. Our project consists of different modules like automatic call picker, pressure sensor used for security, GPS sensor to trace the location when wrong pattern entered, Soft surface detection in order to activate the ringer mode, closed environment identification for battery saving purpose etc.

We are using multiple sensors in this project so we need to write different parsers for each sensor we are using. We are taking care of battery optimization also in this project to make it more efficient. As a long-term running middleware, it considers both energy consumption and user friendship. We prototype micro environment sensing on Android OS and systematically evaluate its performance with data. The preliminary results show that it achieves low energy cost, rapid system deployment, and competitive sensing accuracy. The sensors which we are going to use in our application are Accelerometer, Vibrator, Touch Screen, Camera, Gyroscope, Proximity etc. We build the framework of it upon an investigation of phone usage and user habits. The framework covers the majority of phones states, and consists of three core modules: phone placement detection, phone interaction detection, and backing material detection. Phone placement refers to the location of a smart phone along with its user, and we consider the situations of in bag, in chest pocket, in pants, and in hand. Whether a user is concentrating on his smart phone is another key judgment for micro- environment sensing. At last, backing material detection analyzes the hardness of the stuff that touches (or holds) the phone.

In summary, the key contributions of this paper are: First, It is a unified micro-environment sensing framework. Although some previous works have implemented part of similar functionality for simple environments, they cannot be directly combined to an applicable level for practical use with complicated phone situations and user habits. Second, as a middleware run on smart phones, It is both energy optimized and user friendly. We design a hierarchical architecture and a set of efficient algorithms for multi-stage micro-environment detection to reduce working time and the types of sensors. In addition, sensors, especially actuators, are carefully selected for the purpose of effectiveness and non-intrusiveness. For example, it won't trigger vibrator or speaker when a smart phone is carried by its user. We develop a simple yet effective local placement classification scheme with light and inertial sensors. The key insights are twofold. When carried by a user, the phone is mostly placed in either semi-closed/open environments like in-hand, or closed environments such as in-pocket and in-bag. The extent of covering leads to different illuminative conditions for the phone, which can be captured by its built-in camera. Different local surroundings over distinctive spatial degree of freedom, which is magnified when

the user is moving. For instance, a phone is likely to experience fiercer movements when put in pants than inside a handbag. These unique movement patterns can be perceived by the accelerometer.

Hence, our paper is better than other papers as it combines the data from multiple sensors and makes applications based on them. We also took care of battery life of mobile in our application.

III.PROPOSED SYSTEM

Modules of the Projects:

- Automatic Call Picker
- Location traces when wrong pattern entered
- Pressure sensor use for safety
- Surface Identifier for battery saving
- Ringer mode on when on soft surface
- Morse Code Generator
- Automatic Call Picker:

IV.DETAILED DESIGN

In this module we are going to use proximity sensor. We will be checking open and close conditions of proximity sensor. Suppose mobile is in the pocket or in closed environment, then proximity sensor will be close. Application should not receive call at that time. We will check Close-Open-Close condition at that time. If mobile is in an Open environment then we will pick up the call for Open Close condition of proximity sensor.

- Pressure Sensor used for security: In this module, we are using touch and pressure sensor of screen to measure the pressure on a single point of screen. If that pressure is greater than the threshold pressure of application. Application will trigger the alert to the configured numbers in an application.
- Wrong screen unlock location tracker: If someone enters the wrong pattern lock then at that time, we will be taking picture of him/her using the front camera then we will be latching his
- Location using GPS or LBS. We will send this location, time and image taken to the configured Email ID .If front camera is absent we will only send location and time to configured Email ID
- Battery Saving Application: In this module, we are trying to get the location where mobile is placed. We will check the condition of mobile is in hand or kept on some surface. We will be doing this by using Environment, Metal Detector, and Magnetic Field Detector sensor. If we found that mobile is not in use, then we will stop the running processes to save the battery .Once mobile is back to active mode we will start those processes.
- Ringer and Vibrate toggle for soft surfaces: In this module, we will identify the soft surfaces by using metal detector sensor. If call comes on soft surface and mobile is in vibrate mode then in that case application will on the ringer mode so that user can understand the call is coming. Soft surfaces do not give vibration sensing.
- Morse code generation: In this module, we will be generating Morse code using ash sensor. We need to type a word we need to generate in an application and ash sensor will do the rest.

Implementation Constraints: We need to check the code on different android version to make it compatible for all the devices. We need to write an adaptive parser algorithm which will change for each sensor as per the data size transfer of sensor.

Mathematical Modelling:

Let S be the system
Where,

S= F, O, P

Where,

F = Set of input sensors
O = Set of output applications
P = Set of technical processes

Let S is the system

S = Identify the input sensors data S1, S2 .. Sn
F = Proximity, Accelerometer, Gyroscope, Pressure, Flash, GPS Orientation
Identify the output applications as O
O = Call picker, Location Traces, Closed environment identifier, Morse code generator, Surface identifier
Identify the Process as P
P= Listener, Parser, Convertor, Logic Implementation

A. Functional Requirement

External Interface Requirements:

- User Interfaces:
- Login Form
- Application On Off Form
- Settings Form

B. Non Functional Requirements:

Performance Requirements: For good performance the resources must be dedicated and database must be normalized. Mobile application should get the required RAM to run the application.

Safety and Security Requirements: The data stored will be encrypted data so that only sender and receiver will understand the data.

C. Figure

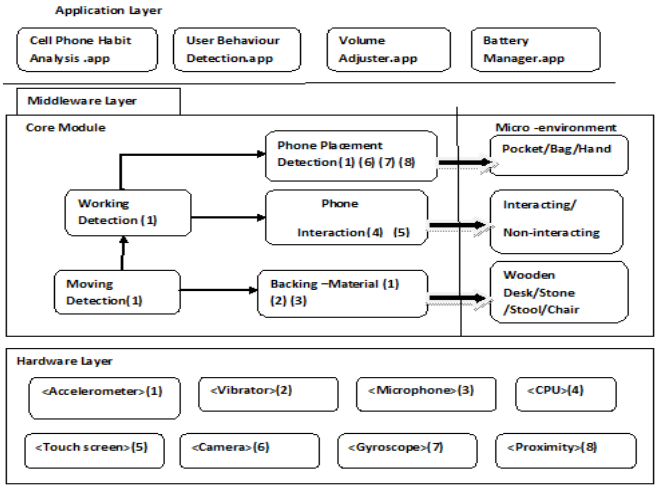

Fig. 1. Architectural Diagram

V. CONCLUSION

In this paper, we present the design for micro-environment sensing for smartphones via collaboration among built-in sensors.Using mobile sensors we are going to develop the application for security and battery saving.

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