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Micro-Environment Sensor based Android Application

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Abstract: ***Now a days mobile smartphones are used in wide range for wide purposes. We design an application which is Micro-environment sensing platform for mobile smartphones. An application is the platform which records Sensor hints automatically as well characterizes surrounding of smartphone. We are building sensor based application framework on the basis of phone usage and user habits. In the current version, we simply trigger an application every 10 minutes, and we believe such intervals rigid to examine phone placement transitions. We implement an application on Android 4.0 Ice Cream Sandwich (ICS). 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 smartphones, an application is both energy optimized and user friendly. The related hardware we are using in this platform are GPS, Accelerometer sensors, this platform runs a daemon process on smartphones and provides different information as mobile location, theft detection using sensors, security using pressure sensors, auto call acceptance, process killing for saving battery. In this platform we are using Hex to ASCII conversion algorithm and data parser algorithm.***

Keywords: All mobile sensor, android smartphone, camera.

I. INTRODUCTION

We are living in 21st century which is the century of technology and innovations. Smartphone is one of the examples of innovation made in this century. Todays smartphones having wide ranges of sensing computation and storage resources. There are several types of sensors as Proximity, Accelerometer, Camera, Touch, GPS etc. We used these sensors and developed an android application.

In previous papers studied we get to know that all papers target application based on single sensor. The application was made by making use of data broadcasted by sensors. But these applications had several drawbacks like it consumes more battery as it has to run continuously. Also there were no supporting application for battery saving purpose. So in our paper we are trying to overcome these drawbacks. Our project consists of different modules like Automatic call picker, Pressure sensor use for security, GPS sensor for location tracing purpose when a wrong pattern entered, soft surface detection in order to activate ringer mode, closed environment identification for battery saving purpose.

As we are using multiple sensors in this project so we need to write different parsing technic for each sensor we are using on the same time we are taking care of battery optimization.

Our application, a micro-environment sensing platform that automatically records sensor data and characterizes the micro-environment of smartphones. The platform runs as a daemon process on a smart phone and provides finer-grained environment information to upper layer applications via programming interfaces [1]. Our platforms run in middleware stage

and provide data which is captured by various sensor to the application which we use in our application via programming interface. Our application 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, an application considers both energy consumption and user friendship. We developed an application on Android OS and systematically evaluate its performance with data collected. The preliminary results show that an application achieves low energy cost, rapid system deployment, and competitive sensing accuracy.

II. MOTIVATION AND OVERVIEW

2.1 Target Applications

The basic aim of micro-environment sensing on smartphones is to provide a more general primitive for new human centric applications, especially in healthcare, behavior monitoring and surface identifying. For example, it is important to ensure that the healthcare monitors are attached to the target user during his daily life, and emerging trends arise to perform such tasks via smartphones [1]. A microenvironment perceivable smartphone, therefore, would remind its user if it is not carried by its user via, e.g. its built-in speaker, and further informs him of its location.

Identifying the phone's micro-environment also opens new possibilities to perform energy saving strategies, which is essential for battery powered smartphones. On detecting being placed in the wooden surface, for instance, it is reasonable for the phone to infer that it will not be used in the near future, and can switch to certain power saving mode and turn off unnecessary sensors, software and applications. A micro-environment sensor based android application enables more accurate inertial based localization and navigation. GPS which helps to estimate user's micro-environment, An application deduces phone's fine-grained micro-environment. It serves as a light-weighted middleware for upper layer applications.

2.2 System Overview

As Figure 1 shows, An application runs as a daemon process in the middleware layer. It employs sensors in the physical layer to record nature value and provides environment information to upper layer applications. As a long-term middleware on smartphones, an application optimizes energy consumption via a hierarchical, multistage architecture. Sensors are carefully selected and logically triggered. Accelerometer, for example, is solely awaken to detect simple environment semantics, after which more sensors are triggered for complex environment classification. In what follows, we describe each architectural module in turn, specifying a high-level view of how the system works.

In this project we have used Hex to ASCII data conversion method. In this method we parse data receiving from different sensors used. Then after parsing data into packets of 8 bits each data is in the HEX form. Hence after that we convert data from Hex to ASCII.

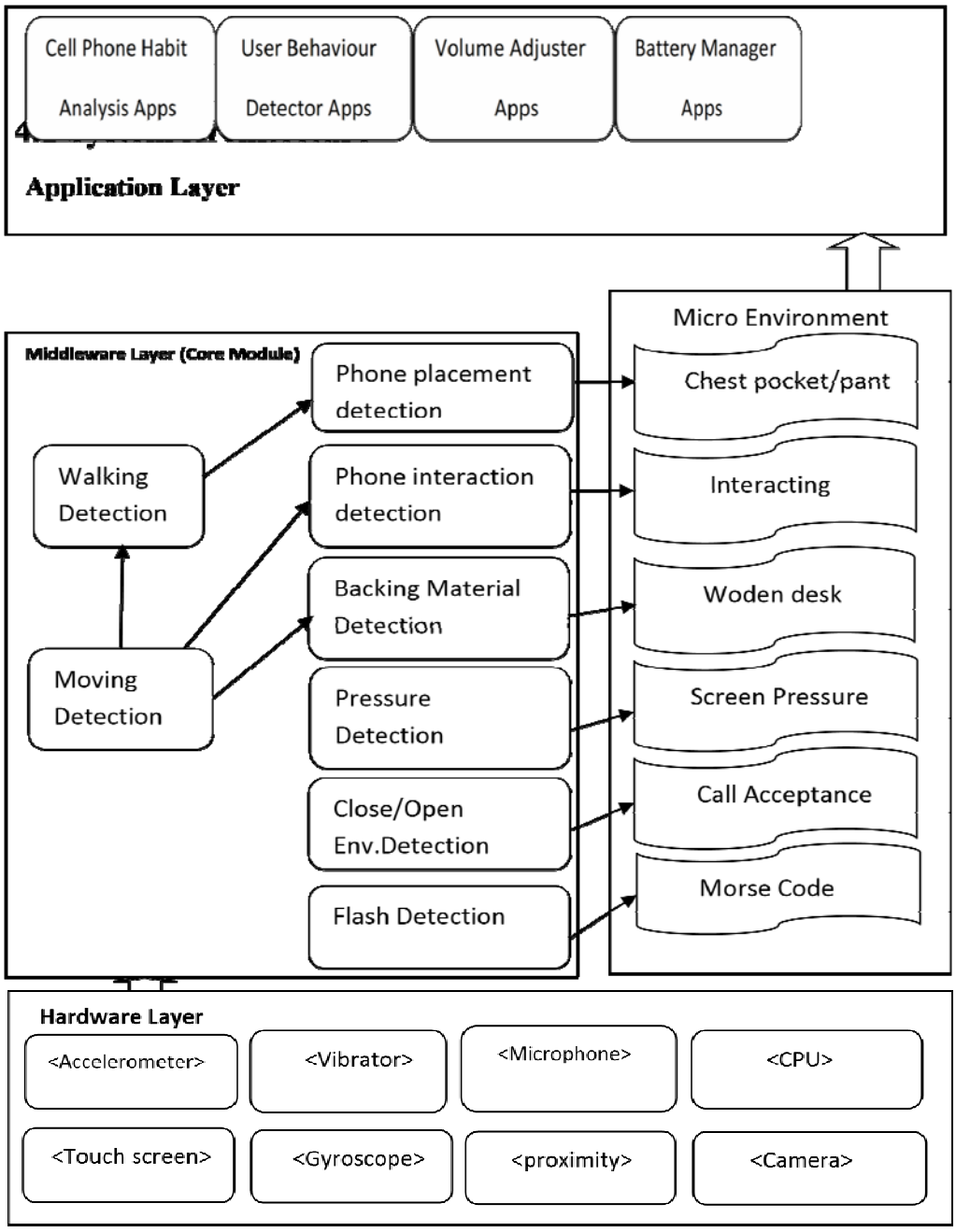

Fig1. General Architecture

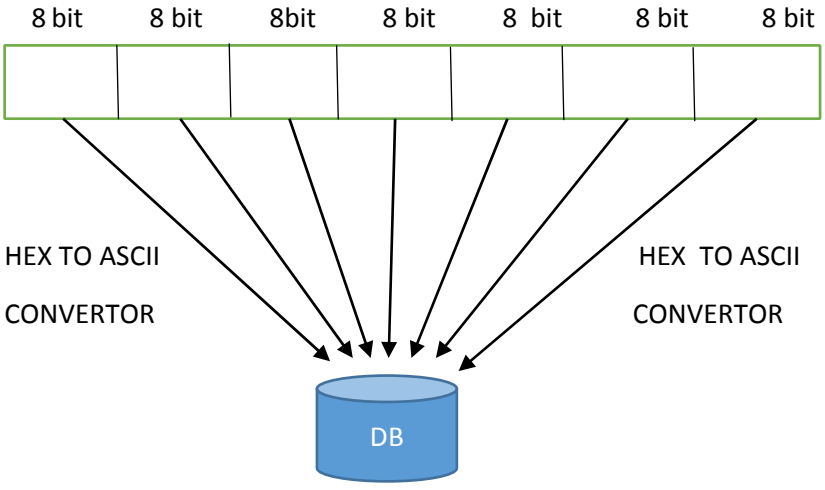

Fig2. Hex to ASCII conversion

III. SYSTEM DESIGN

1. Automatic Call Picker:

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. 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[1]. The extent of covering leads to different illuminative conditions for the phone, which can be captured by its built-in camera. 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.

2. 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.

3. 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.

4. Battery Saving Application:

In this module, we are trying to get the place 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, 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.

5. 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.

6. Morse code generation:

In this module, we will be generating Morse code using flash sensor. We need to type a word we need to generate in an application and flash sensor will do the rest.

IV. CONCLUSION

In this way we Design an Application which senses the Micro-Environment via collaboration among built in sensors. We club various sensors in this application of whose result achieves low Energy Cost and Competitive Micro-Environment Sensing Accuracy. The platform automatically collects sensor hints and characterizes the immediate surroundings of smartphones providing environment information to upper layer applications. Preliminary experiment results show that an application achieves low energy cost, rapid system deployment, and competitive sensing accuracy.

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