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Human Activity Recognition using Smartphone sensors

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ABSTRACT - *Human activity recognition system will recognize basic human activities like still, walking, running & cycling. Here our team developed an android application using Google API which will be using advance technologies like AI & machine learning which will be yielding correct and accurate results. Here we developed an android application using android studio and connected it to a database through a XAMP server and it will show the accuracy of the activities performed by the users of our system.*

Keywords: activity-recognition, smart-phone, efficiency, Android, accuracy, sensors

1. INTRODUCTION

Android phones are normally powerful, having multi-functional ability have boosted the market shift from desktop to 'thin' mobile devices. They are typically equipped with various sensors that can sense location, acceleration, orientation and biometric data & this kind of context/intelligence provided by mobile devices is able to provide context information to various applications. These added capabilities enable human activity recognition to be performed directly with data gathered from the on-board sensors, rather than depending on wearable sensors or environment augmentation. The accuracy of recognition depends greatly on how developers handle each step in the above processes. These skills are often not a must have for most mobile application developers. Here in this system we are looking to improve the accuracy of the activities performed by the user & it will be also showing the time period of the activities performed by the user.

2. LITERATURE REVIEW

Human Activity Recognition& Smartphone Dataset: Khushbu Dewangan, Abhishek Kumar Dewangan: Here Human Activity Recognition (HAR) system can automatically recognized physical activities, which is a key research issue in mobile and ubiquitous computing. An HAR system performs tasks of recognizing different human daily activities from simple to complex.

Bishoy Sefen, Sebastian Baumbach et. al. / Human Activity Recognition Using Sensor Data of Smart phones and Smart watches/ ICAART 2016[1]: Here In this paper work, a platform to combine off-the-shelf sensors of Smartphone's and Smart watches for recognizing human activities in real-time is proposed. Therefore, a data set from 16 participants was collected that includes normal daily activities and several fitness exercises.

ZhinoYousefi/ Human Activity Recognition Using Time Series Classification/ T Space 2015[2]: Here The system uses raw traces in a training set to build a predictor that assigns the proper label to new traces. Our approach addresses the two main challenges in AR using smart phones. First, the system is well trained with fewer training traces compared to benchmark approaches, and new traces can easily be added to our data base. Second, since we use the raw traces without having any particular features, our system gives more general and gives almost perfect accuracy.

3. PROPOSED SYSTEM

The evaluation of Google activity recognition service is done through the service API, developers can support activity recognition in their applications, without dealing with complex pattern analysis of sensor data. According to the our human activity recognition system, the AR service is bundled together with the location services and is part of the Google Play services APK. However, our experiment results (when we remove SIM card and disable wifi and GPS) suggest that the AR service performs activity recognition based on readings from the on-board sensors, for example, accelerometer, gyroscope and compass. To access the AR service, a mobile application must be granted with a special permission. To receive update on recognized activities, applications define a callback function and specify an interval for receiving updates of recognized activity. The intention of this update interval is to provide developers the control of freshness of measurements and power consumption. Also, the Android OS uses this interval to optimize efficiency by merging queries from different applications. When time is up, the system will trigger the callback function with the last recognized activity. In addition to the activity update logic, mobile applications define methods for starting and stopping of the service and error handling. We perform our evaluations using a demo code provided, with an additional code for recording measurements.

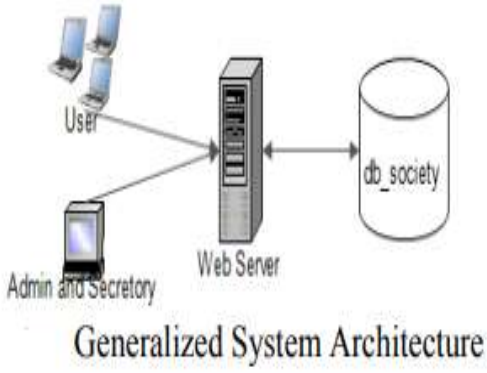
4. SYSTEM OVERVIEW

Here our team developed an android application with the help of Google API which would be showing the activities performed by the user& it would also make use of the database through Xamp server.

4.1 IMPLEMENTATION

This application is implemented using IDE Android studio. Android has a built in support for SQLite database implementation for the local storage of data on the device & the Parse server is used for the storage of user's registration information which has been used for authenticating user push notification. An android application has been developed by following MVC (Model-View-Controller)architecture pattern for development. In android Model represents all java classes i.e. supporting classes in an application. Here view is representing all the activities in application having the layouts defined using xml &controller represents all the backend running services APIs, interfaces &adapters. Now Push Notification technology is applied as "Logic" to fetch the data from "database" and represent using "view" for various operations offered by an application.

Here the system architecture is shown below.



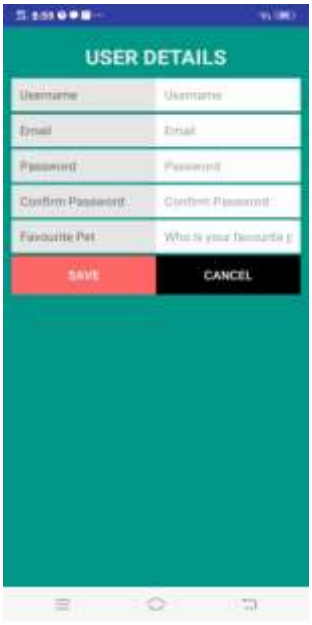
Generalized System Architecture

In order to access the services provided by applications user have to get registered by giving basic information about him/her.

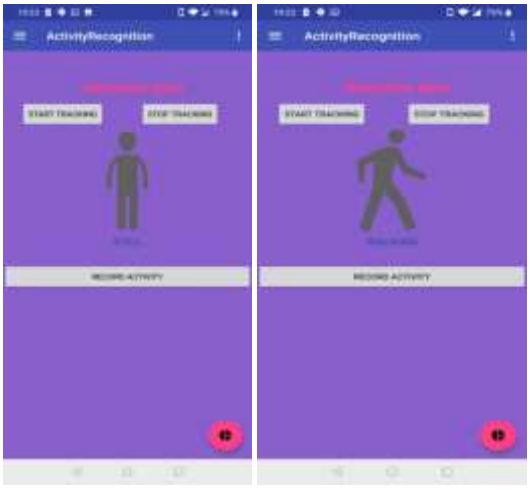
Here in the register part of the application we take the basic details of the user and in the login part the same details has been used to enter into system to track the activities performed by the user.

4.2 RESULTS

Here we are showing the first two pages of our android application which are login& Register.



Here our team has shown the activities like walking & still in our android application.



5. CONCLUSION

Here we can conclude that our system will be working efficiently than the existing systems and it would be getting proper confidence and accuracy values. We are also getting the time period in our human activity recognition systems. In this project, our team designed a smart phone based recognition system that recognizes four human activities like walking, running, still, cycling. With the help of our system we deducted the null & empty values coming in the system which was the drawback of existing systems.

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