

A Framework on Adaptive Information System for Mobile User

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Abstract- People are interested in having automatic services as per their frequent requirements in Personal Digital Assistant like mobile phones, tablets etc. Efficient mobile services to the citizens operating urban and rural lifestyles is become requirement. Though many services provide assurance for ultimate luxury still there is potential scope to provide basic standard requirements based on location and habits of user. This paper proposes and provides a novel adaptive architecture 'Adaptive Information System' for providing role based information to the user. The user can gain information of interest through this interface by specifying the role. In addition the system creates knowledge base which keeps adding the information concerned with the user as well as the role. Thus the services rendered depend on existing or new user. Real-Time data is fetched from internet depending on user attributes. The information provided is divided into two parts firstly the list of services and secondly the list of service providers providing the service. A commercial use for the interested service providers is also discussed wherein they can add their information in data repository.

Keywords- Adaptive system; Data mining; Knowledge Base; Data repository

I. INTRODUCTION

Mobile phone are providing as a great aid in many task along with the communication. The facilities provided by mobile phones have scaled many folds with the addition of Internet in Voice Telephony.

In the last few years, the smart phones have taken over the traditional phones. And these smart phones come equipped with GPS functionality which provides the spatial coordinates of the user location. Android's Network Location Provider determines user location using cell tower and Wi-Fi signals, providing location information in a way that works indoor and outdoor, responds faster, and uses less battery power. Advanced techniques improve the performance of standard GPS in devices connected to the wireless network.

Mobile companies can expect to compete effectively without embracing mobile technology and the capabilities it provides to better perform and meet the expectations of users. Fully realizing the potential of mobile, requires adoption of an enterprise mobile management strategy, which is based on secure enterprise mobile device management (MDM) architecture. Such architecture provides role-based management, configuration and security [10].

Location based Services offer many advantages to the mobile users to retrieve the information about their current location and process that data to get more useful information near to their location. With the help of GPS in phones and through Web Services using GPRS, Location based Services can be implemented on Android based smart phones to provide these value-added services: advising clients of current traffic conditions, providing routing information and helping them find nearby hotels as per the roles of user [11].

Android is a new coevals of smart mobile phone platform launched by Google. This supplies the support for mobile map and location service. Google Maps API provides a number of utilities for adding individual passengers based on the habits to the Google map and various applications can be investigated based on Google Maps API [13].

The architecture proposed here in provides adaptive information system which helps in providing the mobile users on time and reliable services. This paper is organized as follows section 2 presents recent trends in digital and mobile world, section 3 gives related work, section 4 presents methodology specification, section 5 gives the details of proposed architecture of adaptive information system and finally conclusion and future work is discussed. We ask that authors follow some simple guidelines. In essence, we ask you to make your paper look exactly like this document. The easiest way to do this is simply to download the template, and replace the content with your own material.

II. RECENT TRENDS IN DIGITAL AND MOBILE WORLD

The recent advancement in mobile computation is introduced in the market and goes by the name of ROBIN. This phone is designed from the ground up to back up everything to cloud storage, from apps to photos and music. The phone keeps everything user needs accessible but delete anything user don't use or look at — until user wants it. The design is fresh and new as well. Turing Phone is another eye catcher technology. It's equipped

with flagship specs and a strong body made from "liquid morphium," a cool new alloy. Its creators also claim to provide a serious boost to security that eschews third parties like Apple and Google and connects directly to trusted devices. Wearable technology is also another trend which ought to change the use of efficient technology. The technology started from Google glasses has now reached to smart bracelets which are mostly used for security purposes, smart rings which are used as an official gateway to payment modes and smart watches, used for a complete alternative to the orthodox hand held mobile phones.

Other potential digital trends are also gaining interest of many with the advent of time. For instance consider the Long Term Evolution (LTE). The so-called fourth generation of mobile computing (4G) is expected to be rolled out across Country over the next three years, making it possible for corporate users to run business applications on their devices simultaneously with Voice over IP (VoIP) capabilities. As LTE and WiMax networks are deployed, expect to see more netbooks and laptops equipped with built-in radio frequency identification (RFID) and wireless support. Push-button applications also provide insight for upcoming trends. Let's say a waste disposal truck arrives at an industrial site and is unable to empty a dumpster because a vehicle is blocking its path. Smart phones will increasingly have applications built into them that would make it possible for the disposal truck driver to photograph the impeding object and route the picture to a dispatcher to document and time-stamp the obstruction

III. RELATED WORK

Kai Ting Voon et al proposed a solution that achieves an even higher accuracy picking up the passenger. GSM Cell ID positioning will be used to locate a customer, and he can identify his desired pickup location on a map that is given based on his current position and this increases the income of the taxi drivers [1].

Pradip Suresh Mane et al [2], focuses on, Sustainable urban mobility is a key factor for a citizen's quality of life, as an increasingly larger amount of the population lives in urban areas. The integration and interoperability of different transport networks are seen in that document as a key feature for the improvement of urban mobility, together with improved travel information

P.Verma et al gives system which was about making vehicle more secure by the use of GPS, GSM technology and a web application where various services such as delivery services, parents to look after their children and so on [3].

B. G. Lee et al [5] presented the integration of immerse 3D graphics contents as the representative of guidance information in real-time indoor environment. The designed system enables the tracking of nearby targets by utilizing the exact same system within the wireless sensor network sensing range.

J. Liu et al used the concept of a Virtual Balise (VB) to enable a scheme for satellite-based train control that is interoperable with current CTCS (Chinese Train Control System) [6].

S. Huria et al used ARM (Association Rule Mining), one of the most frequently used technique in the domain of data mining and machine learning. Using association rule mining or rule learning extracts the hidden patterns in terms of the association between entities of the training data set [7]. El-Medany et al [8] explores a real time tracking system that provides accurate localizations of the tracked vehicle with low cost. GM862 cellular quad band module is used for implementation. The paper also provides information regarding the vehicle status for speed and mileage.

P.B.Nelson et al [9] illustrates development and deployment of GPS (Global Positioning System)/GSM (Global System for Mobile Communications) based Vehicle Tracking and Alert System. This system allows inter-city transport companies to track their vehicles in real-time and provides security from armed robbery and accident occurrences.

IV. METHODOLOGY SPECIFICATION

The major problem related to online services is management of various services at one tip. Android mobiles are the main means of application based service provider. Their management involves a lot of problems to the authorities. To avoid this, theoretical and architectural concept is given here. This paper gives a possible, efficient and low cost solution to the above problem.

Location-based services offer many facilities to the mobile users. For the mobile user, the examples of location-based services depending on the role are:

- To search and verify the nearest business/organization or service, such as a Bank/college or Hotels/coaching classes.
- Receiving alerts or reminders, such as notification of Sale in Shopping Mall or news of Traffic Jam nearby or opportunities in various fields.
- To provide services to tenants like house owner, ward, tax etc.

The proposed application is to be installed on android mobile and the historical data is to be stored as knowledge base supported with periodical updates. Accessing the data on internet, with the help of a data coming from

potential user and organization or company which is interfaced with Data Mining interface, these habit based information are used to locate the routes in which the standard services have been provided. Also a plot can be made using this information on a map which is updated timely to provide recent location information.

Data mining is widely used in various areas, the extraction of hidden predictive information from large databases. It also predicts future trends and behaviors. Based on this anyone could get knowledge driven decisions. Questions raised on the habits, standard requirements and past history can now be answered directly from the data-quickly. Involving user in data mining operation can result in precise results. For this the user search is to be supported with the knowledge base of the previous activities of user.

V. PROPOSED ARCHITECTURE

Overview of proposed architecture

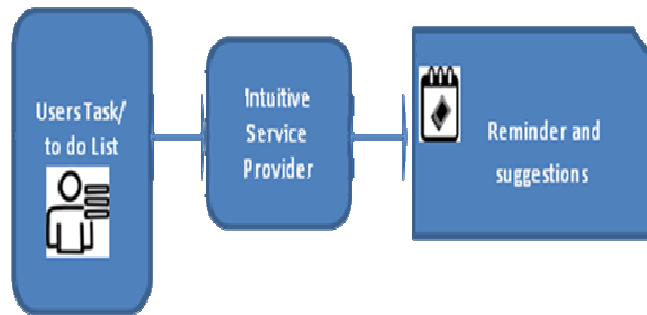


Fig 1: If necessary, the images can be extended both columns

The architecture proposed in fig.1 describes about the intuitive service provider. The ISP(intuitive service provider) will accept the data from various sources like users, or from existing to do lists. This data might be fetched from the various meta data repositories. These repositories might be consisting of users daily operations or special event based data. The ISP 's chief work is to clean the data and to implement various data mining algorithms on the received data. These mining algorithms will be categorizing the data into various clusters and small databases or repositories, based on the habits, previously done operations, location, and intuitive or predictive approaches.

The user will then be prompted with various predictive operations based on their roles. For example, if the user selects role as a student, then a intuitive architecture proposed in this paper, will be giving a prompt about nearby libraries, hostels, study circles, and research labs etc. The user can then select advanced options to receive prompts such as news about career counselling seminar, workshops on advanced technology or various course stations.

The fig 1.1 shows basic architecture of proposed concept. The major role is of Intuitive service provider which act as the backbone for providing services on tips. Based on location of the user and nature of the user, required services will be provided . For instance, if the user will act like a student then user may search for list of schools, colleges, coaching classes, bookstore and other related facilities. If the user is a patient then the services provided to him/her are list of hospitals, medical store, doctors, and specialist.

As per the role of a person such as tourist, patient, task or to do list services will proffer for the user. The users mobile will work smartly by enabling reminder and suggestion depending on the role of a user. The phones can be used to set as the reminder based on the location. For e.g. - Setting the Location based Alarm while traveling in the train. The user can also initiate the search of any nearby ATM or Restaurant within 5/10/15 kms range from his current present location. This facility will help in searching and accessing information quickly.

Introduction to user interfaces for providing information

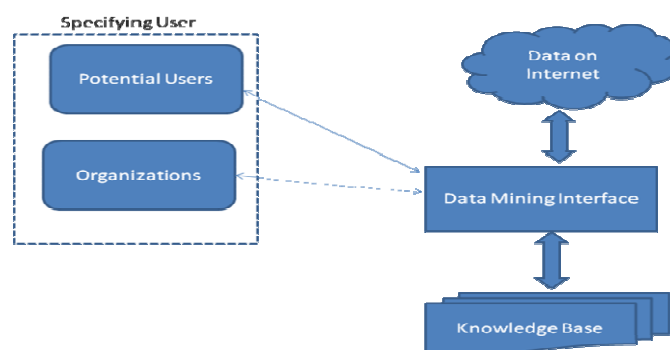


Fig 1.2 Intuitive Service Provider

Here, the word 'data on Internet' is about using the data from Internet for collecting information. The standard Data Mining Interface is located between the data on Internet and Data repository. The specifying role like potential user and company and/or organization interfaced with data mining interface. The huge amount of data is also available from the potential users and company/organization.

Data mining is the analysis of historical business activities to reveal hidden patterns and trends. To provide various services to the mobile users, all the information of the different users will be stored in the data repository in no time. Android also provide an API to access the Google maps. So with the help of the Google maps and the location APIs the application can provide required places to the user on the map.

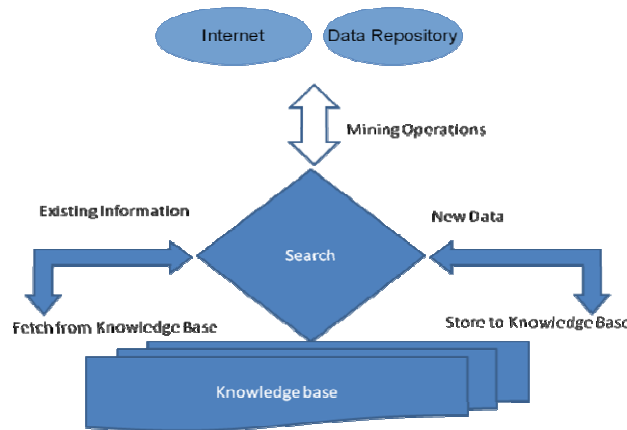


Fig. 1.3 Adaptive Information System

The proposed approach requires an Internet connection and one repository of distributed databases. Figure 1.3 depicts in detail architecture of the approach.

Mobile users would like to have services on the tip of mobile. By keeping this requirement on priority basis Android was reinforced and challenged the developers to create smart service provider applications that take full advantage of all that a handset has to offer. Android systems can be generously extended to incorporate new cutting boundary technologies as they appear. The platform will proceed to acquire, as the zealous community of developers work on neurotic to build forward-looking mobile application.

This approach is a representation of client-server architecture. Android phone serve as client while the server is a combination of three parts: location, habits and standard requirement. The related information is coming from sources like internet and data repository. The replicas of frequent caching information are to be stored on the data repository based on the daily, weekly and monthly activities. Following this Data Mining operations have to be performed on the information/data coming from data repository and internet respectively. Cached data from the data repository will act as a link between the Mobile application and history database. In the second step collected data have been extracted, transform the extracted data in the format as per the requirement of the user, and then loaded for the necessary use. Before loading, the collected data should be pre-processed by using various data mining techniques. Furthermore, in third step the pre-processed data will be transferred to convert it into knowledge base. If the history database is present then the system will use the knowledge and in this case services will be provided faster comparatively for a new user.

User centric approach: Initially the applications on mobile phones were broadly based on domains. The working environment made use of the network specially the commercial network or social network to render the service. Such systems engaged the user for a comparatively longer period of time. Consequently the delayed operation mostly perplexed the user causing and ending into unwanted results. Such system centric methods were driven by the data sets which were previously build by opinion of users. Real time interaction experience of user in such systems was time consuming the execution was based on the comparison between the opinion of users on items as estimated by the recommender system and the judgments previously collected from real users on the same items.

Such situation directed towards the Goal Directed Design Process. This process primarily focused on Research, modeling, requirements, framework, refinement and support. The process notices user activities and makes use of same for better performance. This design process gives a lot of importance to the interface used as it has a vital role to play in user experience. This addresses the issues such as the way tasks are completed, presented to the user and the interface responds. This designs are integral part of mobile phone application. Rather than providing information about user goals such systems provide information at the task level. This type of information is useful for defining layout, workflow, and translation of functions into interface controls, but is less useful for defining the basic framework of what a product is , what it does , and how it should meet the broad needs of the user. For improved results working of developers and client together is recommended.

In user centric approach the system is designed to very precise output for the user. The output is generated keeping in mind context of use including users, tasks and environments. Significance is also given to the user requirements in sufficient detail to drive the design. This leads to producing design solutions which are sufficient to meet these requirements. Based on the results and user-centered evaluations modification can also be done. User centric approach takes into account many factors such as Cognitive and social psychology, Organizational behavior and Human factors and ergonomics.

VI. CONCLUSION & FUTURE SCOPE

To conclude, this paper covers the introductions to basic architectures for location based, android and other mobile operating platforms. The brief review on recent trends in mobile computation includes the discussion about various latest technologies proposed and are currently being used. The section also covers a detailed overview of various architectures.

This proposed approach offers a Location-based service which provides services based on the location, history of the user database, his/her habits and the standard requirement of the user and many facilities to the mobile users. Moreover, the data mining technique used in the said service is also explained in brief. The proposed architecture explains in brief about the adaptive information system which accepts data at the runtime and dynamically reacts to the scenario. The knowledge base/knowledge repository will be used for the intuitive or predictive outcome also the repository will be updated as newer scenario is processed.

In future scope, the proposed architecture can be extended for the advanced data mining applications which can be used for providing a unified interface for providing history based, location based and habit based services. This work can further be extended for implementation of robust, effective and optimised NIS(navigation information system) which will work dynamically for adaptive service based implementations.

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