SMART PERSONAL ASSISTANT FOR MOBILE USER

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ABSTRACT:

The contemporary world is filling with user-centric applications, developed for mobile devices or the web with an aim to cut the workload of a user. As the world closes in on the Internet of Things, there is an increase in the need for devices to be able to interact with the user and take decisions on their own. Additionally, users now look at these devices to help make their lives smoother and easier. The demands of a busy life for a user often leads to situations where work performance degrades mainly due to information or task overload even though users typically possess the necessary skills to perform effectively. Therefore, we propose a novel IoT based SMART PERSONAL ASSISTANT android application for users to enable them to focus on carrying out task than investing time to plan them.

Keywords: IOT, android applications, user-centric applications, SPA

[1] INTRODUCTION

Smart Personal Assistant (SPA) is the important factor of carrier services for mobile users. This new generation of services will allow mobile users to remotely access and manage information using speech recognition technology over telephones. SPA responds to conversational voice commands and delivers a single point of contact that seamlessly engages a wide range of information. The SPA controls the telephone calls, manages the personal activities through calendar, enables the user to access his task manager via voice interface, and includes all the functions of Unified Messaging. The SPA enables the user to optimize the user resources (time, cost), enhance his/her overall productivity, and minimize the interruptions to his regular workflow. The SPA will enable the user to efficiently handle
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increasing demand of telephone calls, messages, meetings and other activities. The paper provides an overview of the SPA applications, and the expected features and future trends. It also proposes a unified decision model based on a quantitative assessment of the importance of the requests and the availability of the user.

The initial market segments for the SPA include professionals as doctors, lawyers, sales representatives, maintenance crew, small offices, and home businesses. SPA allows mobile professionals to remotely access and manages information over telephones. Using a SPA, information that resides on the Internet, corporate intranet or any internal network or database can be accessed. A number of investigators as intelligent software agents has envisioned the SPA concept. Software agents differ from conventional software in that they are semi-autonomous, proactive, and adaptive. Software agents could perform certain tasks on behalf of its user [7]. It could also interact with other intelligent agents and/or human in performing its tasks [8].

The SPA is expected to support and enhance the following features:

1. **Messaging** - Mobile professionals can manage voice-mail, e-mail and faxes using their SPA from the road.

2. **Contact Management** - Scheduling, planning, group calendar, contact and referral organization, all can be managed with the SPA. It’s compatibility with Microsoft Exchange/Outlook make it an ideal contact management solution.

3. **Call Control** - The SPA enables remote users to perform conference calling and call management. Notification and forwarding features allow remote users to be notified immediately when they receive specific voice-mails, e-mails, faxes, or pages [9].

4. **Internet Applications** - The SPA allows personnel to access and engage the internet to help them source information ranging from weather, directions and schedules, to stock performance, competitive data and news. All using simple, conversational voice commands.

5. **Intranet Applications** - Important information contained on the corporate network can be acquired remotely using the VPA. Customer data, shipping and inventory information, sales reports, financial data and more, all can be seamlessly accessed and utilized by mobile professionals.

[2] RELATED WORK

**Presence**, as defined in telecommunications, refers to the ability to know the availability and reachability of a user in heterogeneous communications systems. This means that with presence-enabled systems, users can discover whether other users are available to communicate and through which media they can do this. Presence information, closely related to instant messaging, enables one computer user to see whether another user is currently logged onto a network, corporate LAN, or the Internet. Presence information can beset by the user to indicate a particular status. Presence information is important not only for the SPA to track the user, but also to help the user to locate other people and to suggest the best, or the least cost device to reach them.
Instant Messaging refers to the capability to send an immediate, text-based message to another user on a computer network. Unlike e-mail messages, instant messages are posted immediately to the other user's screen, providing the basis for new forms of collaboration.

Multi-modal communication: With the fast-increasing capabilities of wireless PDAs, and the spread of wide band mobile communication, multi-modal communication, such as MSNetMeeting, can be a very useful online tool. For example, users can review a document or open an application during their telephone conversation. In another example, when receiving call from a known customer, the SPA can bring the customer file for reading by the user, when it is transferring the call to the user PDA, or desktop PC.

Audio and Video Conferencing: MS Exchange provides an integrated support for scheduling online meetings and real-time collaboration. Using the standard meeting request form in Outlook, users can set up a data or videoconference and invite participants from the Exchange directory. Meetings can be either public or private, letting the meeting organizer decide whether the meeting is restricted to the invitees or publicly accessible.

SPA Personality: In VUI the "voice" of the system is the most influential aspect of the system. The "voice" can make or break a system as well as directly affecting the mood of the user and callers, and possibly their attitude toward the products. The user need to enjoy interacting with the SPA and should feel comfortable engaging in dialog with it. It may be useful to let the user select the voice from several personalities with different genders, and different personality traits as well.

Standardization of Agent communication protocol: When a SPA agent receives a call, it starts the greeting message with a “Voice Icon”, which signals the caller that an agent is in charge. Accordingly, when an agent initiates a call it does not speak immediately, but waits until he called party finishes his greeting message. Now, when the calling agent recognizes the initial voice icon, it realizes that the other party is also an agent. They can then switch to a more efficient computer-to-computer signalling and protocol. With the expected wide spread offering of the SPA services by mobile carriers and by many vendors, there will be a growing need for a communication standard between SPA-to-SPA across the spectrum of vendors. The protocol should cover possible interaction media as phones, internet, and multi-modal devices. Security, privacy, and authenticity are also crucial issues in the design of such protocol.

[3] DECISION MAKING MODEL
In this section, we propose a decision-making model, which tries to minimize the user interruption and maximizes the utilization of the user’s time.

![Diagram of the Decision Model]

**Fig. 1. The Decision Model**

The SPA model or “agent”, handles the incoming requests, whether it is a telephone call, an invitation, or a meeting request, and provides an appropriate response based on the importance of the request, and the availability of the user. A request can be initiated by the user, or by another agent or person. A request is described by one or more of the following attributes:

Type: Appointment, meeting, telephone call  
Who: Identity of the initiator of the request.  
What: that is the subject of the request  
When: now, ASAP, between, after, before, in the (morning, evening, afternoon), on, about.  
How long: expected duration of the activity.  
Importance (urgent, important, business, scale from 0 to 10.0).

Upon receiving a request, the agent will try to collect as much information as possible about the request, from the caller ID, person name, from the agent database, from the caller, and from the calling agent. When the user’s agent receives a request, the actions taken will be based on a calculated Request Importance Factor (RIF) as compared to a Personal Availability Threshold (PAT). If the RIF exceeds the PAT, the agent will interrupt the user and notify him of the coming call or message. Meetings and appointment requests will be setup according a similar scheme. As mentioned before, the calendar is used to manage meetings, appointments, and personal activities. The user marks the free time slots in his calendar with convenience score (most convenient, acceptable, inconvenient, never, in a scale 0 to 10). A request with RIF exceeding the time slot convenience threshold will be granted, otherwise will be advised of the next available convenient time slot. The agent will in general try to schedule the meeting starting from the best convenient time, according to some user defined convenience scale. Similarly, if a call is coming while the user is on another call, the new call can be directed to the voice mail box, or directed to the call waiting feature depending on the RIF of the coming call.
Each scheduled activity is assigned two attributes, an Activity Priority Factor APF, and an Activity Availability Factor AAF. APF is related to scheduling, whether the task can replace another scheduled task or occupies certain inconvenient (preferred) time slots. APF is active during the activity waiting state, tentative state, and the pending states. On the other hand, AAF is related to whether the task can be interrupted/suspended once it starts. For example, a dentist appointment for regular check-up may have a low importance factor, and can probably be rescheduled or cancelled, however, once it is running, the user is considered unavailable and cannot be interrupted by his cellular phone. Each activity is also associated with an Activity Accessibility Devices AAD. AAD determines the primary telephone and the secondary telephone(s) that can be used to access the user during the execution of the activity.

It is also desirable that scheduled activities be assigned time-dependent APF that make the activity more important as it approaches its due time and more robust against cancellation by other activities of slightly higher APF. The time dependent APF can also help in scheduling activities that need to be performed before certain deadline, e.g., purchasing an airline ticket, or a gift for the wife birthday. Another desirable feature is to allow time flexibility in start/end of scheduled tasks, and possibly scheduling of overlapping appointments as in doctor offices.

For telephone requests, several actions can be taken based of the RIF value of the caller. For example:
1- Denied immediately and transferred to a voice box. (RIF is too low to be accepted
2- Accepted immediately and transferred to the User. (RIF is urgent, e.g., expected call)
3- Accepted by the agent to confirm identity, then one of the following actions
   a) Delegated actions Get information /advice user of the available time slot to call/fix appointment/ Special message to caller.
   b) Transfer caller to the user immediately
   c) Put caller on hold to check availability of the user
   d) Put caller on hold to accept/process another call.
   e) Put caller in call waiting until the user finishes his current call.
   f) Transfer caller to secretary or another phone number
   g) Page the user for the caller
   h) Transfer caller to mailbox

[4.1] RESULTS

Smart Personal Assistant SPA allows mobile professionals to manage voice-mail, e-mail, fax, contact information, and scheduling of meetings and tasks via Voice User Interface (VUI). Using a SPA, information that resides on the internet, corporate intranet or any internal network or database can be accessed. The core of SPA is a voiced enabled unified messaging (UM) platform to support voice/video Mail, Email and Fax. Fig.2 shows the SPA from the user perspective. The SPA package integrates and manages the Microsoft Exchange/Outlook office automation suite, including the user Inbox, contact list, calendar, and task manager, according to a set of policies and filters set by the user [10],[11]. In the subsequent sections, we cover in more detail some of the perceived features of the new generation of SPAs.
[5] CONCLUSION

The paper describes a new emerging service for mobile user. The Smart Personal Assistance provides an intelligent computer secretarial service for mobile professionals. The new service is based on convergence of internet, speech recognition technology and mobile technologies. The SPA minimizes the interruption of the user, improves the utilization of his time, and provides a single point of communication for all his messages, contacts, schedule, and source of information. The paper proposes as well a decision structure for call screening, as well as handling requests for meetings and appointment. The system initially targets lawyers, doctors, sales personnel, small offices, maintenance crews, etc. However, it is expected to become a standard feature for millions of other users.

REFERENCES


