



A Self-regulatory Personal Assistant for a Smart Home

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ABSTRACT

In this smart age a speech-triggered interface to manage all electronic house- hold devices for a faraway home owner is a necessity. In a smart home an owner can convey an input in natural language form to a gadget to control one or more electronic home equipment's. The user gadget can transmit the home owner speech to a server to be converted into a textual representation. The server can find one or more command interface components and appropriate commands to be performed by the one or more electronic gadgets based on the textual representation. The command interface component includes several communication ports, each communication port related with a different type of communication interface for providing communications to and from the multiple electronic gadgets. The component also includes a speech network communication port for receiving the spoken commands from the home owner and a data network communication port for transmitting monitoring and control information between the multiple electronic devices and the home owner. In operation, the command interface component is responsive to speech triggered commands received from a remote owner via an incoming telephone line. A speech recognition unit within the command interface module is utilized to translate the received speech signal into an "action/control" signal and then perform the desired activity.

Keywords : Command interface component, speech triggered command, speech recognition unit, home gadgets/appliances

I. INTRODUCTION

If we look 20 years back, we were in the early days of internet. There were no smart phones or flat screen TVs, watching a movie at home means loading a heavy cassette into a VCR. So, what will our world really be like in 20 years in future, the technology we use and the homes we live in will probably be much like it is today, but smarter and more automatic. Today we have come to one more step of evolution. Today all our gadgets at home are intelligent and automatic .So the need of the hour is to control all our electronics gadgets at home with the help of app in our smartphone, So that it will be a great help to us when are away from home.

An app in the smart phone can serve as server, which can be used to open doors for this type of remote communication. The server in app may receive a remote command from the home owner via a computer network or Internet. The server at home may have a display unit which is connected to the status and control of the various electronic gadgets, allowing the home owner to access the status of the home devices.

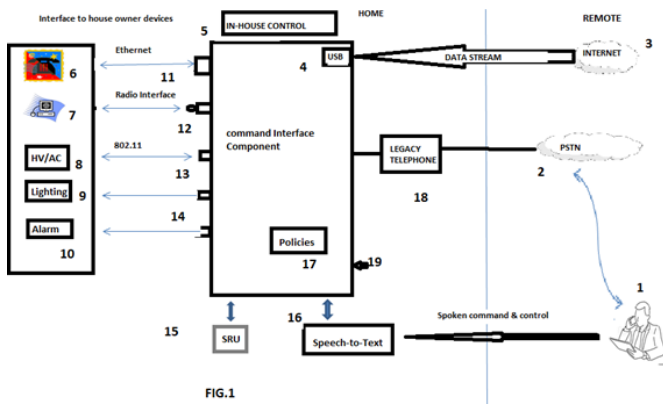


FIG.1

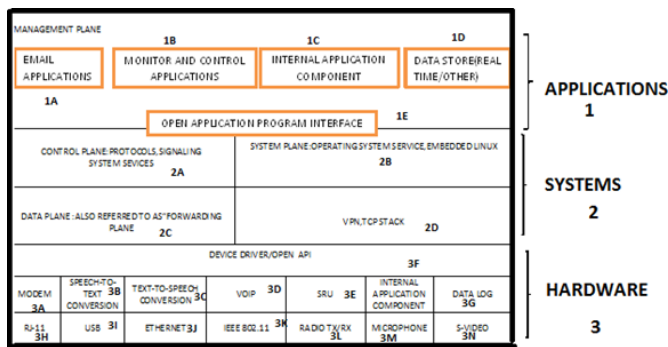


FIG.2

II. SUMMARY OF THE INVENTION

The necessity existing in the previous work can be stated by present invention which describes a system for allowing remote user to keep in touch with various gadgets in his home, more particularly, to the utilization of a single command interface component within the home to provide a communication link between a remote user, his home and other individuals. In the current invention, the command interface component is designed to communicate with several home appliances/gadgets. The command interface component acknowledges the speech commands received from a remote user via an incoming telephone line (either message or speech). A Speech accepting unit within the command interface component is applied to translate the received Voice signal into an action- control signal and then achieving the desired activity.

In addition command interface component also regulates the status like turn certain appliances/gadgets “off” or “on”, adjust settings on

gadgets, provide dial tone to remote home owner, etc. A list of customized “user policies”, which includes supervision of the devices, are stored in a policy data base within the command interface component. A history log database of past actions may also be stored within the command interface component.

It is a contribution of the current invention that the command interface component functions as an interface between the voice and data communication networks. Suppose, a remote home owner may give a call to home, and demand the command interface component to send an email to a particular person. The command interface component will recognize the command (“email”), the “determined party” and the Successive (spoken) message. The command interface component would then engage the home owner's computer to create the email message and transmit the message over the Internet.

In addition the current command interface component can supervise the status of several home gadgets /appliances like alarm/security, HV/AC systems etc. and send "commands" to modify one or more of these appliances, as needed. Taking into account that, the various gadget/appliances can be supervised by the voice commands of home owner (through a telephone connection) when interface is stationed between the appliance and the command interface component, even if he is at a remote location. The potentiality of the current invention can be illustrated with help of following figures. FIG. 1 is a block diagram which depicts the utilization of a command interface component in correspondence with the current invention.

FIG. 2 depicts a classic diagram of the several communication levels within a command interface component formed in correspondence with the current invention.

III. DETAILED DESCRIPTION

FIG. 1 depicts, in simplified block diagram form, a unique home arrangement utilizing a command interface component [19] constituted in correspondence with the current invention. A command interface component includes numerous different internal communication ports, an independent port for interacting with one or more home gadgets/appliances, for which monitoring and control is desired. The different communication ports which the current invention includes are Ethernet port [11], a radio communication port [12], an 802.11 port[13], and an alarm port[14] . A pair of external communication ports (USB connection [4]) and (RJ-11 connection) are used to communicate with the external world via a data network [3] and PSTN [2], respectively.

The home appliances/gadgets in connection with command interface component may include a lighting system [9], a home alarm system [10], a telephone [6], a computer [7], HV/AC system control [8], etc. Several different types of

connections may be used to provide the communication link between the communication port and home device. For example, a home computer [7] can be connected to 802.11[13] in a wireless communication environment. For an Alarm system [10] a radio port [12] may be well suited.

The idea of the current invention are not in consideration of individual connections between the several home devices and command interface component, but for as much as the communication link is capable of supporting two-way communication with the facilities of gathering "status' information/operational data from home devices and issuing "commands' to home devices. Certainly it is a symbolic aspect of the current invention that commands interface component is able to

communicate utilizing several communication standards with a wide variety of different devices. This ability allows for a home owner with relatively weak computer/technology skills to access and use the control/monitoring system of the current invention. In operation, a home owner is capable of monitoring and controlling several home devices .while being remotely located with respect to the home by virtue of using voice commands to access command interface component.

In FIG.1 remote home owner[1], and uses a communication device (such as a wireless telephone) to call into his home through PSTN[2] and legacy phone device[18], where legacy phone device[18] is connected through RJ-11 connection to command interface component.

Assume the home owner gives command to his computer at home through circuit switched network like PSTN[2] to send an email to a particular person. The call home may include a first command that allows the home owner to gain access to command interface component[19] (for example, the utterance "access may be recognized by a Speech Recognition Unit (SRU)[15] in command interface component to activate the two-way interaction between the home owner[1] and command interface component[19] .

Once component has been accessed, the home owner can then send the vocal command "send email to a recipient name', where this vocal command is recognized by SRU[15] and used to activate personal computer[7] and find recipient email address. Then the content of the mail can be given as spoken message by the home owner. In this situation Speech-to-text conversion unit[16] within command interface component[19] is used to convert the speech input into text suitable for transmission as email. The message is then transmitted, and (perhaps) component transmits a reply "email sent to the remotely-located home owner as confirmation.

In another situation a home owner may again “access’ command interface component [19], and request the status of any controlled device within the home. For example, a home owner makes a call to command interface component [19] and pronounce a vocal command to “switch on the lights ’. In this case, the command interface component will diagnose the switch on lights on command using SRU

[15] and activate the all the light bulbs controlled through a microprocessor-based in-house control unit within component. Similarly the remotely-located home owner can supervise the state of the alarm system [10] if there sudden situation arises, which triggers an actual 'alarm condition, interface control component may be configured, using a set of user policies stored within interface control component, to immediately call the home owner's cell number—such as the number of device — (in addition to calling the proper emergency personnel). In a larger sense, the customized user policies may encompass a database of various conditions that are typically programmed by the home owner to control various devices. The policies [17] may exercise time-sensitive information like time-of- day, day-of-week, etc., to turn up/down thermostat settings, turn on/off sprinkler systems, lights, etc., while allowing real- time vocal commands from a remote homeowner to reverse the pre-established policies when necessary.

FIG. 2 depicts an ideal diagram of a multi layered software framework related with the implementation of the command interface component of the current invention. The Software framework is divided into three layers: “applications” [1], “system” [2], and “hardware” [3] displaying the locations of the several framework planes within these three layers. As indicated, with “applications’ set as a first layer , a management plane is indicated and consists of a collection of the several Subsystems and components that are required to carry out the several “remote

control’ commands that may be submitted by a home owner.

In the ideal organization as shown in FIG. 2, management plane is demonstrated as constituting an email applications component [1A], an internal applications component [1B], a monitor/control application component [1C] and a data storage component [1D]. A control plane and a system plane are demonstrated a system/middle layer. An open Application Program Interface (API) [1E]. Component is employed to ensure communication between management plane and control and system planes. Control plane is established as the assembly of subsystems engaged in signalling and routing of data within command interface component.

System plane [2B] in principle is a collection of the several customary services necessary to function in the background to carry out the functionality of command interface component, such as an operating system, file system, etc. A suitable communication method, Such VPN or a TCP stack [2D] may be incorporated in the system plane. Beside this, the details of system plane are not considered as being pertinent to the subject matter of the current invention.

The system/middle layer [2] also includes a data plane [2C] which is in charge of all communication data path processing within component. Precisely, the data communications consists of the physical interface processing for all external interfaces, logical interface processing for all data protocol layers, status and statistics handling, end-point (Service Access Point) support, cross-connect handling for all connection-oriented end-points, forwarding/routing handling for all connectionless end-points, data access to end points (i.e., application access to “source’ or "sink’ data), and Quality of Service (QoS) support.

The hardware level [3] contains several components that are required deploy communication ports, as

shown in FIG.1. The hardware level is depicted as including an RJ-11 component [3H], a USB module [3I], an Ethernet component [3J], an 802.11 component [3K], a radio communication component [3L], and so on. The hardware level also includes the subsystems of command interface component such as speech-to-text conversion unit [3B], SRU [3E] and control unit. Also demonstrated in the hardware level is a "text-to-speech" conversion unit [3C] that works to convert an incoming email (for example) into a speech message that may be transmitted to a remote home owner. A voice-over-IP (VoIP) unit [3D] is included and may be accessed via a "dial tone" speech command from a remote homeowner. A data history log [3G] is included and may be used to store information related to past activities of component.

In accordance with these instructions of the current invention, therefore, it is possible to design an interface command component that can efficiently interact with the existing voice and data networks, providing a smooth connection between a remote home owner and a variety of different gadgets/appliances. For the reason of using existing technologies Such as Speech recognition in fusion with the emerging wireless home device technology, a home owner will be able to contact with home from virtually any place in the earth A technique and scheme has been bring to light for remotely controlling several home gadget/appliances via speech command with the help of a cellular telephone.

Despite of the fact that the current invention has been represented in accordance with the organization as displayed, one of standard technique in the art will immediately make out that there could be variations to the structure and those variations are considered to fall within the spirit and scope of the current invention.

Subsequently many adjustments may be made by one of standard technique in the art without departing

from the spirit and scope of the reclamation as appended here to. What is claimed is:

(A) A technique to control variety of electronic gadgets placed within a home, the method involving: receiving a voice telephone call over a public-Switched telephone network at a home-based command interface unit, the Voice telephone call being made by a remotely located user; receiving, at the home-based command interface component, a spoken command from the remotely-located user during the voice telephone call to the home-based command interface unit; judging the spoken command at the home-based command interface unit to discover genuineness of the remotely-located user and to find out an action requested by the spoken command; and, if authenticated, causing the home-based command interface to interact with at least one of the several electronic devices to carry out the Spoken command from the remotely- located homeowner

(B) The method of claim A, wherein the method additionally consists of a confirmation message from the home-based command interface component to the remotely-located homeowner during the telephone call upon completion of requested actions.

(C) The method of claim A also includes, getting a spoken command, obtaining a set of user policies stored within the home-based command interface component.

(D) The method of claim

(E), wherein the set of user policies comprises a database of working conditions for the several electronic devices.

(F) The method of claim A, again comprising storing the spoken command in a history log within the home-based command interface unit.

(G) An equipment for remotely controlling a variety electronic devices located within a home, the system comprising: a processor; and storage storing programming that when executed causes the processor to perform operations, the operations comprising: receiving a voice telephone call over a public-

Switched telephone network at a home-based command interface unit, the voice telephone call including a spoken command; evaluating the spoken command at the home-based command interface unit to ascertain authenticity of a remotely-located user and deciding an operation requested by the spoken command; and interface for interacting the home-based command interface unit with one of the many of electronic devices to carry out the spoken command from the remotely-located homeowner.

(H). The appliance of claim

(I) wherein the actions further comprise transmitting a confirmation message from the home-based command interface unit to the remotely-located user during the spoken telephone call upon completion of requested actions. 8. The appliance of claim (F) wherein the actions again comprise storing a history log within the home-based command interface component for finished spoken commands.

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