Accessment of Appointments, Tasks, and Contacts from the Mobile for Visually Impaired Person

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Abstract— Storing personal information manager data that is PIM data is important function of any Mobile phone and we know that the mobile phone usage in the World is spreading rapidly and has gone through great changes due to new developments and innovations in mobile phone technology. But the visually challenged persons are not able to access the general features of smartphone such as adding appointments, listening appointments, adding tasks, listening tasks and addingcontacts and retrieving contacts in Microsoft smartphone .In this application, above said tasks are performed efficiently by The Blind.

In this paper, Blind user inputs text command and receive speech- output as response. Buttons (in case of event handling in .NET compact framework) [2] for charactes and commands are placed on touch screen[2] of the Smartphone (Windows Mobile)[15][16] and Braille overlay[3][4] is placed on touch screen. When user touches any character or some commands, respective character or command will be read aloud as feedback so that user can be assured for correct input. For reading aloud text messages, Text to Speech sytem[5][11][6] is there which converts text into audible form. The text is read aloud by audio player. Related work done by some other researchers, is limited to audio access to smartphone[1]. There is no provision to input text using Braille.

Index Terms – *Windows Mobile, Braille, Text to Speech Synthesizer, Personal Information Manager Data, .Net Compact Framework*

I. INTRODUCTION

For each request of the user, speech output is produced. Many times, the output is produced in text form. So text to speech synthesizer is required to convert text into speech[5][11][12]. Microsoft has designed an interface called SAPI (Speech Application Programming Interface)[6][14] which supports dynamic speech input and output, and integrated it in its current operating system. With the API it is possible to develop speech-enabled applications without caring about the details of synthesis and recognition. It is common all over world that one braille code has 6 points. With the combination of 6 points, 64 characters can be expressed by one cell. If more than 64 characters are to be encoded, then 2 cells are used like a shift code system. In this work, I have used only 46 characters (including buttons), so one cell is sufficient to each character. Buttons are treated as a character or a command here. All the buttons are placed on touch screen. The blind can identify the characters (or Buttons) by touch.

II Goals

Specifically, this research paper describes how to perform following activities by the Blind by giving text commands-

1. Add an appointment with start date and time
2. Read aloud all appointments for a given date
3. Add a task with "due date"
4. Read aloud all tasks available in the Smartphone
5. Delete a task after completion
6. Add a new contact with contact name and cell no
7. Making a Call

III. PRAPOSED SOLUTION AND IMPLEMENTATION

The blind cannot use smart's phone keypad to input text commands. But the touch screen can be behaved as a keypad by placing buttons on it and by providing functionality of keys to them. Actually, an overlay will be placed on the touch screen of the smart phone. This overlay will give feel of Braille keypad. By touch this overlay, it can be easily known-"Which key, the finger tip is going to access?"
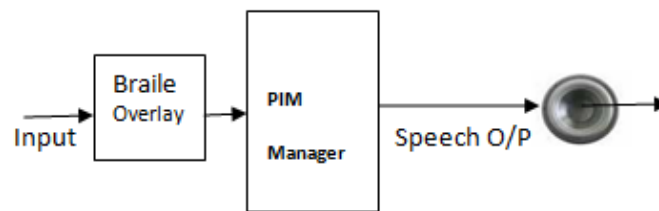

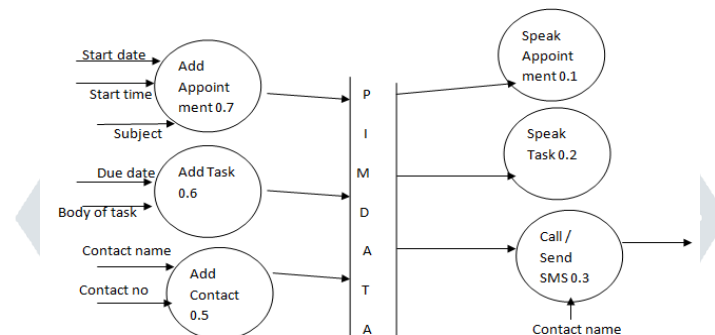Figure 1: Block Diagram of the Application

Figure 2: Level 1 DFD for the blind's assistant

Similarly, the blind can't see the results on output screen but he can listen the results. Therefore, voice interface is to be created. So that the blind can access results, progress messages and exceptions.

(1) Addition of an appointment - the software must take start date, start time as well as subject of the appointment. Start date must be in yyyymmdd format and start time must be in hhmim format and appointment subject should be inputted followed by a hash (#).

1. Test case1 – when start date does not have 8 characters. In this case, software must say-"there is an error ,the start date is invalid, please reenter the date".

2. Test case2 – when any of 8 characters in the start date is not a digit. In this case, the software must say-"there is an error, all characters in a date must be digits".

3. Test case3 – when the start date is earlier than today. The software must say-"there is an error, the start date of the appointment is earlier than today".

4. Test case4 – when start time does not have four characters. In this case the software must speak-"there is an error- the start time has less than four characters".

5. Test case5 - when any of four characters is not a digit. In this case, the software must say-"there is an error, all characters in the start time should be digits"

6. Test case6- when both date and time are not in valid format. In this case, the software must say-"Enter appointment subject followed by #".

(2) **To read aloud all the appointments** for a given start date, the software must take a date as start date in yyyymmdd format. Following test cases can be produced for this activity-

Test case1 – when start date does not have 8 characters. In this case, software must say-"there is an error ,the start date is invalid, please reenter the date".

Test case2 – when any of 8 characters in the start date is not a digit. In this case, the software must say-"there is an error, all characters in a date must be digits, please reenter the start date".

 Test case3 – when the start date is earlier than today. The software must say-"there is an error, the start date of the appointment is earlier than today, please reenter the start date".

There may be multiple appointments for a given date but with different start times. Flow chart to read appointments for a given date is shown in fig. 3.
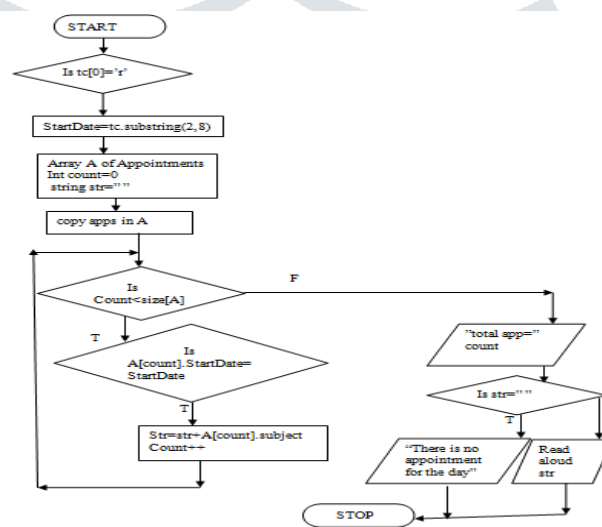

Fig. 3: Flow chart to read appointments for a given day

(3)   *To add a task*, the software will take due date for the task. Following test cases can be produced for this activity

 Test case1- when due date does not have 8 characters. In this case, software must say-"there is an error, the due date is invalid, please reenter the due date".

Test case2 – when any of 8 characters in the due date is not a digit. In this case, the software must say-"there is an error, all characters in a date must be digits, please reenter the due date".

Test case3 – when the due date is earlier than today. The software must say-"there is an error, the start date of the appointment is earlier than today, please reenter the due date".

Test case4- when due date is in correct format. In this case, the software must say-"Enter task subject followed by #".

(4) **To read aloud all the tasks**, the software will take nothing as input. It reads aloud all tasks with their due dates.   By just selecting this activity, tasks will be read aloud tasks one by one.

(5) **After listening a task**, the user can delete the task by entering text command "deltask"

(6) To save a new contact-

It represents a Contact item in the Contact collection[8]. Contacts represent information records of friends, colleagues,
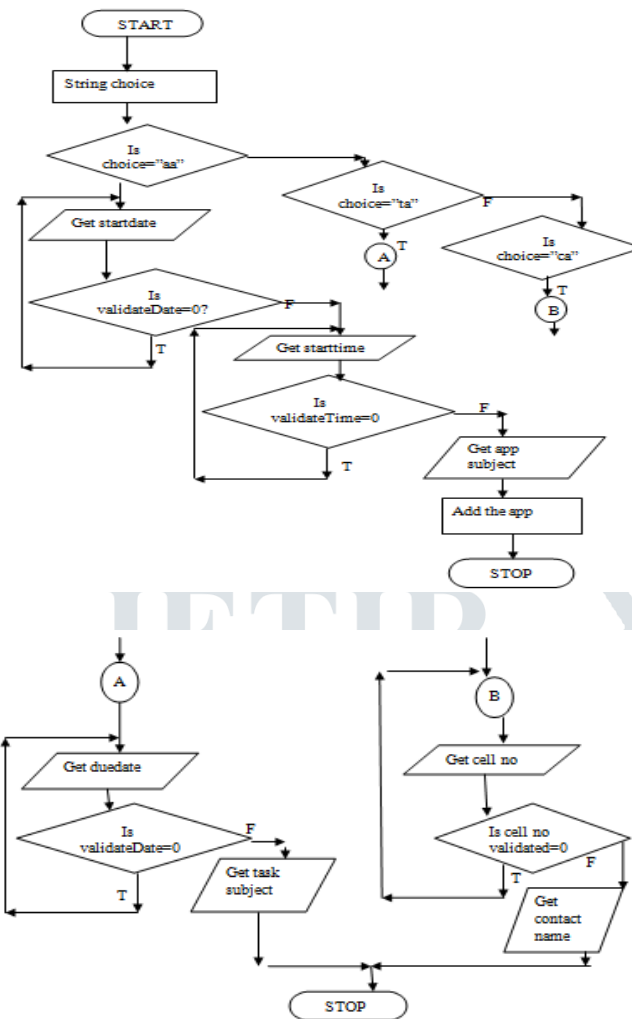

Fig. 4: Flow chart to add PIM data

(7) **To read aloud all the tasks**, the software will take nothing as input. It reads aloud all tasks with their due dates.   By just selecting this activity, tasks will be read aloud tasks one by one.

(8) **After listening a task**, the user can delete the task by entering text command "deltask"

(9) To save a new contact-

It represents a Contact item in the Contact collection[8]. Contacts represent information records of friends, colleagues, acquaintances, or even a company. They can be used for a variety of purposes (for example, addressing mail, e-mail, and text messages). A sizable Contact collection containing richly populated Contact items, is an enormously powerful database.

A Contact is a specialized PimItem. The ContactCollection is used to add and retrieve Contacts to and from the Contact folder.

If a person is to be called or an SMS is to be sent to the person and the person's contact details are not added to contact collection ever before, then contact name and cell no (10 digits) can be saved to contacts. There may be two cases arise-

Test case1- any one of 10 characters in cell no is not digit. In this case, the software must say –"all characters of a cell no must be digits"

Test case2- the contact name already exists. In this case, the software must say-"the contact name already exists please try again with another contact name"

Test caes3- both cell no and contact name are received correctly. In this case, the software will speak- "the contact has been added successfully".

(10) *Making a Call -* If user needs to call a person, the call can be made by name as well as by cell number.

(a) Call by Name - The person name is inputted then press "Call" button. The contact collection is searched against the person name. if search completes successfully, the call starts with reading aloud a message-"your call is under progress". Otherwise, another message will be read aloud –"The contact name does not exist in Contact collection". (if no input is made then the software must read aloud-"Please enter a contact name first").

(b) Call by cell Number – the cell number is inputted with '@' as the first character, then "call" button is pressed. A message is read aloud if number is valid-"your call is in progress".

Flow chart to call a person either by contact name (if it is already saved in Contacts) or by cell number is as follows:
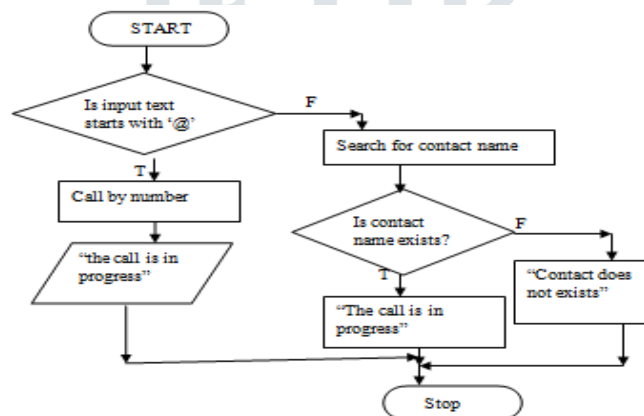

Fig.5 : Flow chart to call a person

Image 1: Image of the Smartphone with the application

IV.   SmartRead Mobile TTS SDK 4.0

SmartRead Mobile TTS SDK[11][12] can run on Microsoft Mobile 2003/5.0/6.0, the ARM/MIPSII/X86 client of Pocket PC 2003/2003SE/5.0, translate the text to speech and transmit to speaker. It also can run on Windows Mobile CE.NET 4.2 system, but some changes must be done to adapt it.

TABLE 1
PERFORMANCE AGAINST SPEECH RATE

Speech Rate	Audio Quality
2	Too slow
5	Good
9	Too Fast to understand

V.   CONCLUSIONS

This is very user-friendly Application for visually challenged person. I have successfully tested this software on windows mobile and it is working absolutely fine. The minimum memory requirement for installing this program into mobile phone is 5 MB and minimum processing power requirement is 100 MHz.

VI.   ACKNOWLEDGEMENTS

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