

TEXT TO SPEECH FUNCTIONALITY IN CICS MAINFRAME

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Abstract— Mainframe, being one of the oldest technologies being used, is seen as one which can serve only as a back-end to applications. An unappealing user interface is by far the most apt reason for this. The GUI can be improved by incorporating templates in CICS. Templates can be defined as a 'User friendly GUI' by assisting a user in learning the various functionalities of an application package. A user friendly application is one thing that help us to deliver great product and attract customers. An attractive GUI is a must for any application, through which we have a control over the way customers interpret our application. In addition to this, we are also able to provide a text to speech interface that uses text message that be displayed and spoken, without actually closing the underlying application program in the Mainframe Environment. Additionally we will also discuss about developing a web application in Mainframe using HTML in CICS.

Index Terms—Application, CICS, GUI, Text-To-Speech(TTS).

I. INTRODUCTION

A lot of applications already exist in Mainframes and a lot more are being created each day. Most of these applications provide 'HELP' to the users in the form of documents. Searching through all these documents to find the answer to any problem is a tedious task. The application demonstration continues to play a critical role in the sales process. Unfortunately this great opportunity to convince the prospects of the application goes unrealized for the simple lack of good demonstration techniques. What if we could develop applications that provide interactive and illustrative help to the users? Such a help is the initiative of our innovation.

HTML gives the users a better understanding about the application and creates an emotional attachment with the product. What if we could develop applications that provide interactive GUI to the users? In addition to this, wouldn't it be something if we are also able to provide text to speech functionality on screens in the Mainframe Environment. In this paper, we are proposing a solution to implement these features. Additionally we will also discuss about developing a web application in Mainframe using HTML in CICS.

Designing the visual composition and temporal behavior of GUI is an important part of software application programming in the area of human-computer interaction. The goal is to enhance the efficiency and ease of use for the underlying logical design of a stored program, a design discipline known as usability. Methods of user-centered design are used to ensure that the visual language introduced in the design is well tailored to the tasks. For such a purpose we have incorporated the GUI features of map using template. A major feature of template is the ability to be manipulated easily and intuitively even by inexperienced users.

In Mainframe environment, handling multiple screens at the same time is always a hurdle. Users can always traverse between screens in an application.

But if one requires viewing a particular screen multiple times, always traversing back and forth to that screen can be irksome. Providing a web GUI options with text to speech functionality for individual screens to facilitate easy access to screens is an innovative and effective solution.

Access to Mainframe applications through Mainframe environment limits the mobility of the application as it cannot be accessed on the go. Integrating HTML and Mainframes (CICS) is the key to increase the mobility of the application. This not only gives Internet accessibility to the application but also enhances user experience with the help of a better GUI and voice.

II. LITERATURE SURVEY

Speech is the most used and natural way for people to communicate. From the beginning of the man-machine interface research, speech has been one of the most desired mediums to interact with computers and Artificial speech has been a dream of the humankind for centuries. Many development has been done in several decades in area of Text to speech (speech synthesis) conversion (Santen et al. 1997, Kleijn et al. 1998), but the major problem related to these progress were sound quality, naturalness and intelligence. Naturalness expresses how intimately the output sounds like human speech on the second hand intelligibility is the ability with which the output is understood. However, the adequate quality, naturalness and intelligence has been achieved by several present products, one of the successful example is 'Talking head'.

The process of text to speech (TTS) conversion consists of two phases, these are known as low level synthesis and high level synthesis. In the first phase which is also called text analysis the input data or text is transliterate into a phonetic or any other linguistic representation and in second phase waveforms are generated by which the acoustic

output can be generated from the phonetic and prosodic information of first phase.

There are several methods of text to speech(TTS) conversion (speech synthesis) and have some pros and cons of their own, and it is very difficult to find out which is the best one among them. Very promising results have been achieved recently with concatenative and formant synthesis, but there is one more synthesis which may arise a potential method in future.

There are many problems related to text to speech conversion (TTS), Problems occurs in pre-processing of text such as numerals, abbreviations and acronyms. One of the significant problem is to peruse the pronunciation and prosody from the written text because written text doesn't have unambiguous emotions and sometime pronunciation of proper and foreign names is very anomalous. More difficulties come in speech synthesis of female and child voices because of the pitch difference of male female and child.

Some of the system that are made for TTS are following:

SAPI is an interface between applications and speech technology engines, both text-to speech and speech recognition (Amundsen 1996). Currently SAPIs are available for several environments, such as MS-SAPI for Microsoft Windows operating systems and Sun Microsystems' Java SAPI (JSAPI) for JAVA based applications.

INFOVAX, DECTTALK, Bell labs text to speech, Laureate, Soft voice, CNET PSOLA, ORATOR, EURO vocs, Apple Plain Talk are some more examples of text to speech conversion system.

Previous studies on text to speech conversion (TTS) (speech synthesis):

In their everyday lives, visually impaired people can benefit from numerous text-to-speech applications, ranging from "leisure activities to devices which support independent living" (Cryer and Home 2008: 5). Among them are various mobility aids, educational tools, screen reading software and entertainment (Freitas and Kouroupetroglou 2008, in Cryer and Home *ibid.*).

Previous studies on the acceptance of synthetic speech by visually impaired people focused on, *inter alia*, reading daily newspapers (Hjelmquist *et al.* 1990), receiving financial information (Thompson *et al.* 1999) and listening to a GPS system (Loomis *et al.* 2005, all in Cryer and Home 2008). It has been found that while synthetic speech may be difficult to comprehend at first, its tolerance and comprehension increases with more exposure and experience. In addition, while most people would prefer a natural voice, they find synthetic voices acceptable for a number of applications.

A study conducted by the RNIB on the attitude of blind and partially sighted people towards the

application of synthetic speech for the Talking Books service has revealed that most people prefer a human narrator over a synthetic voice when it comes to reading books (Cryer and Home 2009). It has also been found that "most users felt synthetic speech would be acceptable for reference, instructional and non-fiction books, whilst fiction and leisure reading would be preferable with a human narrator" (Cryer and Home 2009: 5-6). It would be interesting to research whether similar patterns can be observed among users with regard to fiction and non-fiction audio-visual programmes with human vs text-to-speech audio describers.

N. Swetha[2] in her paper A blind person cannot also see the length of an input text when starting to listen it with the help of the speech synthesizer, an important feature is to give in advance some information of the text to be read successfully.

Poonam S. Shetake in the paper text-to-speech (TTS) convention transforms linguistic information stored as data or text into speech. TTS systems make it possible to access textual information over the telephone [3].

III. IMPLEMENTATION

Customer Information Control System (CICS) is the user interface used and in order to display data TSQ [4] is used. For more efficient and user friendly experience, we have converted CICS maps into HTML pages which is more convenient when it comes to user experience. For making it more interactive and innovative, we have implemented Text-To-Speech functionality using Java Script technology embedded in HTML.

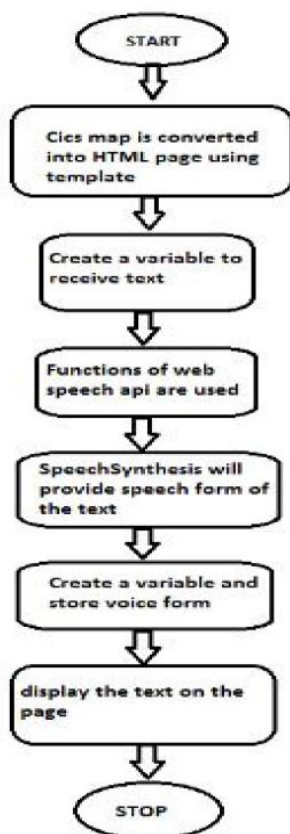
For implementing text to speech we have used web speech API. This specification defines a JavaScript API to enable web developers to incorporate speech conversion and synthesis into their web pages. It enables developers to use scripting to generate text-to-speech output and to use text recognition as an input for forms, continuous dictation and control. The JavaScript API allows web pages to control activation and timing and to handle results and alternatives.

The Cics map is converted into HTML template through changes made in PARM field of MAPCOMP.Template has to be pasted in CICS DFHHTML directoryInstall the template in CICS region and create a variable to receive text.

Functionality is coded in script tag using java script. Various functions are implemented for handling the validations of the map such as choice entering. The message which is displayed on the screen is also converted in voice form. Validations are also implemented in speech form.

SpeechSynthesis will provide speech form of the text. The voice form is sotred in a variable and the text is displayed on the page.

IV. FLOW CHART



V. RESULT

The sole motto is to make a link between CICS maps converting them into webpages incorporating the effect of text conversion into speech so that a user gets a high interactive working environment in CICS. After implementing when we run the template on web browser, it displays the CICS map in very interactive HTML format and it successfully executes the text to speech functionality.

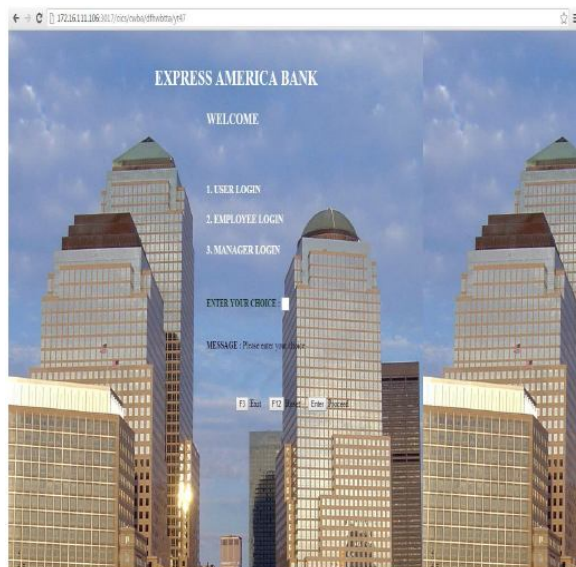


FIGURE 1. CICS MAP

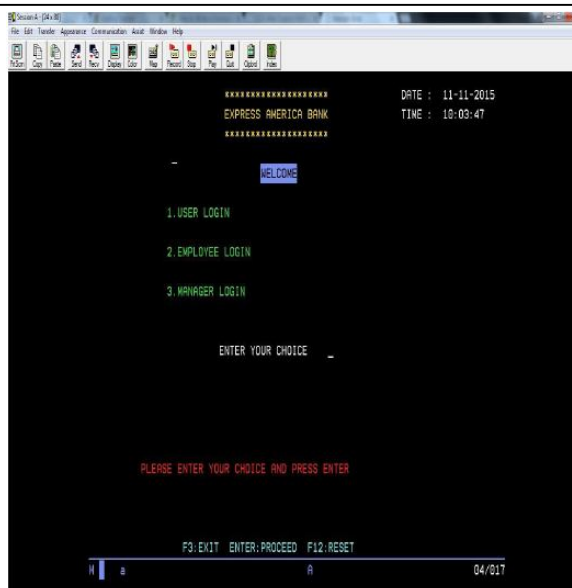


FIGURE 2. HTML WEBPAGE OF CICS MAP

CONCLUSION

As now a days text to speech application is widely used in everyfield to make the things work easily without paying too much constrain on writing things in a pre-defined manner. We have implemented Text-To-Speech functionality using Java Script technology embedded in HTML. At the same time, if the user also has the option to minimize and revisit important screens in the mainframe environment without actually disturbing the current screen he is working on, it makes the application extremely easy to work with. The attitude and intention of a customer towards an application are affected by the ease of use, usefulness, and enjoyment thus by implementing these factors in an application it increases the customer satisfaction and makes him a repeat customer.

REFERENCES

- [1] **Cryer, Heather** and Sarah Home (2008). "Exploring the use of synthetic speech by blind and partially sighted people." RNIB Centre for Accessible Information, Birmingham: Literature review #2.
- (2009). "User attitudes towards synthetic speech for Talking Books." RNIB Centre for Accessible Information, Birmingham: Research report #7.
- Freitas, Diamantino** and Georgios Kouroupetroglou (2008). "Speech technologies for blind and low vision persons." *Technology and Disability* 20, 135-156.
- Hjelmquist, Erland**, Bengt Jansson and Gunilla Torell (1990). "Computer-oriented technology for blind readers." *Journal of Visual Impairment and Blindness* 17, 210-215.
- Thompson, Leanne**, Chris Reeves and Kate Masters (1999) "In the balance: making financial information accessible." *British Journal of Visual Impairment* 17 (2), 65-70.
- Loomis, Jack M.**, James R. Marston, Reginald G. Golledge and Roberta L. Klatzky (2005) "Personal guidance system for people with visual impairment: a comparison of spatial displays for route guidance."

- Journal of Visual Impairment and Blindness* 99 (4), 219-232.
- Sami Lemmetty** (1999). "Review of Speech Synthesis Technology".
- [2] n.swetha 2k..anuradha," Text-to-speech conversion", *International Journal of Advanced Trends in Computer Science and Engineering*, Vol.2 , No.6, Pages : 269-278 (2013).
- [3] poonam.S.Shetake, 2s.A.Patil, 3p. M Jadhav," Review Of Text To Speech Conversion Methods", Proceedings of 10th IRF International Conference, 01st June-2014, Pune, India, ISBN: 978-93-84209-23-0.
- [4] CICS Handbook by Yukihsa Kageyama(Pg.163-192)
- [5] <https://dvcs.w3.org/hg/speech-api/raw-file/tip/speechapi.html>
- [6] Mrs. S. D. Suryawanshi, Mrs. R. R. Itkarkar, Mr. D. T. Mane, "High Quality Text to Speech Synthesizer using Phonetic Integration" , *International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)* Volume 3, Issue 2, February 2014.

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