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JUDUL: TALKING EMAIL POWERED BY VOICEXML

SESI PENGAJIAN: 2004/2005

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TALKING EMAIL POWERED BY VOICEXML

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This report is submitted in partial fulfillment of the requirements for the
Bachelor of Information and Communication Technology (Software Development)

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DEDICATION

I am as ever, especially indebted to my parents, Lau Swee Kiat and Poh Su Guat for their love and support throughout my life…

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Talking Email powered by VoiceXML which I'm planning and implementing is through hard work of research, numberless of discussion. Although the duration of this Project is just a few months, I hope that this system will be created successfully for the use of all company.

I'm supervised under Assoc. Prof. Goh Ong Sing in developing this system and I would like to take this opportunity to thank him for giving me a very good guideline in the process of completing this project. Besides that, I would like to thank some other lecturers who had helped by giving some good ideas to improve the system.

I also asked some of businessman unofficially and they definitely give me a very good picture of how the real working environment and the requirement of this project. From that, I planned and designed the system according to the real working environment. Lastly, I'd like to thank to my friends and family for providing me with moral and spiritual supports.

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ABSTRAK

Tujuan utama membangunkan Talking Email powered by VoiceXML adalah untuk memberi satu cara yang alternatif untuk menyemak emel tidak kira di mana jua, asalkan pengguna boleh membuat panggilan telefon. Sistem *IVR (Interactive Voice Respons)* sedang menghadapi satu masalah yang serius iaitu kebolehupayaan untuk menaiktaraf *(upgrading)*. Sistem ini memerlukan pengubahsuaian untuk menambahkan satu fungsi seperti sistem carian. Oleh yang demikian, *W3C (World Wide Web Consortium)* membuat satu piawai merangkumi dialog, keupayaan sintesis perkataan, keupayaan mengenal perkataan, kawalan panggilan dan aspek yang lain, iaitu *VoiceXML*. *VoiceXML* ialah satu bahasa tambahan kepada dialog untuk menyokong spesifikasi yang lain dan mencipta dialog yang mempunyai ciri-ciri seperti keupayaan sintesis perkataan, keupayaan mengenal perkataan, input butang telefon *(DTMF)*, rakaman ucapan dan lain-lain. Sistem ini akan diimplementasikan dengan mengunakan cara prototaip. Disebabkan kekangan masa, sistem ini akan membekalkan fungsi yang minimal seperti mendapatkan emel, membaca emel dan penghapusan emel. Sistem ini hanya boleh lakukan tugasan seperti yang dinyatakan dengan menggunakan butang telefon sahaja. Kesimpulannya, implementasi sistem ini bukan sahaja memberi satu cara yang alternative kepada pengguna untuk menguruskan emel yang penting, sistem ini pasti dapat memberi manfaat kepada pembangun kerana kebolehupayaan untuk mengurangkan kos dan kebolehan untuk menaiktaraf *(upgrading)*.

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ABSTRACT

The main purpose of developing Talking Email powered by VoiceXML is to provide an alternative method for user to check for their emails no matter where they are, as long as they can make a telephone call. Current Interactive Voice Response (IVR) system is facing a very serious problem which is the ability of upgrading. This conventional system need to be customized before its functionality can be expanded. It means that developers have to write a lot of code or restructure the entire system in order to get a simple function such as search engine in it. Because of that, World Wide Web Consortium (W3C) defined a suite of markup languages covering dialog, speech synthesis, speech recognition, call control and other aspects of interactive voice response applications, which was known as VoiceXML. VoiceXML is a dialog markup language that leverages the other specifications for creating dialogs that feature synthesized speech, digitized audio, recognition of spoken and DTMF key (touch tone) input, recording of spoken input, telephony, and mixed initiative conversations. A prototyping methodology will be used in the process of implementing this system. Because of limited time, this system provides some basic functionality such as retrieval of email and read out loud by the system, deletion of emails. Beside that, user able to customize their own email reader voice such as gender, volume, pitch baseline and speed. Currently, this system is only capable to perform the task using DTMF key. As a conclusion, the implementation of this system not only provides a quick and alternative way for user to manage their important emails, this system will definitely benefit the developer because it is extendibility and cost saving in maintenance and upgrading.

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LIST OF ACRONYMS

ACRONYMS	DESCRIPTION
[A]	
ACD	Automatic Call Distributor
API	Application Program Interface
ASP	Active Server Page
ASR	Automatic Speech Recognition
[C]	
CCITT	Common Gateway Interface
CGI	Common Gateway Interface
[G]	
GSM	Global System for Mobile Communications
[H]	
HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
[I]	
IMAP	Internet Message Access Protocol
ISDN	Integrated services digital network
IT	Information Technology
IVR	interactive voice response
[J]	
JSP	Java Server Page

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[P]

PBX	Private branch exchange
PC	Personal Computer
PCM	Pulse Code Modulation
PHP	Hypertext Preprocessor
POP	Post Office Protocol
PSM	Projek Sarjana Muda
PSTN	Public Switched Telephone Network

[S]

SMTP	Simple Mail Transfer Protocol

[T]

TAPI	Telephony Application Programming Interface
TCP/IP	Transmission Control Protocol/Internet Protocol
TSP	Telephony Service Provider
TTS	Text-to-Speech

[V]

VoiceXML	Voice eXtensible Markup Language
VoIP	Voice over Internet Protocol
VXML	Voice eXtensible Markup Language

[W]

W3C	World Wide Web Consortium

[X]

XML	Extensible Markup Language

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CHAPTER I

INTRODUCTION

1.1 Overview

In this Era of electronic, email already became one of important communication tools. As usual, when a user need to access their email, a device which connected to the internet is needed. Again and again, people will ask the same question:

> *"Is that possible that I can access all my message at once, especially on the road, without hooking up my computer and dialing up using a modem?"*

In order to cope with this problem, a perfect solution been proposed by using Talking Email system that powered by VoiceXML. Why not using a regular IVR to retrieve email and read it out loud? It is because with the VoiceXML, user not only can read emails, but can retrieve information such as stock quotes, sports scores, and weather reports. These, however, are certainly not the only application for VoiceXML. Other application areas, including voice-enabled intranets and contact centers, notification services, and innovative telephony services, can all be built with VoiceXML. **From this point, the VoiceXML is considered with it's highly extensibility and it is a cost saver.**

The email reader application is an interesting application that illustrates the power of VoiceXML for every day use. User can call the application and listen to email. When a user calls the application, the application invokes a VoiceXML document that requests the user's pin that was previously entered on the web page.

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This pin is submitted to a PHP that fetches the user's email and generates the VoiceXML to read out the emails.

The user can browse through the sender and subject headers for all emails and then say 'more' to listen to the body of any email. The Email Reader application uses PHP with additional open-source component to perform server-side functionality such as writing to files and generating VoiceXML documents with the latest emails. The implementation of the Email Reader involves three steps: registration, authentication and retrieval of emails. In order to listen to emails, users must register for the Email Reader service through a web page. When a user calls the email reader application, the first step is to authenticate the user. A Voicexml document will prompt a user to enter his/her pin and submits the form to access that user's email. Once the pin field is filled, the form is posted to fetch the email. Retrieves the POP account info associated with the provided pin, and using API fetches all emails from the user's POP account. The sender name, subject and email body are extracted and reformatted into VoiceXML content. There are few organization been identified as a case study, they VoxSurf, Yahoo! Phone and Loquendo. The methodology that suitable for this project will be prototyping.

According to a survey done in year 2003 by Mobile Direct, there are 1.32 Billion mobile phone user lives in this world and 3.5 Million Malaysia Mobile User. Not all of them have a computer in front of them when they are required to check for email. For that, Talking Email plays an important roles in helping mobile user to access their email no matter where they are.

1.2 Problem Statement

Traditional IVR systems didn't deploy cross platform or universal protocol. Those systems were built according to developer and there are no one central organization to control how the system suppose to react with user. VoiceXML is a standard: any VoiceXML compliant will accept the VoiceXML applications. If the IVR supplier had been changed, traditional voice application can't be easily used on

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another system. A web site can be hosted by any ISP - it's the same with VoiceXML applications.

Traditional IVR systems are not only very expensive, but use arcane programming languages that require you to hire high-priced experts to create applications for you and your clients. Well, it is obvious that the vendors of traditional IVR have not kept up with the technological advances and cost savings IT managers have come to expect.

Traditional IVR system mostly are separated or disconnected from each other. A single-purpose IVR system that does not integrate well with other Web or backend business applications is just not a sound investment. With VoiceXML, It allows IVR application developers to use familiar, Web-based tools, techniques, and architectures to build interactive phone services. VoiceXML changes the rules for IVR application development.

1.3 Objectives

The main objectives in implementing Talking email powered by VoiceXML is to provide an alternative solution for user to retrieve their email. User can "*hear*" their email with their telephone or mobile phone using an open standard by World 3 Consortium (W3C) – VoiceXML 2.0.

VoiceXML's goal is to bring the full power of web development and content delivery to voice response applications, and to free the authors of such applications from low-level programming and resource management. It enables integration of voice services with data services using the familiar client-server paradigm. Its objectives include:

- Minimizes client/server interactions by specifying multiple interactions per document.

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- Shields application authors from low-level, and platform-specific details.
- Separates user interaction code (in VoiceXML) from service logic (e.g. CGI scripts).
- Promotes service portability across implementation platforms. VoiceXML is a common language for content providers, tool providers, and platform providers.
- Is easy to use for simple interactions, and yet provides language features to support complex dialogs.

1.4 Scope

The Talking Email powered by VoiceXML can retrieve any email from all kind of Email server as long it support standards such as POP3 and IMAP. It supported basic function such as:

- Speak out loud with retrieved email
- Delete of email

The language describes the human-machine interaction provided by voice response systems, which includes:

- Output of synthesized speech (text-to-speech).
- Output of audio files.
- Recognition of DTMF input.
- Recording of spoken input.
- Control of dialog flow.
- Telephony features such as disconnect.

The language provides means for collecting character and/or spoken input, assigning the input results to document-defined request variables, and making

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decisions that affect the interpretation of documents written in the language. A document may be linked to other documents through Universal Resource Identifiers (URIs). The user will be everybody who using phone (including mobile phone as well).

1.5 Contribution

Talking email powered by VoiceXML enables user to access and manage email accounts from any telephone, whether user are on the move or imply away from computer. There are several benefits if company deploys this system:-

a) **Highly Extensible.** Talking Email are developed based on W3 consortium VoiceXML version 2.0 standard. It is highly extensible and reduce cost effectively. Emagine, from this project and forward, this system is capable of extending its functionality beside email reader, is can be a news reader, stock information fetching tools wihout any change of code inside the system. Compare with regular email reader that built based on legacy IVR system, when the need of adding new functionality to system has come, the maintanance and upgrade cost are more burden.

b) **Simple System Deployment, Increase in Productivity.** Regardless what kind of data/voice environment has in place, Talking Email is designed to be flexible to fit into existing IT infrastructure. In this project it configured to be Email Reader. Talking Email reads the email as they appear in email inbox, it provides options to repeat, delete, over the phone. Talking Email saves time by accessing messages easier and quicker, make the communication with co-workers or customers more efficient, thus increase overall productivity.

c) **Easy Maintenance, Reduce Cost**. Talking Email is designed to run under Windows NT, Windows 2000 or XP, leveraging Microsoft's networking and maintenance capacities, providing exceptional reliability and scalability. User setup is easy and straightforward; a graphical user interface (GUI) using web is provided to register user to

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the system. By allowing users to change settings by themselves, it saves the time for support, thus reduce maintenance cost significantly.

1.6 Expected Output

User needs one-time registration when the time of deployment of this system has come. The registration provides a way for users to provide their POP account info and choose a pin those maps to this account. The POP account info and the pin mapping are stored to a persistent storage, and in this case it's in database. When the user calls in through the phone and logs in using their pin, the user's email will be read by the system using computer generated voice from the database. Those emails are fetched by a module called Email Fetcher which check each user account from time to time. If a new email has received, the system will notify user by sending short message service (SMS) that particular user. Currently this system still not fully equipped with Automated Voice Recognition module, but it integrated with basic voice recognition functionality. In clearer explanation, the situation below will tell:

1) When user talks to the system "Can you go to page one?" – The system doesn't understand what its mean, but if user says "One" – the system will redirect to page number one. It shows that the voice recognition module is not fully operational.
2) This system will only accept DTMF (Telephone Keypad's tone) as it input.

The features of the system when it reaches the final stage are:

- Read out loud the email fetch by the system
- Delete email capability
- Allow user to customize their personal email reader voice.
- Allow user to register as a user and edit their information through portal.
- Allow user to configure the setting of email server that this system needs to fetch for.

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CHAPTER II

LITERATURE REVIEW

2.1 Introduction

A literature review or study forms an essential part of many projects. It shows that the researcher has read material on the subject of the project, and that the researcher are comfortable with the terms, concepts and theories surrounding the chosen area of research, and will ensure that the researcher is not duplicating research that has gone before. All the resource on this literature reviews are from Internet. There are several organizations are currently implementing the Email Reader with VoiceXML technology, they are:

a. VoxSurf
b. Yahoo! Phone
c. Loquendo

2.1.1 What Is VoiceXML

VoiceXML is a language for creating voice-user interfaces, particularly for the telephone. It uses speech recognition and touchtone (DTMF keypad) for input, and pre-recorded audio and text-to-speech synthesis (TTS) for output. It is based on the Worldwide Web Consortium's (W3C's) Extensible Markup Language (XML), and leverages the web paradigm for application development and deployment. By having a common language, application developers, platform vendors, and tool providers all can benefit from code portability and reuse.

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