

BORANG PENGESAHAN STATUS TESIS

JUDUL: P2P VIDEO CONFERENCING APPLICATION TOOL

SESI PENGAJIAN: 2005

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I hereby declare that this project report entitled

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is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT : _____ Date: 24 November 2005
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SUPERVISOR: _____ Date: 24 November 2005
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DEDICATION

To my beloved parents

ACKNOWLEDGEMENTS

Please take a few minutes to read the names of the people who contribute for the completion of my final year degree project 1 (PSM 1) and (PSM 2) report - they've earned it, and I am humbly grateful to them all.

I would like to thank God to give me good health and strengthen to finish this PSM I on time.

I like to thank my beloved parents who have been inspirational, giving me endless support and motivation throughout PSM 1 and PSM 2 in terms.

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ABSTRACT

Peer-to-peer Video Conferencing Communication Tool which is also known as PVCCT is a video conferencing application which will implement decentralized peer-to-peer concept. Decentralized peer-to-peer concept is a pure peer-to-peer concept which do not use central server. The main problems that been identified in this project is that the free current video conferencing applications are using central server for connection, only support Windows operating system and requires internet connection and cannot use in LAN (Local Area Network). To overcome this problems, this project are using decentralized peer-to-peer concept and do not require central server to do connection with other users. Besides that, java programming language is used in this application compare to visual basic because java programming can support both operating systems, Windows and Linux. This application also will able to use in LAN (Local Area Network) environment only. Many researches have been done regarding this application such as the peer-to-peer concept, codec, video compression, protocols and other which are related to this project. This application has to login with server to get online users and not to do connect with users. After the login, the online users list will appear on the screen and user can use User IP to connect with other user. If the connection success with user, the computer name of the user will appear which they are connected. And together the video display also will display the image of the users. Besides that, the user also can pause the communication with other users.

ABSTRAK

Projek yang dinamakan sebagai *Peer-to-peer Video Conferencing Communication Tool* atau PVCCT ini adalah sebuah *video conferencing application* yang menggunakan konsep *decentralized peer-to-peer*. Konsep ini adalah konsep tulen bagi *peer-to-peer* dan ia tidak memerlukan server tengah. Masalah utama yang dikenalpasti dalam projek ini adalah *video conferencing* percuma ini menggunakan server tengah untuk membuat sambungan, hanya boleh digunakan dalam sistem operasi *Windows* dan memerlukan sambungan *internet* serta tidak boleh digunakan dalam LAN. Bagi mengatasi masalah ini, projek ini menggunakan konsep *decentralized peer-to-peer* dan tidak memerlukan server tengah untuk membuat sambungan. Selain itu, bahasa *java* digunakan bagi projek ini berbanding dengan bahasa *visual basic* kerana bahasa *java* boleh digunakan dalam *Windows* dan *Linux*. Aplikasi ini juga dapat digunakan dalam LAN (*Local Area Network*) saja. Banyak kajian telah dibuat berkenaan dengan *video conferencing* dan contohnya adalah konsep *peer-to-peer*, kodek, *video compression*, protokol dan lain yang berkenaan dengan projek. Aplikasi ini perlu hubungi dengan *server* untuk mendapat senarai pengguna yang menggunakan sistem ini dan bukan untuk hubungi dengan pengguna lain. Selepas *login*, pengguna semasa yang menggunakan sistem ini akan terpapar dalam senarai pengguna. Maka pengguna boleh menggunakan *User IP* untuk hubungi dengan pengguna lain. Jika berjaya, nama *computer* pengguna akan terpapar yang mana mereka yang tengah berhubung. Dan *video display* juga akan terpapar bagi membolehkan pengguna melihat rakan mereka dalam *screen* itu tersebut.

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CHAPTER I

INTRODUCTION

1.1 Project Background

The communication between one party and another over distance has been one of the driving factors in the advance of human civilization and commerce. Most of the current video conferencing tool in the market didn't much concern about users requirements. They actually needed a tool or application that will give them more advanced and satisfied to use the video conferencing tool. Certain video conferencing application developers will offer packages which include with many modules such as shared application, file transfer, chat (text), audio conferencing and lastly video conferencing. But these developers normally didn't concern about video conferencing module in their application for instance yahoo messenger and camfrog video chat. As long as this video conferencing application can complete their application and they don't know what actually users needed for a good and advance video conferencing tool. After some observations and survey on video conferencing application users, many issues have been identified that they are facing problem during implement the video conferencing applications.

1.2 Problem statement

After made a lot of observations on literature, case study and current video conferencing applications have few problems. Below are factors that initiate this project:

Most of these applications are using central server and users need to make registration first before using this applications. So user cannot use this application without logon to the server and need internet connection to make this process. If these central servers are break down, all connections which are communicating each other will be affected and disconnected. These applications are dependent to central server and some times make traffic during logon time or registrations.

Most of the free current video conferencing application cannot be used in LAN (Local Area Network) environment. So this application cannot be run without internet connection such as Camfrog Video Chat, yahoo messenger, MSN messenger and so on. Before using this application they need to register and logon to the server and because of this matter, video conferencing application need internet connection.

Most of the application in the market cannot compatible with other operating system such as Linux and Solaris. In this world, most of the personal computers are using Windows operating systems. Some application programmer don not concern about compatible of other operating systems.

1.3 Objective

Based on the problem statements, a few objectives have been identified below:

This application is develop to use in LAN (Local Area Network) environment. So this application can give a chance to user which needed this application in LAN (Local Area Network) environment. Normally this application can use in meeting, discussion between lecturer and students. This meant every person cans this application for their own needs accordingly to the situation.

This application is to enhance usability of P2P in Video conferencing. In this concept, a user does not need a central server to make a connection with other peers. So when a connection are disconnect, other connection will be not affected. The connection can be made point to point and no need server to do connection with other users.

It also has to compatible with both operating systems such as Windows and Linux platform. Most of the personal computer users in this world are using Windows platform compare to other operating systems because it quite user-friendly but the license is expensive and the open sources operating systems are free.

Besides that, to develop application with using java language and other language required special license such as Visual Basic which own by Microsoft. The java have package that have call only to develop this application and it also an open source language.

1.4 Scopes

This P2P Video Conferencing Communication Application Tool is suitable for those whom in LAN (Local Area Network) environment and does not need internet connection. This application can support Windows only.

For the IP login, the ranges of 224.0.0.0 until 239.255.255.255 have to use for this application. Other IP cannot be used for this application and error will occur. This application can be used by many kind of user such as in the meeting between supervisors and works or discuss between lecturers with students.

This application can support one user to many users and one user to one user, for instance communication between lecturers with students. Many students can connect with their lecturer for the discussion. But a user cannot connect with other person if they have already connected by other user.

Besides that, user also can stop the stream or pause the communication for a few minutes and can resume back after that. There are 4 modules to support this application and be useful to the users.

In this channel, all users have to login and in a same LAN (Local Area Network) connection will display in this screened. From here, user can connect to user they want to communicate. The online list users will display here and user can see who are online right now. It contains item such as IP address.

This channel is to connect with users and display the users which are join the group and communicating. Video will display the video screen for the users which are connected to them and can start their conversation.

1.5 Project significance

The targeted users for this project are for higher learning institutions and companies which in LAN (Local Area Network) environment. Students in higher learning institution can use this application to implement in their discussion section among their peers or with lecturer. Meanwhile company manager can use this application to communicate with staffs and save their time. This project is using peer to peer concept, so this connection will be more reliable and won't affected by other connections if one of the connection are break down based on mesh topology.

1.6 Expected output

The expected output will be delivery from this project is users can use this video conferencing application in Windows platform. They just need to have a LAN (Local Area Network) environment to use this application and no need to have internet connection. Users have to login first to server and get the online list. Besides that, they straight away connect to their peers and enjoy their communication.

1.7 Conclusion

In the current market, there have many video conferencing applications which can use by users for many purposes depend to their needs. Before produce an application, some observations and survey on users about the application must be identified. All users' requirements regarding video conferencing application can be collected and can produce an application that can give the users more satisfied using this application. Peer to peer concept will play main role in this project and many advantages have been identified through doing research. So for the next activities, literature review and project

methodology will take place. In literature section, search, collect, analyze and draw a conclusion from all debates and issues in relevant body of literature are made. The sources can get from books, journals, technical reports, web pages and others which related to this project. Project Methodology is a way to use all available technique, tools and approaches used to achieve predetermined objectives.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter will focus on literature review and project methodology. So literature review are based on searching, collecting, analyzing and drawing conclusion from all debates and issues raised in relevant body of literature such as books, journals, technical reports, web pages and e-books. Meanwhile this project is using Object Oriented Analysis Design (OOAD) for project methodology section. Object Oriented Analysis Design (OOAD) approach will be applied for the design and development of the project which is widely adopted in modern software development.

2.2 Fact and finding

In this part, many researches have been done to collect the information that is related to this application.

i. Video compression method

According to Sanjay Kumar Udani (May 1992) [1], there are three main methods of compression such as inter-frame compression, intra-frame compression and lossless compression. The inter-frame method uses compression in space whereas intra-frame compression uses compression in time. In general, both these methods are lossy compression methods. It is seldom used for motion video because of its low compression rates.

The main uses of lossless compression are used in sensitive applications such as in medical imaging where resolution and accuracy are plays important roles. MPEG is a combination of inter-frame and intra-frame compression techniques which it will result in high compression rates. MPEG is capable of real-time compression rates and this standard is intended primarily for motion video, and promises a compressed bit rate of fewer than 1.5 Mbps for color video with acceptable quality.

JPEG is an intra-frame coding standard that was originally intended for still pictures or images and used in both still and motion video compression. For JPEG, the compression rates are lower than MPEG, but this compression technique is commonly available in both hardware and software. Single chip implementations of JPEG are available that can perform real-time coding at rates of up to 100:1.

So in this project, maybe have to use MPEG compression compared to JPEG that is applied in Sanjay Kumar Udani project because he using JPEG compression for video capture image while this project using real-time video. Furthermore, he also concerns the usage of grayscale images and not real-time video content. He has his own criteria to

choose compression method, namely the compression type should be parameter able so that the user can select the desired compression or quality and the compression type should be well established the hardware should be commercially available

ii. The transport protocol, TCP and UDP

Based on Thomas Dreibholz (20 February, 2001) [2], the unreliable User Datagram Protocol and the reliable Transmission Control Protocol. These protocols are the most important protocols of the transport layer. Both contain endpoint identification using so called port numbers. The IP address identifies source and destination host, but the port number identifies the so called socket, which is the interface between an application and the transport layer.

UDP provides an unreliable, connection-less service comparable to sending and receiving raw IP packet plus the endpoint identification and a checksum for the complete UDP packet. The main usages for this protocol are multimedia transmissions, where fast transmission is more important than reliability. For example in an audio conference, lost or damaged packets causing a few noises are acceptable but it is not acceptable to wait for retransmissions which happen in TCP.

The reliable service provided by TCP is a connection-oriented and it need to establish a connection before data can be sent and to release it if the transmission is complete. This can be compared to a phone call where a connection is established by dialing a number and after transmission released by hanging up. TCP is also stream-oriented, that is an application on station A writes a number of bytes to the TCP socket, which is packaged by TCP into one or more packets. The application itself has no knowledge about this packaging. Station B receives the packets and reconstructs the original byte sequence which is then given to the application via the socket. Since lost packets are requested again, the transmission is reliable. Further, TCP does flow and