TELECONFERENCE SYSTEM

A PROJECT REPORT PRESENTED

BY

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CERTIFICATION

I Ominyi Victor, certify that this project, Teleconference, was wholly carried out by me and to the best of my knowledge and has not been submitted anywhere in partial fulfilment of the requirements for the award of a degree in any institution.

Sign:…… Date:……

DEDICATION

This work is dedicated to the Almighty God for his divine love, guidance and infinite mercies throughout my stay in school.

To my parents WO. and Mrs. Blessed Ominyi, for their love and support.

To my sisters, Obiageli, Veronica, Amaka and Rita and to my cousins Chinazor, Chinekwu, Ogochukwu, Mmesoma and also friends, Mr. Abubakar irhekohire, Chidozie Oguaghamba, Uchenna Francis, Emidun Kingsley, Ekpo Richard, Agha-okoro Nneka, Ugwuanyi Martha for their assistance and encouragement.

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To God Almighty, the author and finisher of all authorities, knowledge and powers, be the glory.

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TABLE OF CONTENT

CHAPTER THREE

System Analysis and Design

CHAPTER FOUR

Implementation ,Testing and Integration

CHAPTER FIVE

Summary, Recommendations, and Conclusion

ABSTRACT

This project topic, Teleconference System, is one of the state of the art invention and need of many organizations for purpose of reducing cost, risk and time wastage. This project strives to bridge the geographical

distance between two or more organization. Other importance of Teleconference includes: (i) For organizations, delivery costs are reduced with resultant cost benefit in terms of time, travelling and spread of resources over large groups. (ii) Delivery of full courses, lessons, tutoring, project work and training can be provided to the students through teleconferencing. The study outlines the main concepts of the analysis and design methodology of the proposed system, compares it to the existing and goes further to explain the design and implementation of the system. System was achieved using visual basic 6.0 and run on a windows xp or higher versions. The fact finding techniques employed is interview, observation, online and library research.

CHAPTER ONE

INTRODUCTION

1.1 Background

As computer and electronics technology continues to grow over the ages, many new innovations continue to flood the industry, creating machine and avenues through which human activities can be enhanced.

The development video messaging over media is an important aspect of this growth in technology. Such information was then able to be packaged and transmitted remotely from source to intended users. But this was rarely a real time scenario. The best we can get out of this was a live coverage of an event, which was usually of high cost and difficult for individuals to own.

The advent of the internet offered better opportunity for inventors to think of better ways of making the communication of video information from source to target in real time and with less cost. Many equipment have been developed to this effect. Further improvement has given birth to what is now known as teleconference.

The word **'tele'** means distance. The word '**conference**' means consultations, discussions. Through teleconferencing two or more locations situated at a distance are connected so that they can hear or both see and hear each other. It allows the distant sites to interact with each other and with the teaching end through phone, fax, and e-mail. The interactions

occur in real time. This means that the learners/participants and the resource persons are present at the same time in different locations and are able to communicate with each other. In some situations, questions can be faxed/e-mailed early for response by the resource persons

conference is further described by Matthew Lombard and Theresa Ditton as “an illusion that a mediated experience is not mediated." Today, it often considers the effect that people experience when they interact with a computer-mediated or computer-generated environment. The conceptualization of presence borrows from multiple fields including communication, computer science, psychology, science, engineering, philosophy, and the arts. The concept of presence accounts for a variety of computer applications and Web-based entertainment today that are developed on the fundamentals of the phenomenon, in order to give people the sense of, as Sheridan called it, “being there." Since teleconferencing is actually a useful tool in organizations because it is solely used to bridge the geographical distance between two or more companies, and from my research, I have discovered that it is only big companies that can actually afford it, so I designed this project inorder to

curb that trend that is allow smaller companies purchase and also make use of it.

1.2 Aims and Objectives

The major objective of this work is to develop a Computer Based Teleconference. It also targets at contributing to academic research work.

1.3 Justification for the project

The need for a teleconference system is obvious for several reasons as shown below:

a. It Impacts on education by allowing live participation without physically being present for a lecture
b. Legal issues can still be treated even when a person is not fit to go to court
c. Press men can attained international conferences without having to be physically present
d. Telemedicine is possible because of teleconference

e. It makes the best use of the available resources by expanding the learning opportunity and taking the resources to the learners.
f. It overcomes time or scheduling problems for the learners who can assemble at a learning center for a limited period only because of their full time or part time work, and family and community commitments.
g. It can be designed to meet local specific requirements of training in terms of content, language and conditions.
h. Training is of high quality and consistent. There is exposure to multiple perspectives from the primary sources, and therefore as the input from the resource persons is direct, there is little loss of quality in transaction.
i. There is greater appeal, motivation and retention of information as a variety of teaching methodologies are used.

1.4 Scope of the Project

The scope of this work will include the following

a. A dynamic Network system that can communicate in real time

b. To be able to implement a video streaming server.

c. Explore the power of visual basic in data handling

1.5 Project Report Organization

This report is organized into five chapters. The first chapter takes care of introduction: background, aims and objectives, justification, and scope of the project. Chapter two is the literature review. Chapter three is the project methodology, analysis, limitations of the existing system, system design, system flowchart and top down design were done. The input, processing and output modules are critically analyzed.

In chapter four, system implementation, testing and integration: choice of development tools, system requirements, and testing were carefully done. Finally chapter five closes up with summary, recommendations and conclusions: limitation, Bill of Engineering Measurement and Engineering (BEME), bibliography, appendices

CHAPTER TWO

LITERATURE REVIEW

2.1 General Overview of Teleconference

The word **'tele'** means distance. The word '**conference**' means consultations, discussions. Through teleconferencing two or more locations situated at a distance are connected so that they can hear or both see and hear each other. It allows the distant sites to interact with each other and with the teaching end through phone, fax, and e-mail. The interactions occur in real time. This means that the learners/participants and the resource persons are present at the same time in different locations and are able to communicate with each other. In some situations, questions can be faxed/e-mailed early for response by the resource persons

Three essential features of teleconferencing are :

Learners/participants present at particular time and in dispersed places

a.Resource persons present at the same time at the teaching end or different teaching ends.

Interactions between

b. Learner – resource persons/AV materials at the teaching end(s).

c. Learner – learner at the learner center

d. Learner – facilitator/materials/activities at the learner center

e. Learner – learner at/between other learner centers

f. Resource person – resource person.

The communication in teleconferencing is both vertical and horizontal, and the emphasis is on interaction at all levels. Meaningful interaction in real time is the strength of teleconferencing, and this sets it apart from other technologies used in education. The one-way limitation of educational broadcasting is overcome through the technology configuration.

Stimulating responses to visuals, situations, dialogue, discussion, sharing, active experimentation, project work, etc. encourage interactivity, resulting in different transactional processes such as:

a. Conceptualization
b. Concretization of experience
c. Reflective observation
d. Application

These and other transactional processes of this nature accelerate learning and Communication skills. Learning is systemized as it takes place in a structured teaching-learning environment.

Teleconferencing could have different technical configurations and applications. It includes use of telephone for audio conferencing, graphics

in addition to audio for audio-graphic conferencing, television and/or computer for video conferencing. The video conferencing could be one-way video two-way audio or two-way video. The configuration can be simple or complex. The presentation can be just talk/discussion or it can be highly structured using sophisticated visual support.

In today's terminology video conferencing and teleconferencing are similar as they function on the same pattern.

2.2 Historical Concept

The term teleconference was coined in a 1980 article by Marvin Minsky, who outlined his vision for an adapted version of the older concept of teleoperation that focused on giving the remote participation a feeling of actually being present.

A science fiction entitled Waldo by Robert A. Heinlein proposed a primitive teleconference master-slave manipulator system in 1942. In his pioneering paper, Minsky wrote: "My first vision of a remote-controlled economy came from Robert A. Heinlein's prophetic 1948 novel, Waldo." The year of the publication of Waldo in Minsky's comment in the paper was incorrect.

The Brother Assassin, written by Fred Saberhagen in 1969, introduced the complete concept for a teleconference master-slave humanoid system. In

the novel, the concept is described as follows: "And a moment later it seemed to all his senses that he had been transported from the master down into the body of the slave-unit standing beneath it on the floor. As the control of its movements passed over to him, the slave started gradually to lean to one side, and he moved its foot to maintain balance as naturally as he moved his own. Tilting back his head, he could look up through the slave's eyes to see the master-unit, with himself inside, maintaining the same attitude on its complex suspension."

The first commercially successful teleconference company, Teleport (which was later renamed TeleSuite), was founded in 1993 by David Allen and Harold Williams. Before TeleSuite, they ran a resort business from which the original concept emerged, because they often found businesspeople would have to cut their stays short to participate in important meetings. Their idea was to develop a technology that would allow businesspeople to attend their meetings without leaving the resorts so that they could lengthen their hotel stays.

Hilton Hotels had originally licensed to install them in their hotels throughout the United States and other countries, but use was low. The idea lost momentum, with Hilton eventually backing out. TeleSuite later

began to focus less on the hospitality industry and more on business-oriented teleconference systems. Shareholders eventually held enough stock to replace the company's original leadership, which ultimately led to its collapse. David Allen purchased all of the assets of TeleSuite and appointed Scott Allen as president of the new company called Destiny Conferencing.

Destiny Conferencing licensed its patent portfolio to HP which became the first large company to join the teleconference industry, soon followed by others such as Cisco and Polycom. After forming a distribution agreement with Pleasanton-based Polycom, Destiny Conferencing sold on January 5, 2007 to Polycom for $60 million.

An important research project in teleconference began in 1990. Headquartered at the University of Toronto, the Ontario Teleconference Project "was a three year, $4.8 million pre-competitive research project whose mandate was to design and field trial advanced media space systems in a variety of workplaces in order to gain insights into key sociological and engineering issues. The OTP, which ended December, 1994, was part of the International Teleconference Project which linked Ontario researchers to counterparts in four European nations. The Project’s

major sponsor was the Province of Ontario through two of its Centres of Excellence—the Information Technology Research Centre (ITRC) and the Telecommunications Research Institute of Ontario (TRIO)." (quoting from the project's final report[4]) The Project was an interdisciplinary effort involving social sciences and engineering.

2.3 Related Technologies

2.3.1 Video calls and Video Conferencing

Videophone calls (also: videocalls and video chat), differ from videoconferencing in that they expect to serve individuals, not groups.[13] However that distinction has become increasingly blurred with technology improvements such as increased bandwidth and sophisticated software clients that can allow for multiple parties on a call. In general everyday usage the term videoconferencing is now frequently used instead of videocall for point-to-point calls between two units. Both videophone calls and videoconferencing are also now commonly referred to as a video link.

Webcams are popular, relatively low cost devices which can provide live video and audio streams via personal computers, and can be used with many software clients for both video calls and videoconferencing.

A videoconference system is generally higher cost than a videophone and deploys greater capabilities. A videoconference (also known as a video teleconference) allows two or more locations to communicate via live, simultaneous two-way video and audio transmissions. This is often accomplished by the use of a multipoint control unit (a centralized distribution and call management system) or by a similar non-centralized multipoint capability embedded in each videoconferencing unit. Again, technology improvements have circumvented traditional definitions by allowing multiple party videoconferencing via web-based applications. A separate webpage article is devoted to videoconferencing.

A **teleconference system** is a high-end videoconferencing system and service usually employed by enterprise-level corporate offices. Teleconference conference rooms use state-of-the art room designs, video cameras, displays, sound-systems and processors, coupled with high-to-very-high capacity bandwidth transmissions.

Typical use of the various technologies described above include calling or conferencing on a one-on-one, one-to-many or many-to-many basis for personal, business, educational, deaf Video Relay Service and tele-medical, diagnostic and rehabilitative use or services. New services utilizing

videocalling and videoconferencing, such as teachers and psychologists conducting online sessions, personal videocalls to inmates incarcerated in penitentiaries, and videoconferencing to resolve airline engineering issues at maintenance facilities, are being created or evolving on an on-going basis.

2.3.2 Virtual presence (virtual reality)

Teleconference refers to a user interacting with another live, real place, and is distinct from virtual presence, where the user is given the impression of being in a simulated environment. Teleconference and virtual presence rely on similar user-interface equipment, and they share the common feature that the relevant portions of the user's experience at some point in the process will be transmitted in an abstract (usually digital) representation. The main functional difference is the entity on the other end: a real environment in the case of teleconference, versus a computer in the case of immersive virtual reality.

2.3.3 The cooperative web

The Cooperative web or Co-Web refers to a browser-based platform that promises to replicate the power of face-to-face communications via web-

touch without sacrificing the quality of human interactions, using the human sensory elements of vision, sound and manipulation.

2.4 Applications

Application examples could be cited within emergency management and security services, hospitals, government and education industries.

2.4.1 Connecting communities

Teleconference can be used to establish a sense of shared presence or shared space among geographically separated members of a group. Teleconferencing is essentially a means for communication and training. It can be used for information dissemination, guidance in response to policy, consultations with experts, focused group discussions, interviews, etc.

As a Technology, it has broad applications in education, training and development, business/corporate communication, governance and professional and medical courses/services.

2.4.2 Education

In the academic area, teleconferencing is useful for the following activities:

a. Delivery of full courses, lessons, tutoring, project work and training can be provided to the students through teleconferencing,
b. Delivery of certificate level courses for professional development. These courses can be modular and multi-media in nature comprising print, contact programs, and audio-video conferencing.
c. Partial support to courses through counseling, etc.
d. Introduction of short/new courses in skill development, vocational training, professional development, and to address problems related to introduction of new curriculum, and lack of teachers and facilities.
e. Tutoring in difficult areas of the curriculum.
f. Remedial learning and off-hours teaching can be provided.
i. Enrichment, updating, guidance to additional learning resources, extension of existing courses.
j. Interaction by students with scientists, experts, decision and policy makers, etc. to obtain multiple perspectives on an issue.

Apart from academic activities, teleconferencing is used for administrative matters such as:

k. Problems solving and counseling on admissions, examination, status of courseware materials distribution, Guidance and advice on course content, expectations, assignments, grading, credits, etc.

2.4.3 Training and Development

Teleconferencing is used to provide training and staff development for capacity building in agriculture, health, nutrition, family welfare, etc. in remote rural areas.

It reaches out to a large number of groups such as community workers, farmers, functionaries, etc. for extension activities, sharing of experiences, raising of issues, introducing government schemes, projects, mobilizing for activities and conducting campaigns.

2.4.4 Teleconferencing Technology

Education and Training

Teleconferencing has been effectively used for empowerment of women and local self-government bodies and training of grass root workers spread over large geographical areas.

2.4.5 Business and Corporate Communication

In the business and corporate sector, teleconferencing has been used for a variety of purposes such as organizing conferences, interviews for recruitment, project supervision, problem solving, consultations, information dissemination and training of the personnel. Education, training, instruction, information and counseling are merged resulting in an overall improvement in staff performance.

2.4.6 Governance

Using teleconferencing facilities, planners, administrators and executives can directly and simultaneously interact with people at all levels for speedy dissemination of policy, execution and monitoring the implementation of projects, problem solving, and providing expert consultations.

2.4.7 Professional and Medicinal Courses and Services

Medicine is an area in which teleconferencing is being increasingly used. Hospitals can provide medical services to remote areas with expert diagnosis and medical advice. Similarly, many professional training institutes are using the teleconferencing mode to provide quality teaching support to widely dispersed student community

2.4.8 21st century improvements

Significant improvements in video call quality of service for the deaf occurred in the United States in 2003 when Sorenson Media Inc. (formerly Sorenson Vision Inc.), a video compression software coding company, developed its VP-100 model stand-alone videophone specifically for the deaf community. It was designed to output its video to the user's television in order to lower the cost of acquisition, and to offer remote control and a powerful video compression codec for unequaled video quality and ease of use with video relay services. Favorable reviews quickly led to its popular usage at educational facilities for the deaf, and from there to the greater deaf community.

Coupled with similar high-quality videophones introduced by other electronics manufacturers, the availability of high speed Internet, and sponsored video relay services authorized by the U.S. Federal Communications Commission in 2002, VRS services for the deaf underwent rapid growth in that country.

2.4.9 Present day usage

Using such video equipment in the present day, the deaf, hard-of-hearing and speech-impaired can communicate between themselves and with

hearing individuals using sign language. The United States and several other countries compensate companies to provide "Video Relay Services" (VRS). Telecommunication equipment can be used to talk to others via a sign language interpreter, who uses a conventional telephone at the same time to communicate with the deaf person's party. Video equipment is also used to do on-site sign language translation via Video Remote Interpreting (VRI). The relative low cost and widespread availability of 3G mobile phone technology with video calling capabilities have given deaf and speech-impaired users a greater ability to communicate with the same ease as others. Some wireless operators have even started free sign language gateways.

Sign language interpretation services via VRS or by VRI are useful in the present-day where one of the parties is deaf, hard-of-hearing or speech-impaired (mute). In such cases the interpretation flow is normally within the same principal language, such as French Sign Language (LSF) to spoken French, Spanish Sign Language (LSE) to spoken Spanish, British Sign Language (BSL) to spoken English, and American Sign Language (ASL) also to spoken English (since BSL and ASL are completely distinct to each other), and so on.

Multilingual sign language interpreters, who can also translate as well across principal languages (such as to and from SSL, to and from spoken English), are also available, albeit less frequently. Such activities involve considerable effort on the part of the translator, since sign languages are distinct natural languages with their own construction, semantics and syntax, different from the aural version of the same principal language.

With video interpreting, sign language interpreters work remotely with live video and audio feeds, so that the interpreter can see the deaf or mute party, and converse with the hearing party, and vice versa. Much like telephone interpreting, video interpreting can be used for situations in which no on-site interpreters are available. However, video interpreting cannot be used for situations in which all parties are speaking via telephone alone. VRS and VRI interpretation requires all parties to have the necessary equipment. Some advanced equipment enables interpreters to control the video camera remotely, in order to zoom in and out or to point the camera toward the party that is signing.

2.5 Education

Research has been conducted on the use of teleconference to provide professional development to teachers. Research has shown that one of the

most effective forms of teacher professional development is coaching, or cognitive apprenticeship. The application of teleconference shows promise for making this approach to teacher professional development practical.

The benefits of enabling schoolchildren to take an active part in exploration have also been shown by the JASON and the NASA Ames Research Center programs. The ability of a pupil, student, or researcher to explore an otherwise inaccessible location is a very attractive proposition; For example, locations where the passage of too many people is harming the immediate environment or the artifacts themselves, e.g. undersea exploration of coral reefs, ancient Egyptian tombs, and more recent works of art.

2.5.1 Teleconference Art

True teleconference is a multidisciplinary art and science that foundationally integrates engineering, psychology, and the art of television broadcast.

In 1998, Diller and Scofidio created the "Refresh", an Internet-based art installation that juxtaposed a live web camera with recorded videos staged by professional actors. Each image was accompanied with a fictional

narrative which made it difficult to distinguish which was the live web camera.

In 1993, Eduardo Kac and Ed Bennett created a teleconference installation "Ornitorrinco on the Moon", for the international telecommunication arts festival "Blurred Boundaries" (Entgrenzte Grenzen II). It was coordinated by Kulturdata, in Graz, Austria, and was connected around the world.

From 1997 to the present Ghislaine Boddington of shinkansen and has explored, in a multi group process called The Weave using performing arts techniques, the extended us of teleconference into festivals, arts centres and clubs and has directed numerous workshops leading to exploration of teleconference by many artists worldwide. This work has been most recently applied to extending skills in tele-intuition for young people in preparation for the future world of work through the NESTA project "Robots and Avatars" an innovative project explores how young people will work and play with new representational forms of themselves and others in virtual and physical life in the next 10–15 years.

2.5.2 Teleconference and artificial intelligence

Marvin Minsky was one of the pioneers of intelligence-based mechanical robotics and teleconference. He designed and built some of the first

mechanical hands with tactile sensors, visual scanners, and their software and computer interfaces. He also influenced many robotic projects outside of MIT, and designed and built the first LOGO "turtle."

CHAPTER THREE

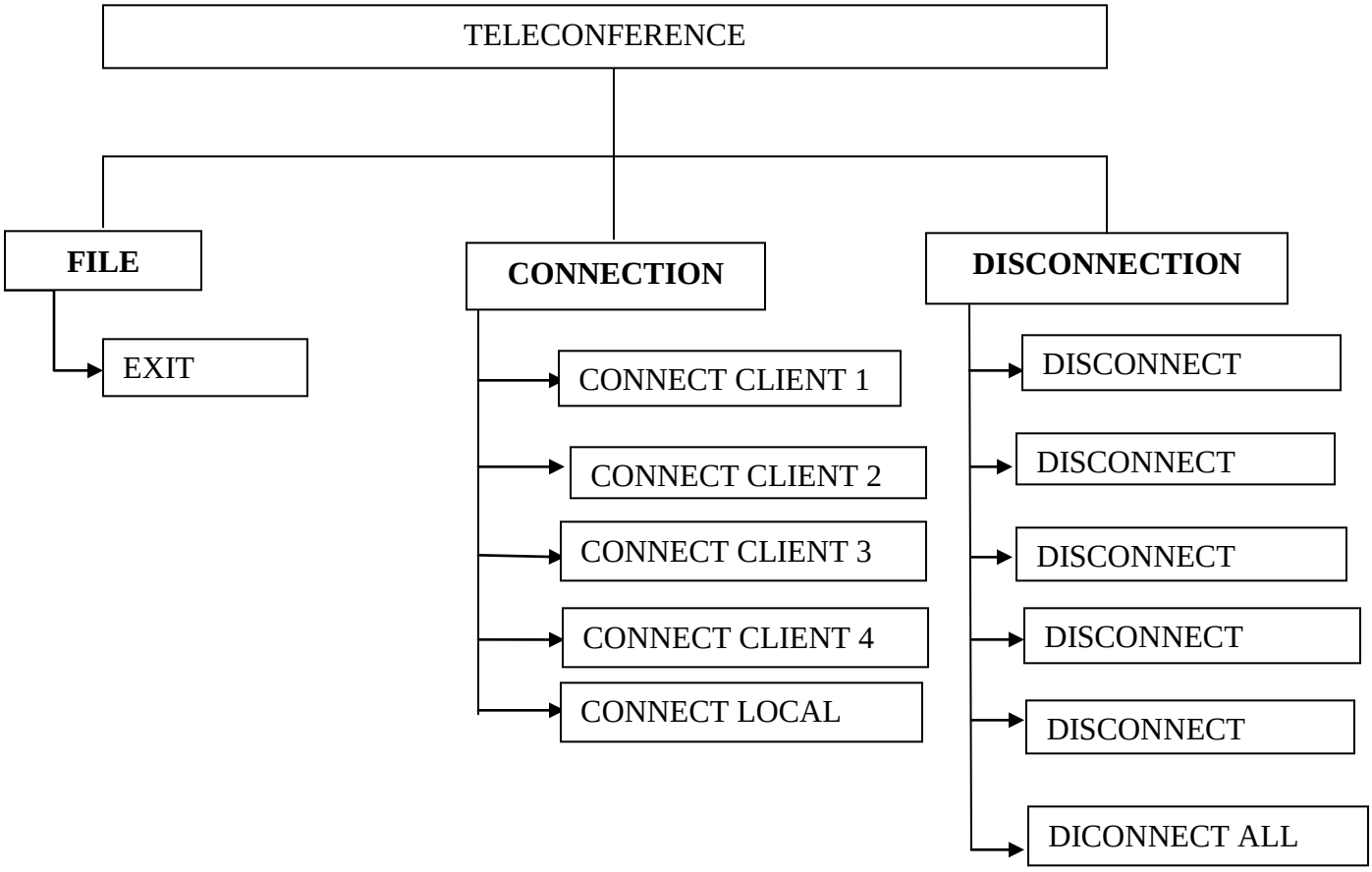
SYSTEM ANALYSIS AND DESIGN

3.1 Methodology

This is usually a guideline system for solving a problem with specific components such as phases, tasks, methods, techniques and tools.

It involves the specification of procedures for collecting and analyzing data necessary to define or solve the problem for which the research is embarked upon.

TOP DOWN DESIGN



Here, connection provides a drop down menu where different clients including the host can connect to each other. Unlike connection, disconnection provides a drop down menu where the different clients including the host can disconnect from each other

3.2 Data Collection

This project was achieved by gathering materials from different sources. One of the invaluable sources of data was oral interview, which I conducted with stake holders in industries and prospective users of similar systems.

Another source that gave me a wealth of information was the internet, which provided some of the details used to analyze some key issues. Several web sites were willing to let go vital information on teleconference. The state and federal library were also resourceful in these achievements.

3.3 Analysis of the Existing System

Telepresence has long existed as video conferencing. The core technology used in a videoconferencing system is digital compression of audio and video streams in real time. The hardware or software that performs compression is called a codec (coder/decoder). Compression rates of up to 1:500 can be achieved. The resulting digital stream of 1s and 0s is

subdivided into labeled packets, which are then transmitted through a digital network of some kind (usually ISDN or IP). The use of audio modems in the transmission line allow for the use of POTS, or the Plain Old Telephone System, in some low-speed applications, such as videotelephony, because they convert the digital pulses to/from analog waves in the audio spectrum range.

The other components required for a videoconferencing system include:

- **Video input** : video camera or webcam
- **Video output**: computer monitor , television or projector
- **Audio input**: microphones, CD/DVD player, cassette player, or any other source of PreAmp audio outlet.
- **Audio output**: usually loudspeakers associated with the display device or telephone
- **Data transfer**: analog or digital telephone network, LAN or Internet
- **Computer**: a data processing unit that ties together the other components, does the compressing and decompressing, and initiates and maintains the data linkage via the network.

There are basically two kinds of videoconferencing systems:

2. **Dedicated systems** have all required components packaged into a single piece of equipment, usually a console with a high quality remote controlled video camera. These cameras can be controlled at a distance to pan left and right, tilt up and down, and zoom. They became known as PTZ(Pan-Tilt-Zoom) cameras. The console contains all electrical interfaces, the control computer, and the software or hardware-based codec. Omnidirectional microphones are connected to the console, as well as a TV monitor with loudspeakers and/or a video projector. There are several types of dedicated videoconferencing devices:
    a. Large group videoconferencing are non-portable, large, more expensive devices used for large rooms and auditoriums.
    b. Small group videoconferencing are non-portable or portable, smaller, less expensive devices used for small meeting rooms.
    c. Individual videoconferencing are usually portable devices, meant for single users, have fixed cameras, microphones and loudspeakers integrated into the console.

3. **Desktop systems** are add-ons (hardware boards, usually) to normal PCs, transforming them into videoconferencing devices. A range

of different cameras and microphones can be used with the board, which contains the necessary codec and transmission interfaces. Most of the desktops systems work with the H.323 standard. Videoconferences carried out via dispersed PCs are also known as e-meetings.

3.3.1 Conferencing layers

The components within a Conferencing System can be divided up into several different layers: User Interface, Conference Control, Control or Signal Plane and Media Plane.

Video Conferencing User Interfaces could either be graphical or voice responsive. Many of us have encountered both types of interfaces, normally we encounter graphical interfaces on the computer or television, and Voice Responsive we normally get on the phone, where we are told to select a number of choices by either saying it or pressing a number. User interfaces for conferencing have a number of different uses; it could be used for scheduling, setup, and making the call. Through the User Interface the administrator is able to control the other three layers of the system.

Conference Control performs resource allocation, management and routing. This layer along with the User Interface creates meetings (scheduled or unscheduled) or adds and removes participants from a conference.

Control (Signaling) Plane contains the stacks that signal different endpoints to create a call and/or a conference. Signals can be, but aren't limited to, H.323 and Session Initiation Protocol (SIP) Protocols. These signals control incoming and outgoing connections as well as session parameters.

The Media Plane controls the audio and video mixing and streaming. This layer manages Real-Time Transport Protocols, User Datagram Packets (UDP) and Real-Time Transport Control Protocols (RTCP). The RTCP and UDP normally carry information such the payload type which is the type of codec, frame rate, video size and many others. RTCP on the other hand acts as a quality control Protocol for detecting errors during streaming.

3.3.2 Multipoint videoconferencing

Simultaneous videoconferencing among three or more remote points is possible by means of a Multipoint Control Unit (MCU). This is a bridge that interconnects calls from several sources (in a similar way to the audio conference call). All parties call the MCU unit, or the MCU unit can also call the parties which are going to participate, in

sequence. There are MCU bridges for IP(Internet Protocol) and ISDN-based videoconferencing(Integrated Services Digital Network). There are MCUs which are pure software, and others which are a combination of hardware and software. An MCU is characterized according to the number of simultaneous calls it can handle, its ability to conduct transposing of data rates and protocols, and features such as Continuous Presence, in which multiple parties can be seen on-screen at once. MCUs can be stand-alone hardware devices, or they can be embedded into dedicated videoconferencing units.

The MCU consists of two logical components:

a. A single multipoint controller (MC), and
b. Multipoint Processors (MP), sometimes referred to as the mixer.

The MC controls the conferencing while it is active on the signaling plane, which is simply where the system manages conferencing creation, endpoint signaling and in-conferencing controls. This component negotiates parameters with every endpoint in the network and controls conferencing resources While the MC controls resources and signaling negotiations, the MP operates on the media plane and receives media from each endpoint.

The MP generates output streams from each endpoint and redirects the information to other endpoints in the conference.

Some systems are capable of multipoint conferencing with no MCU, stand-alone, embedded or otherwise. These use a standards-based H.323 technique known as "decentralized multipoint", where each station in a multipoint call exchanges video and audio directly with the other stations with no central "manager" or other bottleneck. The advantages of this technique are that the video and audio will generally be of higher quality because they don't have to be relayed through a central point. Also, users can make ad-hoc multipoint calls without any concern for the availability or control of an MCU. This added convenience and quality comes at the expense of some increased network bandwidth, because every station must transmit to every other station directly.

3.3.3 Videoconferencing modes

Videoconferencing systems have several common operating modes that are used:

a. Voice-Activated Switch (VAS);

b. Continuous Presence.

In VAS mode, the MCU switches which endpoint can be seen by the other endpoints by the levels of one's voice. If there are four people in a conference, the only one that will be seen in the conference is the site which is talking; the location with the loudest voice will be seen by the other participants.

Continuous Presence mode display multiple participants at the same time. The MP in this mode puts together the streams from the different endpoints and puts them all together into a single video image. In this mode, the MCU normally sends the same type of images to all participants. Typically these types of images are called "layouts" and can vary depending on the number of participants in a conference.

3.3.4 Echo cancellation

A fundamental feature of professional videoconferencing systems is Acoustic Echo Cancellation (AEC). Echo can be defined as the reflected source wave interference with new wave created by source. AEC is an algorithm which is able to detect when sounds or utterances reenter the audio input of the videoconferencing codec, which came from the audio output of the same system, after some time delay. If unchecked, this can lead to several problems including:

a. the remote party hearing their own voice coming back at them (usually significantly delayed)
b. strong reverberation, rendering the voice channel useless as it becomes hard to understand and
c. howling created by feedback. Echo cancellation is a processor-intensive task that usually works over a narrow range of sound delays.

3.4 Limitations of the Existing System

Some observers argue that three outstanding issues have prevented videoconferencing from becoming a standard form of communication, despite the ubiquity of videoconferencing-capable systems. These issues are:

1. **Eye Contact:** Eye contact plays a large role in conversational turn-taking, perceived attention and intent, and other aspects of group communication. While traditional telephone conversations give no eye contact cues, many videoconferencing systems are arguably worse in that they provide an incorrect impression that the remote interlocutor is avoiding eye contact. Some teleconference systems have cameras located in the screens that

reduce the amount of parallax observed by the users. This issue is also being addressed through research that generates a synthetic image with eye contact using stereo reconstruction. Telcordia Technologies, formerly Bell Communications Research, owns a patent for eye-to-eye videoconferencing using rear projection screens with the video camera behind it, evolved from a 1960s U.S. military system that provided videoconferencing services between the White House and various other government and military facilities. This technique eliminates the need for special cameras or image processing.

2. **Appearance Consciousness:** A second psychological problem with videoconferencing is being on camera, with the video stream possibly even being recorded. The burden of presenting an acceptable on-screen appearance is not present in audio-only communication. Early studies by Alphonse Chapanis found that the addition of video actually impaired communication, possibly because of the consciousness of being on camera.
3. **Signal latency**: The information transport of digital signals in many steps need time. In a telecommunicated conversation, an

increased latency larger than about 150–300 ms becomes noticeable and is soon observed as unnatural and distracting. Therefore, next to a **stable large bandwidth**, a small total round-trip time is another major technical requirement for the communication channel for interactive videoconferencing.

3.5 System Design

This is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements.

The design and analysis conducted were divided into four sections. These are:

a. User Interface

b. Output interface

3.5.1 Input Interface Design

The system allows users to log-in with their ip - address and port number. The input from therefore was design to accommodate keyboard input with a few command buttons that allows the user to click for certain instructions to execute.

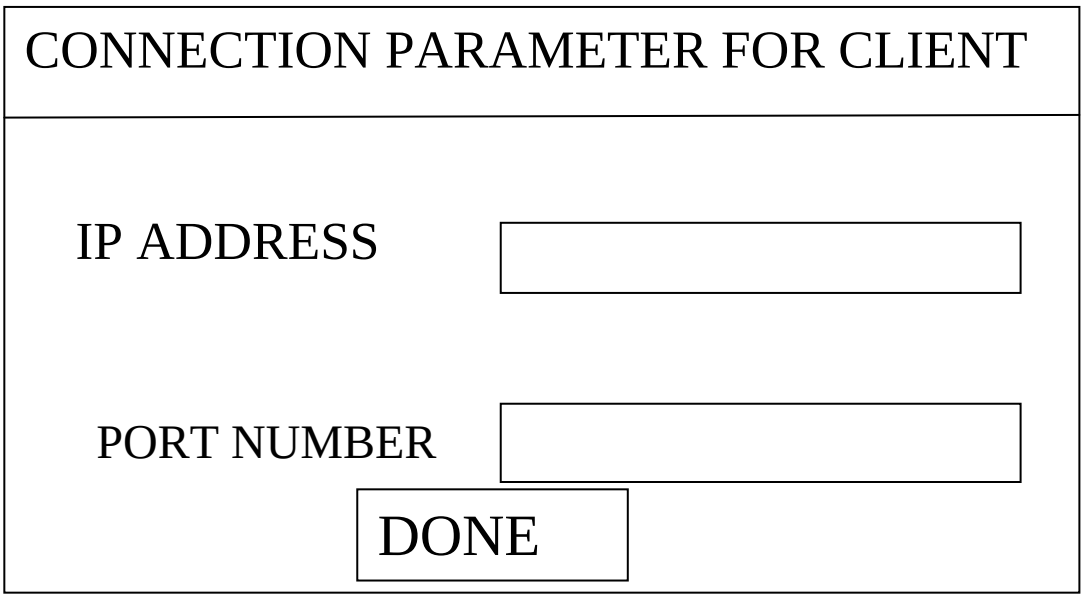


Figure 3.1 INPUT INTERFACE DESIGN

3.5.2 Output Form

The output interface was designed to allow the participants in the teleconference system to see the video images of each other as well as hear the voices of one another over the network. Therefore the design must be able to contain the tools that facilitate these.

The design utilized the windows media tool and a link that is able to communicate with the streaming server.

The form has five video units for five participants. This means that a maximum of five users can make use of this system a

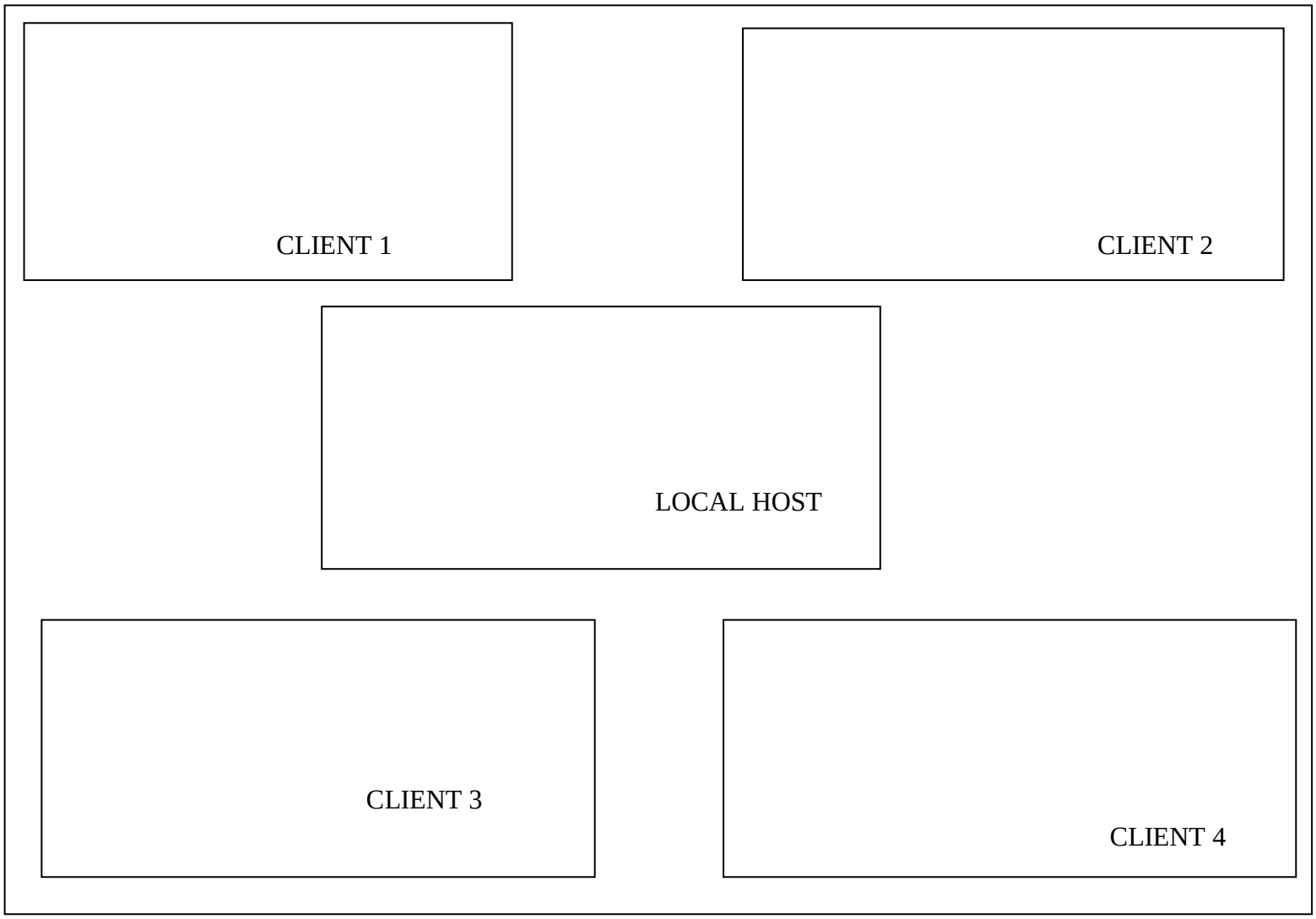
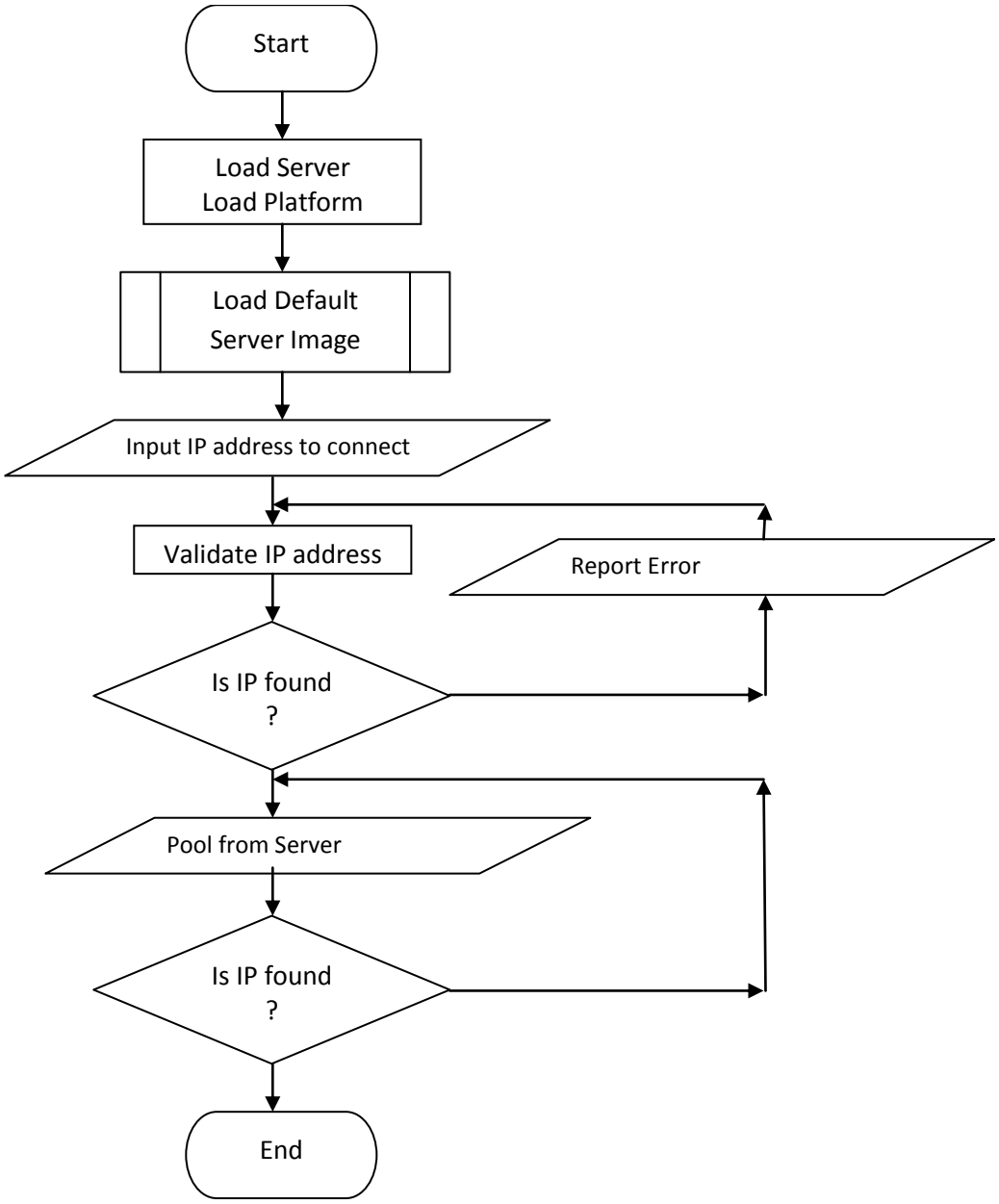


Figure 3.2 OUTPUT INTERFACE DESIGN

Figure 3.3 Program Flow Chart



This is the flowchart of the program, it shows the different stages involved in the operation of the program. The organization of the program flowchart above describes the directional path in which the teleconference

application is executed. Firstly, the server setup is started in which the server application is configured then the teleconference application is also launched. The various clients now inputs their unique ip address in the field provided and it is in turn validated by the server, the server will then pool the image and voice required for communication. A user may decide to leave the conference by automatically disconnecting itself from the server.

CHAPTER FOUR

IMPLEMENTATION, TESTING AND INTEGRATION OF THE NEW SYSTEM

4.1 Choice of development tool

The programming language deployed in the implementation of this system was visual basic version 6.0. This choice was informed by its flexibility and most availability. Visual basic 6.0 provides the required tools that will be used to transmit information across a network.

4.2 System Requirement

This involves technical facts about my project. They are divided into 3 subheadings:

4.2.1. software requirement: the system must run on

a. window XP or higher versions

b. video streaming server and visual basic 6.0 must be installed

4.2.2 Hardware requirement: The system must have the following:

a. HDD size should be at least 2GB

b. Ram size is 128mb and above

c. Audio sound card

d. CD-ROM

e. high quality VGA

f. Network capability

g. Web camera

h. Sound speakers

i. Microphone.

Here all the input and output are design to use the basic input and output devices such as mouse, and keyboard.

4.3 Implementation

This is the realization of an application or execution of a plan, idea, model, design, specification, standard, algorithm or policy.

The new system is designed to be put into efficient use. Here, we will look into the various technical aspects that influenced the successful implementation of this system and determine the effective operation of the system. System implementation follows the approval of the system proposals and its objectives, thus it is to arrive at a satisfactory, implemented, completed, and function evaluated automated system. It also embodies the preparation of resources including equipment's and personnel.

Before communication can take, the users must be on the same network and they must all have each others unique ip address which will serve as their phone number. The first user to start up the connection is automatically the host and other users that will connect to the host are called the clients, a client can connect to a host by automatically entering the hosts ip address and port number in the field provided.

4.4 system testing

Testing presents an interesting anomaly for the software engineer where he attempts to build software from an abstract concept to a tangible product. During testing, the engineer creates series of test cases to discard preconceived notions of the "correctness" of software just developed and overcome a conflict of interest that occur when errors are uncovered. As a secondary benefit, testing demonstrates that the software functions appear to be working according to specification, that behavioral and performance requirements appear to have been met. In addition, data collected as testing is conducted provide a good indication of software reliability and quality as a whole.

Testing should begin "in the small" and progress toward testing "in the large". 80 percent of all errors uncovered during testing will likely be

traceable to 20 percent of all program components. The components would be isolated and thoroughly tested. Testing ensures that internal operations are performed according to specifications and all internal components have been adequately exercised. The type of testing carried out was unit testing which involves testing the various modules separately

TABLE 4.1 UNIT TESTING

THE TEST DATA	EXPECTED TESTED RESULT	ACTUAL TEST RESULT
Main form	Expected to see the five(5) screens immediately the software is run	When the software runs, five screens would appear where the clients and local host can see and communicate with each other
Client input parameter form	Contains the ip address field where clients and hosts can type in their unique system ip address and also port number field where they can also type in their port numbers	After the clients and host have finished typing their unique ip address and port number, the connection is automatically established

4.4.3 Integration

System integration is the successful putting together of the various components, assemblies, and subsystems of a system and having them work together to perform what the system was intended to do. After successfully designing the input and output module and testing them to make sure that they are working properly, the modules were merged together to make up the complete system. Integration follows the coding phase in the development life cycle, as shown in below and is intertwined with the testing.

Figure4.1: Integration's Place in the Development Life Cycle

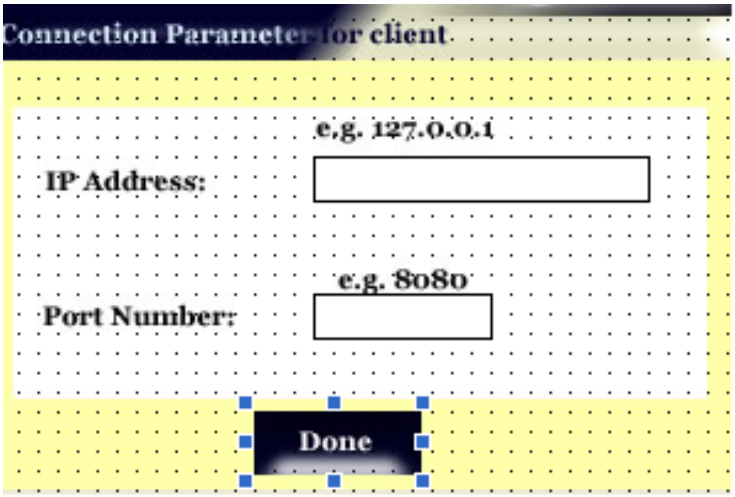


Figure 4.2 Input Form

Figure 4.3 Output Interface

CHAPTER FIVE

SUMMARY, RECOMMENDATION AND CONCLUSION

5.1 Summary of findings

I am glad to have finished such a project although a lot of problems were encountered during the design and implementation phase, it seemed to be worth it because it turned out to be an opportunity to do some thing of that magnitude and complexity, which of cause, has exposed and taken me deep into programming especially with the use of Visual Basic Programming language and all of the wonderful features it has to offer. This project has been a challenging and fulfilling one because it took me much time and effort to develop and the final output proved it to be worth it. Today, with the internet in place, organizations can now hook up to their websites and get a teleconference system without the hug cost of installing necessary equipment for this.

5.2 Limitations of the project

The achievements mentioned above were however not without its attendant challenges. These are as follow:

Difficulty in gathering the necessary materials: These was really challenge for me, It was difficult to get the much-needed information on which to implement this project. Most business outfits seem to be too busy and reluctant to attend to my request of getting relevant information. My suggestion is that the school authorities should assist student who experience such setbacks in their project design by way of organizing a forum where such problem can be discussed with the cross section of the public.

Unsteady power supply: There was continuous power failure most time especially during the implementation stages of the project. Although this is more or less a common problem in this country, its negative impact becomes more apparent, unbearable and crippling when you are working against time. Power Holding Company should do a better job by ensuring that there is at least a fairly steady power supply.

Time and money spent: An appreciable amount of time and money was spent browsing the internet to get more additional information that would facilitates the smooth implementation of the project.

5.3 Recommendations

Project design and implementation is a continuous process; this is the same in computer and software development. However, I recommend this teleconference system for all schools, hospitals, financial institutions and other industries. This system will be useful since it is computerized and will promote effective, efficient and improved service delivery, thereby promoting profit oriented activities and save time and transportation cost.

5.4 Bill of Engineering Measurement and Engineering (BEME)

ITEM	ITEM PRICE(₦)
COMPACT DISK	400
MODEM	6000
TRANSPORT	2000
VB 6 TRAINING	10,000.00
MISCELLANEOUS	2,000.00
COMPUTER SYSTEM	70,000.00
PRINTING	2,000.00
BINDING	500.00
TOTAL	92,900.00

5.5 Conclusion

Computerization of a video conference is an important aspect to consider in the live of every organization. A situation where meetings and other crucial gatherings such as conference, lectures media briefing and others can be actualized by a single click of the mouse is not just interesting but a sought after. This work has contributed in the development of computer based Teleconference system. A working model of the work was submitted alongside this report.

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APPENDIX A

SOURCE CODE

CLIENT INPUT SOURCE CODE

```
ipAddress = txtIp.Text

port = txtPort.Text

If clientNo = 1 Then

   Call Form1.connection1(ipAddress, port)

ElseIf clientNo = 2 Then

Call Form1.connection2(ipAddress, port)

ElseIf clientNo = 3 Then

Call Form1.connection3(ipAddress, port)

ElseIf clientNo = 4 Then

Call Form1.connection4(ipAddress, port)

ElseIf clientNo = 0 Then
```

OUTPUT SOURCE CODE

```
Public Sub connection1(ip As String, port As String)

client1.URL = "http://" + ip + ":" + port


End Sub

Public Sub connection2(ip As String, port As String)
```

```
client2.URL = "http://" + ip + ":" + port


End Sub

Public Sub connection3(ip As String, port As String)

client3.URL = "http://" + ip + ":" + port


End Sub

Public Sub connection2(ip As String, port As String)

Client4.URL = "http://" + ip + ":" + port
```

APPENDIX B

USER GUIDE

CONNECTION

1 The intended systems for the teleconference must all be connected wirelessly

2. The server software should be launched and configured, select pull from server when asked to choose the type of service, then click next all through the configuration

3. After configuring the server, you can click on the "start encoding" button to begin encoding.

4. You launch the main teleconference application and automatically your voice and image are transferred to the "local host" screen (the middle screen)

5. The other systems (clients) will then click on the "connection" button where they will be needed to provide their various ip addresses and port number

6. The host will now accept their connection by also entering the ip address and port number of all the clients in the connection field provided.

7. Automatically, voice and images of the clients and host will appear on their various screens and they can start charting.

DICONNECTION

1. Click on the disconnection button and you will get a drop down menu of all the connected clients and host.
2. If for example you are client 1, simply select "disconnect client 1" from the options provided and you are automatically disconnected from the conference
3. Finally, go back to your server application and click on the "stop encoding button".