
UNIT 2 APPLICATIONS OF MULTIMEDIA

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2.0 INTRODUCTION

In the First unit of this block, we have discussed about the digital multimedia system technology that is, hardware and software for multimedia. We have also presented, in brief, the development methodology for multimedia packages, and given you hints about the applications of multimedia. The multimedia technology as a standalone technology is quite useful, however, the use of multimedia system is only partial if we do not integrate it with communication technology. The integration of multimedia and communication technology have resulted in bringing down the geographical distances.

In this unit, we will present various scenario where multimedia technology is used along with communication technology to form powerful applications. Please note that all the applications mentioned in this unit involves multimedia. However, you may find many similar kind of application which do not use multimedia technology.

In fact, boundary between multimedia and non-multimedia products is getting blurred and will cease to exist in near future become then all the applications will have multimedia facility. We have not covered all the applications of multimedia in this unit, only a representative sample is presented.

2.1 OBJECTIVES

After going through this unit, you will be able to:

- define the term collaboration;
- define various utilities provided on networked multimedia system;
- define the multimedia facilities needed by business and distributed learning environments; and
- propose new multimedia applications based on the examples presented.

2.2 APPLICATION AREAS FOR MULTIMEDIA

With the advancement of technology many applications are evident for the multimedia technology. The advancement of technology have opened up newer fields for the application development. One such fields which is having tremendous potential and falls under the broad perview of multimedia is virtual reality, may be the tool of tomorrow. Today, virtual reality is primarily used in applications in entertainment industry but is going to be very useful tool for performing simulative, remote control applications. Virtual reality will have a tremendous impact on on-job training sector. In the following sections we will present a broad categorisation of multimedia applications.

2.2.1 Entertainment

The entertainment industry has used this technology the most to create real life like games. Several developers have used graphics, sound, animation of multimedia to create variety of games. The special technologies such as virtual reality have made these game just like experiences of real life. Our such example is flight simulator which creates a real-life imaging.

Many multimedia games are now available on computers. The children can enjoy these experiences, for example, they can drive cars of different variety, fly aircraft, play any musical instrument, play golf etc.

2.2.2 Edutainment

Edutainment is nothing but educational entertainment. Many computer games with focus on education are now available. A simple example, in this case is an educational game which plays various rhymes for little kids. In addition to playing rhymes, the child can paint the pictures, increase reduce size of various objects etc. Similarly many other edutainment packages which provide a lot of detailed information to kids are available. Microsoft has produced many such CD- based multimedia such as Sierra, Knowledge Adventure etc. which in addition to play provide some sort of learning component. The latest in this series is a package which teaches about the computer using games playing.

2.2.3 Business Communications

Multimedia is a very powerful tool for enhancing the quality of business communications. The business communications such as employee related communications, product promotions, customer information and reports for investors can be presented in multimedia form. All these business communications are required to be structured such that a formal level of content structure exist in the communication.

Other common business application involving multimedia requires access to database of multimedia information about a company. The multimedia technology of today can easily support this application as natural language enquiry systems do exist for making queries.

2.2.4 Knowledge Transfer

This kind of application involve transmission of a piece of information with the maximum impact, that is, the transfer of information in such a fashion that it facilitates the retention. This application is meant for academia and business both.

In academies, the knowledge transfer is used as the building block, whereas, in business it is the effective transfer of information which might be essential for the survival of a business. Multimedia based teaching is gaining momentum and will become a powerful teaching aid in the near future. Multimedia is one of the best ways to provide short term training to the workers in a business house. It gives lot of flexibility in providing training.

2.2.5 Public Access

Public Access is an area of application where many multimedia applications will soon be available. One such application may be the tourist information system, where a person who wants to go for a sight seeing trip may have the glimpse of places he has selected for visiting. Using Multimedia. many such applications may be developed providing a repository of information. For example, for a very simple public information, that is, the Railway Time table enquiry, a multimedia based system may not only display the trains and time but also the route map of the destination from the source you have desired.

In the subsequent sections we will discuss many applications of multimedia technology in several important areas.

2.3 PUBLISHING INDUSTRY AND MULTIMEDIA

The publishing industry can be classified according to the market it caters for. One of the classification is based on the information which is presented in published text, for example; a publication may be for reference purposes or archival purposes or tutorials. It can also be grouped on the basis of the community for which a particular publication is meant, such as, for the family, or the school children or professional persons or the academics. The publication media for all above categories, traditionally, was printed texts.

But today the publishing industry has changed drastically because of availability of Multimedia. The publications which are meant for family such as newspapers, family magazines etc. are readily available on-line, that is in multimedia form giving real life experiences. For example, the on-line- news clippings are not only read but can also be experienced by seeing the video film associated with it. Example in this category are: Microsoft Multimedia. The life and composition of Bethovan etc. where a rich mix of sound, visuals and movies are provided for publication.

The publishing meant for children has changed tremendously with the advent of multimedia. Today many encyclopedia and books providing a sort of edutainment are available. The advantage of using multimedia on these books are evident from the type of media rich experiences these CD-ROM based product provide. For example, an atlas encyclopedia may not only allow you to pinpoint the location of Delhi in

India but also shows you a Road map of Delhi showing several historical sites. A dictionary meant for children not only shows the meaning of the words but can also show its characteristics for example a tiger may be defined as a wild animal and along with that a movie in which tiger is shown in his natural habitat can be shown. Thus this kind of media rich experiences are much more entertaining and provide better learning environment for children.

In fact, we believe that for increasing general awareness of a child, multimedia is the best tool available to us today. However, still the reading habits, listening habits, paying ,attention etc. are the capabilities on which the education will rely upon.

For professionals, today many a products are available in the market. For example, how to tackle many management oriented issues, can be presented in multimedia form. Professionals, however, can use multimedia technology for on-line video-conferencing. on-line document editing etc. functions.

As far as academics are concerned multimedia publishing is a boon. Today, if a researcher wants to refer to a conference proceedings all he has to do is buy a CD produced for it. This CD normally contains abstracts, paper presentations, reports presentation etc. The other advantage an Academician gets by having such a detail on CD is that his search through the material can be faster, as in general, several indexes are being provided in the CDs. Thus, Multimedia publishing has a great potential and will be the technology which has tremendous potential.

The multimedia technology also supports the process of collaborative development of documents for printing, thus, makes process of publishing faster and better.

2.4 COMMUNICATION TECHNOLOGY AND MULTIMEDIA SERVICES

The advances of computing, communication and creation of relevant standards have lead to the beginning of an era where you will be provided with the multimedia facilities at home. May be in the form of an Interactive T.V.

These services may include:

- Basic Television Services
- Interactive entertainment
- Digital Audio
- Video on demand
- Home shopping
- Financial transactions
- Interactive single and multiuser games
- Digital multimedia libraries
- Electronic versions of newspapers, magazines etc.

Cable TV and telephone companies are the main infrastructure providers for these facilities. The networking technology along with the improved compiling and compression technologies will soon be delivering interactive services profitably. The entertainment cable, telephone, companies are trying to design wide variety of such multimedia services.

Today PCs are the tool that promote collaboration. They are essential to any multimedia workstations. Many high speed networks are in place that allow multimedia conferencing, or electronic conferencing. Today, we have to depend on

our telephone to link us with others, whether it is a phone call or a group audio conference. However, tomorrow it will be PCs that link us with others. A PC-based multimedia conference allow us to exchange audio, text, image, and even video information. The PC will also facilitate group development of documents and other information products. Let us discuss more about these concepts in greater details.

2.5 MULTIMEDIA IN BUSINESS

Multimedia can be used in many applications in a business. In this section we will focus on the facilities which might change the outlook of the whole business.

The Global Team

The multimedia technology along with communication technology has opened the door for formation of global work groups. Today, the team members may be working anywhere, and can work for various companies. These team member may:

- be in different cities or countries,
- speak different languages.

Thus, the work place will become global. If such is the future of a business then the multimedia network should support the following facilities:

Voice Mail

Voice mail is a tool which communication voice over a line. A recorded voice is better than having no voice. A voice mail based system is not person dependent. The voice mail however, has the obvious limitation that it can handle only audio information, however audio information is sufficient for quick and simple exchange of information.

Please note that voice mail is time-and location-independent. However, a voice mail system is non- interactive, that is, if you want to get a reply then you have to wait, however, you can send and receive voice mail quickly.

Electronic Mail

Electronic mail is preferred than the voice mail to exchange information for the cases which require wider distribution of complex information. In general the written word leaves less room for misinterpretation. In addition the word files are easier to store and retrieve.

The future electronic mail software must handle voice and video, FAX, and graphic information. In addition the user interface for e-mail should be very easy. Electronic mail is also time-and location- independent, however it is non-interactive.

Multimedia based FAX

FAX, in general, is better accepted than electronic mail because:

- it can be used to send detailed information
- is easier to use
- handles graphic information
- provides a printed copy of information.

FAX provides a non-interactive interface to the user. Today's multimedia PCs are equipped with FAX-modem cards and the FAX message gets stored electronically in these machines. On development of newer multimedia based e-mail, the distinction will gradually become blurred and will gradually fade out.

Office Needs

The activities in an office such as meetings, group discussions, trainings are some areas where we need the concepts such as brainstorming, sharing of idea, problem solving etc. For real-time meetings which involve geographically disperse group of people we can avail the choices as:

- Audio conferencing
- Video conferencing, or
- Document conferencing.

Audio Conferencing

This technology allows 'out-of-town' people to participate in a formal meeting. This technology can also be used by a group of people to meet frequently whatsoever is the physical distance among them. Audio conferencing is an effective means of communication for reporting about a project status. It can be used to solve problems quickly. One of the disadvantage of audio conferencing is that such conferences are restricted to only voice, so this conference can be preceded by sending email of documents that are to be used during the conference. The second disadvantage is that the person who is not proficient in spoken words cannot participate well in such conference.

Audio conferencing technology was first available only in the conference room but is now available on desktop machines.

Video Conferencing

Video conferencing is being used successfully by several organisations abroad. Video conferencing resembles an office meeting, thus, require setting of time, preparing rooms and place, agenda etc. However the biggest drawback is the cost of the equipment.

Video conferencing brings people together naturally and tries to simulate a real life meeting environment. Today video conferencing has been brought to the computer however, it is not easy to use as the participant has to continuously look at the camera on the top of his machine.

Document Conferencing

Document conferencing also called audio-graphic conferencing technology allows people to meet using their PCs and telephone lines. The telephone lines connect the participants so they can share audio information and the data they have stored in their PC. In addition, it allows on line editing of a document by several participating people in the conference. This conferencing technology has been used in the education field. It extends the boundaries of the classroom and reach out into the community. A document which can be used in the conference may consist of text, graphics, sound or even video clippings.

2.6 MULTIMEDIA PEDAGOGUES: INTERACTIVE SYSTEMS FOR TEACHING AND LEARNING

Pedagogues are useful teaching aids only if they stimulate and motivate the students. The audio-visual support to a pedagogue can actually help in doing so. A multimedia tutor can provide multiple number of challenges to the student to stimulate his interest in a topic. The instruction provided by pedagogue have moved beyond providing only button level control to intelligent simulations, dynamic creation of links, composition and collaboration and system testing of the user interactions. Let us look into some of the examples of pedagogues:

2.6.1 Simulations

This is an important area of pedagogy where a student is engaged in situations of problem solving. Simulations are mainly categorised in two main forms:

- Scenarios based simulations
- Knowledge based simulations.

Scenario based simulations, which are multimedia based use video, graphics and sound to engage the student in a particular problem situation. However, these scenario based tutors have limited answers and suggestions to offer.

Knowledge based simulations are more intelligent as far as behaviour is concerned and are adaptive to student needs, however, are difficult to design. Let us discuss about some good examples in this area.

The Cardiac Tutor

This tutor has been developed by Chus Eliot, at the University of Massachusetts, Computer Science Department. It is a knowledge based simulation which teaches the student about the cardiac resuscitation. The knowledge about cardiac resuscitation was collected iteratively from various experts in the area. This tutor has been designed to present a graphical view of an emergency patient. The goal for the student is to save the patient. The tutor also provide clues to the students. These clues can be:

- spoken advice
- emergency room sounds
- graphical indications such as Electro Cardiogram (ECG) trace, blood pressure and vital signs.

Thus, providing a sort of real life operative situations where mistake cost nothing but bad score. This tutor in fact goes to the extent that it provides different levels of teaching for different kinds of students and assists the learning process dynamically.

2.6.2 Multimedia Composition

A composition created by a student on Multimedia platform require lot many activities to perform. These activities may include aspects like:

- creation of text, drawings or digitised pictures.
- organisation that is marking and classifying the items.

- access of documents which involves searching of patterns, and indexing or filtering certain types of items.
- communication which helps in basically sharing the work and ideas.

The skills required to create and use multimedia will become essential in near future. Today many platforms are available for the development of multimedia communications even for an inexperienced students. These developments can be done either at a standalone stations or through distributed networks.

A well connected multimedia interface allows integration of several media forms for a particular piece of information. Several media presentations such as text, process descriptions or graphics etc. about a single topic can be combined.

2.6.3 Multimedia and Explanatory Systems

The multimedia systems also show a very important property that is they adapt their responses to the student needs. Thus, providing explanation to various situations which have been put for the pedagogue to solve. These types of system will become common place in near future.

In explanatory systems the students who are using it can select the media for displaying information. A typical example, in such a category is the explanation planner. This system is developed at the University of Massachusetts. This planner responds to the queries of the students in real time. On the basis of a students query this tutor selects the appropriate text and graphical information. The students may end up seeing several media form on a topic depending on his queries. It is not the system which only present information but it adapts itself to the needs of a student based on the question asked by the student.

The advantages of this planner over a normal hypertext based presentations are:

- The students can themselves choose the media to display information. Some of the types of information which is present is animation, text, graphics etc.
- A piece of information can be reused for answering different question as the objects are defined in the forms of a shared base of information.
- Capabilities of having natural links still exist.

Another example in this category is the Microcosm system. This system, however, uses different approach. This system provide explicit and implicit links through hypertext. These links are maintained in Database which is separate from the document. Thus, in this database newer links for a user can be defined and maintained. In this system explicit links are used for defining relationships between two multimedia objects. Implicit links are utilised for creation of run time links which result in presentation of information in a way desired by the user.

2.6.4 Technological Challenge for Developers

Today, if we want to use the potential of multimedia technology and wants to use it in day to day life of the students then we have to deal with the following challenges:

- We have to move to a knowledge based multimedia systems which will customise the presentations based on the curriculum or student or the situation they are responding to.
- In future, there will have to be trends of having network based multimedia systems which will allow an application to reside at several sites. The people making these sites will be responsible for updating the information relating to the

field of information they are holding. Thus, having collaboration of work. The concept is further discussed in the next section.

- More advanced authoring tools need to be developed which provide easy representation for implementing thinking pedagogues.

2.7 CONCEPTS FOR DISTRIBUTED LEARNING ENVIRONMENT

The process of learning and motivation for learning are influenced by a variety of factors, which are not necessarily accessible to analysis. However, these factors are in the semiconscious or subconscious area of the human cognition. One of the essential component of the learning process is social interaction. The informal peer learning is as important as formal teaching.

Collaboration and Multimedia Learning: Benefits and Pitfalls

Today, multimedia learning materials are available on various platforms. Just like multimedia a collaborative learning environment integrates text, graphs, audio and video. However, the traditional CBT systems operate in standalone mode that is user interactivity is restricted to the CBT only, whereas the possibility to interact with instructors and peers is offered by collaboration using multimedia communication. Thus, by using a communication network and collaborative learning in groups is possible.

The main elements of such kind of environment of learning are:

Collaboration: The traditional CBTs require the student to work in self study mode. But work without a tutor may be ineffective. Thus, instead of offering courses on CD-ROM or video-tape a new learning environment is needed which focuses on bringing several learners together for better attainment of learning goal. Communication should be possible in any direction, learners can ask their tutors or talk to other learners.

Distance Cooperation: The collaboration of such kind have no geographical boundaries. The only mean required is the availability of telecommunication facility. The availability of telecommunication facility is a must for any collaborative environment.

Deferred or Real Time Communication: This system will provide possibility to communicate with the colleagues and tutors in a time frame which is not immediate. For example, a learner may be allowed to answer a question at a later time i.e. not on the spot. A new type of learning process may take place with benefits for some learning situations. Thus, students can learn in a group situation not in real time but later, thus, allowing more contemplation and depth.

Distributed Data: Learning data, such as learning material, videos, graphics, text files etc. are no longer needed to be stored on the local computer, but can be distributed over the network. All participants may share the same information, which can be modified at a common place. However, a student should not be allowed to modify the data. Thus, proper data security measures need to be incorporated for such learning.

Multimedia Interface: A usual way to communicate is to talk to and see our communication partner. This natural way of interfacing may be provided by multimedia environment using audio and video communication technology.

2.8 A MEDICAL APPLICATION: MEDNET – A MEDICAL COLLABORATION AND CONSULTATION SYSTEM

The basic properties of multimedia that is delivery through multiple media with the use of Communication technology make us realise that this application is a distributed, collaborative application. Since a medical consultation system is extremely critical as decision taken by doctors are life critical, therefore, the data manipulations and user interaction in such a system are extremely broad and quite demanding.

This application is an distributed multimedia based project which is being developed at University of Pittsburgh medical centre. At present this system is used at seven hospitals and many diagnostic and research laboratories. Mednet provides the following services:

- A real-time monitoring and multiparty consultation
- Collaboration during brain surgery.

The intra-operative monitoring places a real-time control about the condition of the patient. Mednet is different from the other picture taking teleconferencing systems as it provide real time monitoring and collaboration.

The term "collaboration" is one of the commonly used term in multimedia applications today. The verbal meaning of this word is the actual meaning in the context of multimedia, that is collectively doing a particular work but for this collaborative work physical presence may not be required. How can it be achieved by Mednet as in most of the surgeries the anesthesiologist, the surgeon and other supporting staff have to be present, however, the consulting neurophysiologist (who are normally difficult to find) whose presence is not a necessity may remotely monitor the case along with few other cases. He can see and listen the responses of the monitoring equipments on his screen and in case of any problem that is, when the nervous system of a patient is being damaged, informs the surgeon who is performing the surgery.

Thus, with the limited expertise available a lot of activities can be performed. However, the cost effectiveness of such a system cannot be ignored.

2.9 REVIEW QUESTIONS

- 1) At Escorts heart centre a multimedia information system is being used. Explore this system.
- 2) Propose a multimedia based Airlines promotional system.
- 3) Propose a multimedia based documentation/promotion system for any big industry.
- 4) IGNOU wants to deliver CIT programme in multimedia form. Design a CIT block in multimedia form.

Hint: Assume a section of a unit to be smallest entity. Then propose text, graphics, audio, video, animation required for that section. You can also think of linking several non-linear sections.

- 5) Design a high tech centre of IGNOU which provide counselling to the student without counsellor being physically present.

2.10 SUMMARY

In this unit, we have given you a broad overview of various types of applications that may be available on a networked or standalone multimedia platforms. Our discussions are focussed on only few applications, but it does not means that these are the only applications currently available. Many people are working in this area for bringing out more and more applications. The areas of application may be very different, however, they may be incorporating some of the concepts discussed in this unit. You should also keep on exploring about newer applications and newer ideas.

