Distributed Multimedia Systems and Applications

DURATION: From 2 to 5 days

OBJECTIVE:

The objective of this tutorial is to provide an in-depth survey of the-state-of-the-art in distributed multimedia systems design and applications. We will begin with basic definitions and requirements for multimedia systems, and continue with an overview of multimedia compression techniques and standards (such as JPEG, MPEG, and H.261). We will then discuss multimedia networks and protocols including traditional networks (Ethernet, token ring) and some new networks, such as ATM. Basic concepts and techniques of media synchronization (audio and video) will be presented. Techniques for multimedia storage and retrieval, as well as video partitioning techniques, and video indexing and retrieval methods will be introduced. An overview of multimedia systems, tools, and applications will be presented. The case study of video-on-demand applications including interactive TV will be analyzed in detail. The tutorial assumes little or no familiarity with multimedia systems.

TARGET AUDIENCE:

This tutorial is intended for system designers, engineers, and programmers who are involved in distributed multimedia system design and applications. It is also intended to anyone interested in receiving an overview of the-state-of-the-art in distributed multimedia systems. This course assumes little or no familiarity with multimedia systems. This tutorial can also be beneficial for managers and engineers involved in evaluation of various multimedia systems and tools.

TUTORIAL OUTLINE:

1. INTRODUCTION TO MULTIMEDIA
   - Definition of multimedia
   - Requirements for multimedia: bandwidth, latency, synchronization,
     storage, processing power
   - Architecture of a multimedia system

2. COMPRESSION TECHNIQUES AND STANDARDS
   - Storage requirements
   - Still image compression: JPEG standard

- Video communication: H.263Kbps standard
- Full-motion video: MPEG1, 2 and 4 standards
- Implementation issues

3. MULTIMEDIA NETWORKING AND SYNCHRONIZATION
- Traditional versus multimedia communications
- Characteristics of multimedia traffic
- Traditional networks and multimedia
- ATM network
- Multimedia object composition, synchronization classes and scope
- Overview of multimedia synchronization techniques

4. MULTIMEDIA STORAGE AND RETRIEVAL
- Digital audio and video characteristics
- Existing storage allocation techniques
- Constrained block allocation for multimedia data
- Video partitioning techniques
- Video indexing and retrieval techniques

5. ON-DEMAND MULTIMEDIA SERVICES
- Present and future architectures for on-demand MM services
- Components of a hierarchical distributed multimedia architecture
- Multimedia servers and their design
- On-demand, interactive television systems

6. MULTIMEDIA SYSTEMS, TOOLS, AND APPLICATIONS
- Multimedia PCs and development platforms
- Multimedia development tools
- Overview of multimedia applications
- Multimedia application development - case study

TUTORIAL MATERIAL:

1. Class notes including copies of all transparencies
2. Recommended reading list
3. Key articles