MULTIMEDIA STANDARDS
Peter Stanchev

A. The tutorial motivation

The aim of this tutorial is to review some of the standards related to multimedia and their metadata.

Today there are many technologies related to multimedia presentations. We will start with MPEG 21, which provides an open framework for multimedia delivery and consumption. These streaming instructions facilitate the fragmentation of content-related metadata, the association of media and metadata fragments with each other, and the synchronized streaming and processing of those fragments.

MPEG-7 is a multimedia content description standard. It was designed to standardize a set of Description Schemes and Descriptors, a language to specify these schemes (called the Description Definition Language), and a scheme for coding the descriptions. We will also cover MP7QF query format that uniformly queries MPEG-7 enabled multimedia databases.

With the Internet grow several format were proposed for media scenes description. Some of them are open standards, such as: VRML1, X3D2, SMIL3, SVG4, MPEG-4, published by ISO, W3C, etc. Others are proprietary, like Adobe's Flash and Autodesk's 3ds.

Television has become the most important mass medium. There is also a fast growing community for videos in the web (e.g. YouTube). Serious attempts are done to give the users interactive functions. For these purposes, standards such as MHEG, DAVIC, Java TV, MHP, GEM, OCAP and ACAP have been developed. Some of them will be presented together with the history and future of the interactive TV standards.

There exist a large number of standards for representing audiovisual metadata. We will cover the MXF, which is an example for a container format, the DPX used for image sequences in digital cinema production, and the DCP that is used to transport digital movies and associated metadata to cinemas.

Web 2.0 communities have become mobile and multimedia based. Several Web 2.0 standards and tools will be presented: Ajax, WMS, WFS, WCS, GML, XML, RSS and Web 2.0 mash-ups.

The semantic web technologies for knowledge representation use RDF Schema - language for representing information about resources in the World Wide Web and OWL Web Ontology Language that is designed for use by applications that need to process the content of information instead of just presenting data to humans. Ontologiy standard languages offer meta-concepts for the description of constraints and relationships among objects in multimedia materials.

B. The tutorial objectives

1) **MPEG-21** (Moving Picture Experts Group - Multimedia Framework). Vision. Technologies and Strategy. Digital Item Declaration. Digital Item Identification. Intellectual Property Management and Protection (IPMP). Rights Expression Language. Rights Data Dictionary. Digital Item Adaptation. Reference Software. File Format.
2) **MPEG-7** (Moving Picture Experts Group - Multimedia Content Description Interface). Development schedule. Description Definition Language. Perceptual Descriptions of the information in the content. Visual descriptors. Color descriptors. Texture descriptors. Shape descriptors. Motion descriptors. Evaluating the effectiveness of the MPEG-7 descriptors. MP7QF - Query format.
3) **Standards for scene description**. VRML (Virtual Reality Modeling Language), X3D (eXtensible 3D), SMIL (Synchronized Multimedia Integration Language), SVG (Scalable Vector Graphics), MPEG-4 (Moving Picture Experts Group - Coding of audio-visual objects), Adobe Flash and Autodesk 3ds.
4) **Open standards for interactive TV (iTV).** MHEG (Multimedia and Hypermedia Information Coding Expert Group), DAVIC (Digital Audio-Video Council), Java TV (an extension of the Java platform), MHP (Multimedia Home Platform), GEM (Globally Executable Multimedia Home Platform), OCAP (OpenCable Application Platform), ACAP (Advanced Common Application Platform). History and Future of the iTV Standards.
5) **Standards in the audiovisual media.** DPX (Digital Picture Exchange), MXF (Material Exchange Format), Engineers (SMPTE), DCP (Digital Cinema Package).
6) **Web2.0 tools.** Ajax, Web Map Server (WMS), Web Feature Server (WFS), Web Coverage Server (WCS), Geography Markup Language (GML), XML (Extensible Markup Language), RSS (RDF (Resource Description Framework) Site Summary), Web 2.0 mash-ups.
7) **Semantic web technology**. What is ontology? W3C's Web Ontology Language (OWL), Resource Description Framework (RDF)

C. Primary/secondary audience

Computer science Ph.D. students, researchers, people willing to work with multimedia and their metadata. Not special preliminarily knowledge is required.

D. Duration

3 hours

E. Organizer's profile

Peter Stanchev is currently professor at Kettering University, Flint, Michigan, USA and professor and chair at the Institute of Mathematics and Informatics, Bulgarian Academy of Sciences, Sofia, Bulgaria. He publish 2 books, more than 200 chapters in monographs, journal and conference peer-reviewed papers, more than 200 conference papers and seminars, and have more than 250 citations. His research interests are in the field of multimedia systems, database systems, multimedia semantics, and medical systems. Serving also on many database and multimedia conference program committees, he is currently on the editorial boards of several journals. He is also co-chair of the annual workshops "Many phases of the multimedia semantics" in the frame of the ACM multimedia conferences.

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