

# Interactive Digital Television and Multimedia Systems

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## ABSTRACT

Interactive digital television is an emerging field with a high impact in our societies: it offers interactive services to the masses. This tutorial aims to establish a common framework by summarizing the most significant results in this multidisciplinary field. The review includes topics such as content distribution, system software of the receivers, and user interaction. In addition, we will discuss current commercial events such as the next generation of optical discs (e.g., blue-ray), BBC peer-to-peer service, and mobile television. Based on this discussion, we will formulate an agenda for further research. The agenda includes, for example, end-user enrichment of television content and social television. This half-day tutorial will provide the attendee a solid understanding of the technologies currently in use and an introduction of the open questions in the field.

## Categories and Subject Descriptors

D.2.11 Software Architectures [Languages]. H.5.1 Multimedia Information Systems [Audio, Video]. H5.2 User Interfaces [Graphical user interfaces, Interaction styles].

## General Terms

Design, Documentation, Languages, Standardization

## Keywords

Interactive Digital Television, Software Architecture, Tutorial

## 1. TOPICS COVERED

In this tutorial we will, first, introduce interactive digital television (iDTV) from different perspectives such as available services and user interaction. Then, we will formulate an agenda for further research in the field. The list of topics covered during the tutorial are the following:

### a) iDTV State of the Art

- *Services*: enhanced television and return path usage.
- *Broadcast*: review of the current standards used in USA (ATSC, OCAP), Europe (DVB), and Japan (ISDB).
- *System software*: software architecture and middleware standards such as DVB-MHP, ACAP, and ARIB.
- *Service selection and user interaction*: electronic program guide and recommendations.

### b) Research Opportunities

- *Non-monolithic rendering of multimedia content*: to extend content rendering and interaction to other devices than the television set and the remote control.
- *End-user creation and sharing of content*: the success of services such as Flickr and youtube provides new challenges in social television research.
- *P2P broadcast*: broadcasters such as BBC and the research community (e.g., tribler<sup>1</sup>) are exploring this possibility.
- *Mobile TV*: television reception in mobile devices (e.g., DVB-H).
- *Internet video*: initiatives such as google video.
- *iDTV as a solution for the "digital divide"* in developing communities in, for example, Brazil or India.

## 2. PREREQUISITES

The attendee is expected to have basic understanding of multimedia programming and tools, multimedia systems architecture, and computer networking.

## 3. INSTRUCTORS

Dr. Pablo Cesar holds a Ph.D. in interactive digital media (A Graphics Software Architecture for High-End Interactive TV Terminals<sup>2</sup>; 2005). Since 2000 he has participated in several iDTV-related projects. Currently, he is researching how the TV viewers are becoming producers and distributors.

Dr. Konstantinos Chorianopoulos holds a Ph.D. in Human-Computer Interaction (Virtual Television Channels: Conceptual Model, User Interface Design and Affective Usability Evaluation<sup>3</sup>; 2004). Since 1997 he has been a member of the academic research labs (Greece, UK, and Germany), which specialize in the areas of multimedia, intelligent systems, and interaction design.

## 4. BACKGROUND READING

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- [3] Morris, S. & Smith-Chaigneau, A. (2005). Interactive TV Standards: A Guide to MHP, OCAP and JavaTV. Burlington, MA: Focal Press.

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2.<http://lib.tkk.fi/Diss/2005/isbn951227888X>

3.<http://uitv.info/about/editors/chorianopoulos/thesis/phd.pdf>