Æliens

preface

This book was written in response to a rather disastrous evaluation of a previous introductory multimedia course.

Students complained that the material was boring, that the presentation was bad, and that, after all, the course had nothing to do with their practical assignment.

So, obviously, some change was needed. Instead of reducing the introductory course to the practical assignment only, it seemed better to make things clear and assert more forcefully that multimedia has an academic component as well. That may, admittedly, be boring or seemingly irrelevant.

Indeed, studying multimedia is not (only) fun. Compare it with obtaining a driver license. Before you are allowed to drive on the highway, you have to take a theory exam. So why not take such an exam before entering the multimedia circus.

Don't complain, and take the exam. After all it makes you aware of the rules governing the (broadband) digital highway.

themes and variations

So, who is this book meant for? It is meant for the student or reader who is looking for a quick introduction to the main topics in multimedia. These notes provide a concise, yet somewhat steepgoing, overview of the themes and trends in current multimedia practice and research.

The themes and variations addressed in this book may be summarized as follows.

themes and variations

- *digital convergence – all for one, one for all*
- *broadband communication – entertainment*
- *multimedia information retrieval – as an afterthought?*

To explain in somewhat more detail, *digital convergence* may be characterized as the coming together of data (including audio, video and information) in a possible multitude of platforms, to which these data are delivered by a variety of (broadband) communication channels. In fact, the increasingly powerful communication infrastructure due to the popularity of the Internet and the World Wide Web, leads to an almost universally accessible multimedia (information) repository, for which (unfortunately) the notion of (multimedia) information retrieval seems to have occurred only as an afterthought.

An underlying thought that motivated the writing of this book is that somehow the gap between *authoring* and *retrieval* should be bridged. In other words, either by developing the technology for extracting features or attributes from multimedia objects, or by applying content annotation for such objects, multimedia information

retrieval should be considered as a necessary asset to make a multimedia web an effective information repository.

what do you need to learn

When taking up multimedia as a subject of study, you may ask yourself what you need to know and learn about it. In general, what this book presents is

> a collection of concepts, a number of facts, some history, potential applications and application areas, a brief overview of standards (some of which are still being developed), technology issues, as well as some scattered insights on the relevance of multimedia.

Let me be frank with you. There is too much information to be digested in a first course. Nevertheless, after studying this book you will have an introduction to multimedia that should be viable for the rest of your (academic) career.

Now, don't hesitate, put yourself to the test and check which phrases and acronyms you are familiar with in the lists given for the subjects of *digital convergence*, *broadband communication* and *information retrieval*.

digital convergence

- concepts – *digital revolution*
- facts – *from the entertainment industry*
- history – *from Pong to Big Brother*
- applications – *infotainment*
- standards – *MPEG, RM3D, SMIL*
- technology – *TV, PC, DVD*

How did you succeed thus far? If you did well, try the second round and test yourself in what detail you have have knowledge about technologies mentioned.

broadband communication

- concepts – *Quality of Service*
- facts – *compression is needed*
- history – *the internet*
- applications – *entertainment and communication*
- standards – *HTTP, TCP/IP, RTP*
- technology – *cable, (X)DSL*

Finally, check to what extent you master the vocabulary of multimedia information retrieval.

multimedia information retrieval

- concepts – *features, precision, recall*
- facts – *the problem is utterly complex*
- history – *from text to multimedia*
- applications – *digital libraries*
- standards – *distance metrics*
- technology – *indexing & algorithms*

If you are working online, you may click back to the text in the book that explains these notions. Just to make sure whether your impression of familiarity was justified.

assignment

I strongly believe that practical work is necessary, also for academics, to get a good grasp on multimedia. Even if your interest is purely intellectual, it pays off to make your virtual hands dirty and indulge in making a compelling presentation.

As an assignment, consider making a presentation that offers an

Annotated Tour in Amsterdam

Amsterdam is the place where I live, and where our students take their courses. You may find it more convenient or natural to replace Amsterdam with a location of your choice.

Online, you will find an elaborated version of the assignment, including an extended description, a working plan, deliverables and hints. In essence though, the intent of the assignment is to make a compelling, not to say artistic, presentation, and to explore the realm of multimedia rethorics.

As a tool you may choose, for example, for Macromedia Director or Flash. The online material contains a concise manual for Director, so that you can start right away.

examination

Despite the fact that some consider the practical aspects of multimedia to be exclusively relevant, the intellectual aspects of multimedia should not be ignored.

Consider the following question, which is directly related to the theme underlying this book, that is the complementarity of authoring and retrieval:

multimedia

> *Give a short description of the contents and structure of your presentation. Indicate how the information contained in your presentation can be made accessible (for example in search).*

This question can only be answered when the student has a sufficient level of experience, insight and knowledge of the field, and is able to relate theory and practice.

Each chapter contains a brief list of questions that may be used as a checklist, to see if you have sufficient knowledge of a particular area. These questions may also be used to prepare exams! The questions are meant to test for insight, that is the ability to discuss a somewhat broader theme, and knowledge of concepts and technology, covering definitions, applications, historical facts, as well as the technological infrastructure enabling the deployment of multimedia applications.

In addition to the regular material, the book also contains a number of sections indicating *research directions*. These sections are not meant to be part of the exam, but might provide the student with suggestions for projects or further research.

CDROM

The CDROM contains the full online version of the course notes. Open the file `index.html` in Netscape Navigator or Microsoft Internet Explorer, and click on *readme* for an explanation or *introduction multimedia* to access the material.

The online version provides you with both an HTML-based presentation format, as well as a VRML-based format, for presenting the lectures in class. The *blaxxun* Contact 3D VRML browser you need for this may be freely obtained from www.blaxxun.com.

The course notes are also available at http://hush.cs.vu.nl/media

how to use this book

The intended audience for this book is

- students (beginning and advanced)
- instructors
- professionals and interested laymen

The course notes were explicitly written for first year Computer Science and Information Science students. (The Information Science students are expected to choose the specialisation *Multimedia and Culture*, a curriculum provided by the Division of Mathematics and Computer Science of the Faculty of Sciences of the Free University of Amsterdam).

The course has a practical part and a theoretical part, which in combination takes 2-4 weeks, full time study.

The book covers the theoretical part. The online version gives a skeleton assignment that may adapted by the one responsible for the course.

The online version contains all the material needed for presentation, including

- presentations for all chapters, including the preface in HTML, VRML and Powerpoint
- a manual for Macromedia Director, also available in presentation format
- presentable versions of the MPEG-4 standard, and other relevant material
- possible exam questions, with back links into the text for quick learning and review
- seven sample lectures, with additional explanation for the instructor

One additional remark may be made. This is (so to speak) 'a book with an attitude'. It is slightly authorative and directive towards the students, telling them to learn the facts and 'do the exam'. Some students take refuge to learning the 'keywords and phrases'. They are even helped in this respect, since the text uses a 'graphic' layout to emphasize important points, and to allow for a quick recognition of chunks of relevant material.

acknowledgements

This book is the result of developing the course notes for an *introduction to multimedia* for first year Computer Science and Information Science students. Hence, first of all, I like to thank the students that had to endure the first rough drafts of this material.

Further I like to thank Harrie van der Lubbe and Sander Lammers for developing the manual for Director and their support in developing the practical assignment. Also, I like to thank Martin Kersten from CWI for allowing me to join his Multimedia Database Systems research group as a guest for a period of about two years, and Alex van Ballegooij for his active involvement in the RIF project. Also from CWI, I like to thank Lloyd Ruttledge, Lynda Hardman and Jacco van Ossenbruggen, for their effort in thinking about the multimedia course in its initial stages, and Lloyd and Jacco for their involvement in some of the practical work, and Jacco in particular for his knowledge of hypermedia systems that he shared with me during the period that he was my Ph.D. student. From CWI, I like to thank Zsofi Ruttkay for her general interest in 'my projects'. From the VU, I like to thank Andy Tanenbaum for allowing me to use his material on digital video, Gerrit van der Veer for taking the initiative for *Multimedia and Culture*, Zhisheng Huang for his excellent contributions to the WASP project, and Claire

Dormann, for our discussions on the direction the *Multimedia and Culture* curriculum should take, and for sharing her thoughts on persuasive technology with me.

Finally, I must mention that I owe much insight and material to (among others) the following books and articles: [MMDBMS], [Convergence], [Spaces], [Hypermedia], [Codecs] and [Magic]. As in any intellectual endeavor, intellectual ancestry can hardly be praised enough. So let me briefly indicate, for each chapter, some of the sources that provided me with inspiration, insight and material:

1. [Convergence], [Entertainment], [Experience].
2. [Spaces], [Hypermedia], [Magic].
3. [Codecs], [MPEG-4], [Web].
4. [MMDBMS], [IR].
5. [MMDBMS], [Meldex], [ACOI].
6. [MMDBMS], [Networked].
7. [Networked], [Navigation], [Community].

Only the material in 6.1, 6.3, and 7 reflects my own research efforts. The other material has all been diligently collected from (among others) the sources mentioned.

introduction *multimedia*

This book was written in response to a rather disastrous evaluation of a previous introductory multimedia course. Students complained that the material was boring, that the presentation was bad, and that, after all, the course had nothing to do with their practical assignment. So, obviously, some change was needed. Instead of reducing the introductory course to the practical assignment only, it seemed better to make things clear and assert more forcefully that multimedia has an academic component as well. That may, admittedly, be boring or seemingly irrelant. Indeed, studying multimedia is not (only) fun. Compare it with obtaining a driver license. Before you are allowed to drive on the higway, you have to take a theory exam. So why not take such an exam before entering the multimedia circus. Don't complain, and take the exam. After all it makes you aware of the rules governing the (broadband) digital highway. The book and accompanying material is available at http://hush.cs.vu.nl/media