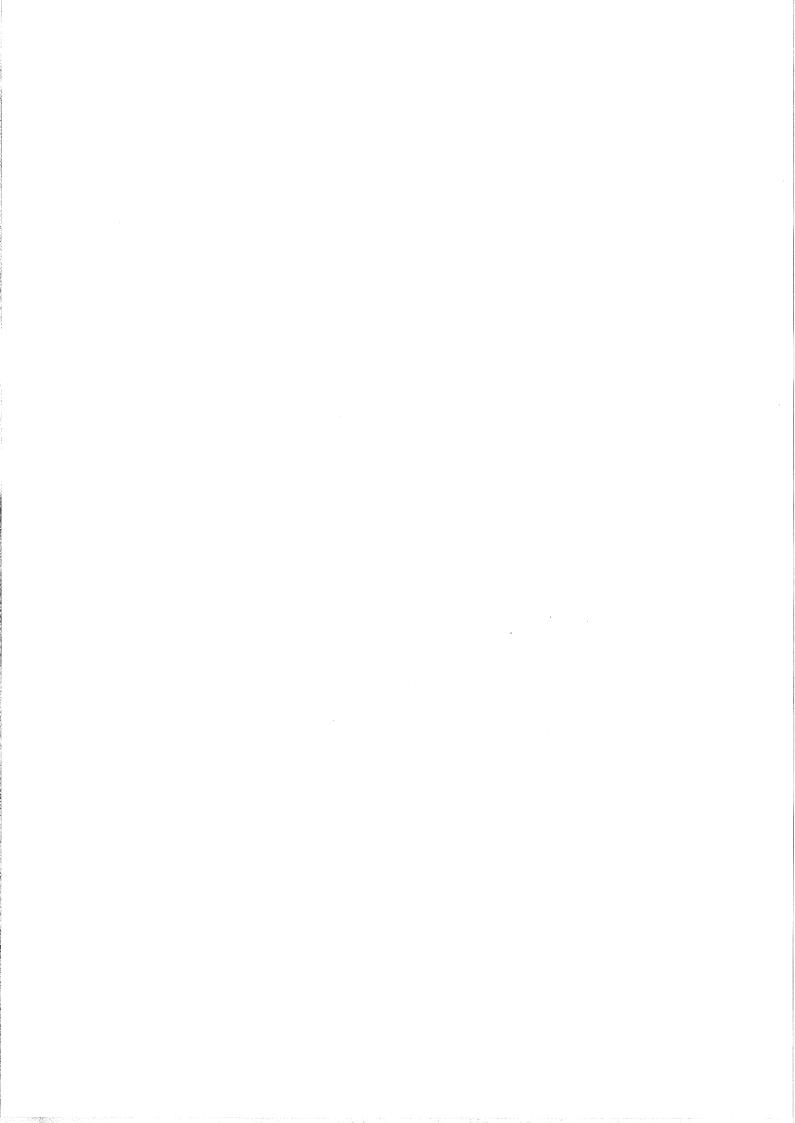# DIVISION OF COMPUTER SCIENCE

A Survey of Tools for Modelling Multimedia Systems

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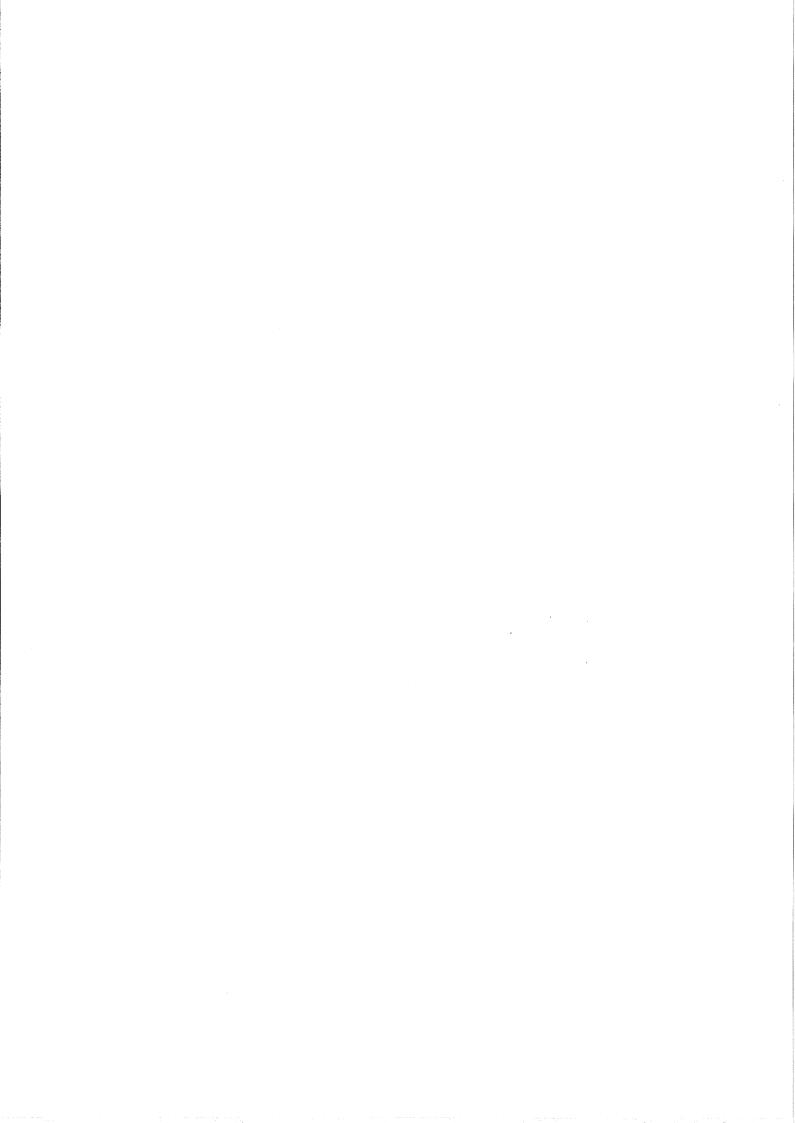Tel: +44-(0)181-455-7921, Email: myersm@staff.richmond.ac.uk.

Introduction

This report summarises the results of a survey of tools for modelling multimedia systems which was carried out as part of the M3 (Modelling MultiMedia) ROPA project [BRI96]. No tool was found which concentrates specifically on the modelling of multimedia, so the survey has focused on the design components of authoring packages.

This report is one of five deliverables from the M3 project; the other reports are [BRI96 a,b,c and e].

In the past few years developers of authoring tools have increasingly incorporated modelling and design tools in the authoring applications. There are, however, no tools available in the market which cater specifically for the modelling stage of multimedia development. There is currently no automated support available for modelling requirements for a multimedia system, and any automated support for the design stage of the multimedia development process is geared to a particular authoring package.

In this report an overview of some available authoring tools is presented. From the point of view of design, there are three types of authoring tools: Card- and Page-Based, Icon-Based and Time-Based tools.

One tool which does cover the whole development process from requirements capture to implementation is Designer's Edge developed by Allen Communications. The Designer's Edge tool is described at the end of this report.

Card- and Page-Based Authoring Tools

Card and Page-Based authoring tools use the metaphor of a book or organised cards. This is easily understood by designers, as the concepts of sections or chapters of a book or cards in a stack provide a familiar structure on which to base the design of the multimedia system. The tools investigated which use the book or card metaphor are Hypercard, ToolBook and Visual Basic.

Hypercard (Macintosh)
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014

Since 1987 every Macintosh is equipped with a copy of Hypercard. However, since 1991 only a run-time version is freely provided and the full version must be purchased. Hypercard is the most widely available authoring tool for the Macintosh. It can be used on single or networked stations and can be linked to other programs running locally or across a network.

Projects developed using Hypercard are called stacks and are made up of cards. Each card can have animation, graphics, text , sound and video. Any link between cards is possible at development time provided the designer has established the link during the design of the system.

There is no claim made that the tool supports modelling of requirements before design.

ToolBook(Windows)
Asymetrix Corporation
110-110th Ave. N.E., Suite 717
Bellevue, WA 98004

The metaphor used in ToolBook is book and pages. Every project is like a book which consists of pages which are linked together to assemble the book, i.e. project. ToolBook supports multiple windows, i.e. at any instance you can have many ToolBook windows open which can interact with one another.

The CBT edition of ToolBook (for Computer Based Training) has a library of models including templates, widgets and book specialists to create courses. This enables the developer to create a system with little or no effort.

There is no claim made that the tool supports modelling of requirements before design.

Visual Basic(Windows)
Microsoft Corporation
One Microsoft way
Redmond, WA 98052

Visual Basic is probably the most programming oriented multimedia authoring tool. It is made up of controls (named objects) and windows (named forms). Visual Basic is event-driven, that is code is attached to the objects. The code is executed upon the user or system response, e.g. button clicked or time out. The book/page metaphor is represented in terms of projects and forms.

There is no claim that Visual Basic supports modelling before design.

Icon-Based Authoring Tools

This group of authoring tools use a visual programming approach to the development of multimedia presentations. The structure of a system is designed by the aid of drag and drop icons. These icons include computations, graphics, sound and video. Once the flow line of the system, i.e. the logical path, is designed the developer can fill in the gaps by giving properties to the icons on the flow line. The two tools investigated are Authorware and IconAuthor.

Authorware Professional(Macintosh and Windows)
Macromedia
600 Townsend, Suite 310W
San Francisco, CA 94107

IconAuthor(Windows)
AimTech
20 Trafalgar Square
Nashua, NH 03063

The automated design tool facility incorporated in these authoring tools enables the developer to design either prior to development or alongside the development. A flow line is created automatically and with the aid of drag and drop icons the designer can create the logical outline of an application. This flow line includes events, tasks and decisions. The method encourages a semi-structured design of the system. However, some developers may find it restricting. This restriction is due to the fact that if a manual design has been carried out, the developer would like to have the option of tackling the screen designs directly without the need to design the flow line. This option is not available and the designer is forced to automate the original manual flow line.

Both Authorware professional IconAuthor are available in restricted versions (Authorware Star and HSC Interactive)

Neither package claims to be appropriate for modelling system requirements.

Time-Based Authoring Tools

Time-based authoring tools use a time line for sequencing the events of a multimedia presentation. There are two ways of managing events over time. The first method is when layers of various media elements or events are displayed alongside the scale. The other method is to arrange a long sequence of graphic frames and add the time component by adjusting the duration of play. It could be claimed that these methods support design.

Action (Macintosh and Windows)
Macromedia
600 Townsend, Suite 310W
San Francisco, CA 94107

Action uses the metaphor of slides and scenes. A system is made up of slides where each slide is a scene which lasts for a certain time. The design is carried out by drag and dropping multimedia objects onto the timeline. There is also a control panel which helps in arranging the scenes. The tool provides a facility called content list which displays the entire presentation in outline form for quick editing. There is also a scene sorter which displays each scene as a preview and lets the user rearrange scenes quickly.

Director (Macintosh and Windows)
Macromedia
600 Townsend, Suite 310W
San Francisco, CA 94107

Director uses the metaphor of film production. The design is carried out on a time line and the designer has more control over transition. Director Studio is a very powerful authoring tool. A project is assembled using Cast and Score. Cast is a multimedia database of images, sound, text, video, progrmas and other Director files. Multimedia elements for a system can be imported from Cast or created from scratch by using Director's own tools and editors. Once the Cast for the system has been developed, a sequencer called Score is used to display, animate and play Cast members. Score offers complex visual effects and transitions as well as control of tempo. Director also uses a scripting language, Lingo, to manage interactivity and the overall program.

Designer's Edge

Designer's Edge
Allen Communication
5 Triad Center, 5th Floor
Salt Lake City, UT 84180, USA.

Allen Communication have developed a Pre-Authoring Software tool for
Instructional Design. It is estimated that when creating interactive training,
authoring is 25% of the life cycle; Designer's Edge claims to be " a tool for the other
75% of your time". The tool aims to support the development process of interactive
multimedia training systems, from analysis through to evaluation. The stages of
development covered by Designer's Edge are as follows:

- Analyse Needs
- Draft Mission Statement
- Create Audience Profile
- Write Objectives
- Analyze and Outline Content
- Layout Course Map
- Define Treatment
- Select Learner Activities
- Storyboard Course
- Manage Media
- Evaluate Course

Allen Communication claims that Designer's Edge can be used in with any
authoring package, so that al multimedia developers can benefit from it, whatever
authoring package they are using.

Designer's Edge will take the system developer through the entire design process -
from analysis to evaluation. It is based on the traditional ISD model that is widely
used and accepted by instructional designers.

Of all the tools studied Designer's Edge is the only one which explicitly covers the
early stages of multimedia system development. The tool is, however, geared
explicitly to the development of instructional systems and does not claim to be
applicable to other types of multimedia system.

References

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