

## CHAPTER 13

# USING PCs FOR CARTOGRAPHIC PRESENTATION OF MAP SYMBOLS<sup>(\*)</sup>

By

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### ABSTRACT

This research explore the most commonly used map Symbols in Egyptian Geography books.

A training proposed course using PCs was executed for the students of Geography Dept. in menoufeya University to learn How to enhance some primary graphic elements of the map, and how two Classes of symbols (Point, & Area, in focuse) could be presented whether they are used for nominal, ordinal or interval - ratio data.

The recomended software proposed in this rearch was (photofinish Zsoft 3.0 & Excels 5).

This research also compares between the normal methode of symbols presentation and the recommended steps by using computer, and the two kinds of maps produced by eac of the two different methods. The out come of this researc is in favour of using computer to assure a better cartigraphic Quality and a real meaningfull symbols for the presented data.

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**(\*) The Original Version is written in Arabic Language.**



4. Noor al-Itrah.

5. Noor al-Hikmah.

**V. From the Arab Kingdom of Saudi Arabia:**

The "Dawaleg" Technology Company. Produces educational multimedia in the following domains: mathematics - physics - sciences - chemistry - linguistics. These multimedia are designated for preparatory level in Saudi Arabia and relevant preparation of scientific material. Programming and production are carried out at the Company's premises in Riyadh.

**VI. From Lebanon:**

Future for Electronic Publishing Company. Produced two multimedia:

1. Recited copy of the holy Quran.
2. A multimedia for teaching physics to secondary schools' students in Lebanon.

**VII. From the United Kingdom, Egypt and the UAE (Dubai):**

The International Mark Company. Produces nearly 52 multimedia encompassing various educational fields including physics, chemistry, biology and mathematics and historical multimedia concerning the environment, and climate.

erating system, through a simplified explanation relation to a series of examples, exercises and subjective tests, as well as multimedia for teaching Word 6 and Excel 6.

## **II. From the United States of America:**

Centura Software Limited Company. Produced English and an Arabic multimedia entitled "Al DAIRAH".

## **III. From the United Kingdom:**

SINDIBAD Multimedia Company. This company produces Arabic multimedia for the expatriated Arab communities in England and west Europe and link them to the Arabic language. It produced educational multimedia including:

- a. The "Garden of Letters" for teaching, reading and writing for children of 3-7 years range.
- b. Four educational entertaining stories inspired by the Isop stories for 8-11 years old children.
- c. Four series of spectacular Arabic calligraphs and ornaments to be used in offices and households.

Moreover, there are six multimedia that are being developed most of which are educational ones.

## **IV. From Iran**

The CRCIS Company. Produced the following multimedia:

1. Noor: including Quran text and recitation with English and Persian translations.
2. Noor al-Fiqaha.
3. Noor al-Anwar.

## APPENDIX 3

### MULTIMEDIA TITLES PRODUCED BY COMPANIES THAT ARE SUBJECT OF THE QUESTIONNAIRE AND ABSTRACTS OF THESE TITLES

#### **I. From the Arab Republic of Egypt:**

1. The ITI Institute affiliated to the Egyptian Cabinet of Ministers. Displayed two products at the Egyptian stand. The first is entitled: "Good-bye 20th Century". This multimedia reviews contemporary history of Egypt to date, including all political economic and artistic events. The second multimedia is entitled: "Oriental Musician for Windows" which is designed in full to teach Arabic music.
2. The Arab-American Company for Computers. Displayed a series of multimedia related to Islamic jurisprudence. These included:
  - a. "Al-Mughani" by Ibn Qudama containing all Islamic jurisprudence issues on more than 84 MB of TXT data.
  - b. A multimedia encompassing the works of Ibn-Taymiya (an Islamic scholar).
  - c. Another collection of Islamic books.
3. Meta Media Company. Presented a special multimedia for teaching children, entitled: "Riddles from Space", designed for primary pupils. It includes a series of questions and tests on intelligence, power of observation, memory, Arabic language, sciences and history through an interesting game and displays between stars.
4. ARABIZE Company. Presented a complete collection of the "approach" to Arabic titles for teaching principles of using computer and the key op-

**VI. From Lebanon:**

Future for Electronic Publishing: Mr. Akram Saqqal.

**VII. From the United Kingdom, Egypt and the UAE (Dubai):**

The International Mark Company: Professor Dr. Ahmed Wael Moussa.

## **APPENDIX 2**

### **NAMES OF COMPANIES AND OFFICIALS WHO FILLED THE QUESTIONNAIRE AND WERE PERSONALLY INTERVIEWED**

#### **I. From the Arab Republic of Egypt:**

1. The ITI Institute affiliated to the Egyptian Cabinet of Ministers:

Engineer Mohammed Salama

Engineer Eman Mostafa

Engineer Maged Mohamed Mustafa

2. The Arab-American Company for Computers: Engineer Osama Fadel

3. Meta Media Company: Mr. Adel Albert

4. ARABIZE Company: Ms. Manal Amin

#### **II. From the United States of America:**

The Centura Software Limited Company: Mr. Dhunji Bilimorja

#### **III. From the United Kingdom:**

SINDIBAD Company: Mr. Mohamed Ahmed al-Agha.

#### **IV. From Iran:**

The CRCIS Company.

#### **V. From the Arab Kingdom of Saudi Arabia:**

Al-Dawaleg Technology Company: Mr. Emad al-Zo'air.

13. What are the **multimedia phases** you are considering in developing your multimedia packages?

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14. What are the **multimedia standards** you are considering?

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CD-I

CD-ROMXA

Others - please write

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9. What is the **speed** of your CD-ROM?

150 kbps

300 kbps

600 kbps

8x

10x

12x

10. What is the multimedia platform used in your company?

Stand alone

LAN

Internet

11. What are **the protocols** used in these networks?

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12. What are the **multimedia development packages and authoring tools** used in your company?

- Delphi

- Author ware

- V. Basic

- Visual C

- Power builder

- Video for windows

- Others - please write

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Other types of digital audio-please write

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5. What is the type of digital video used in your company?

MOV

AVI

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6. What is the name of the OS your company is using?

DOS

WINDOWS

OS/2

UNIX

NOVELL

3.X

95

NT

Other types of OS-please write

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7. What are the compression tools your company is using:

- JPEG

- MPEG-1

- MPEG-2

- MPEG-3

- MPEG-4

- Others - please write

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8. What is the kind of storage media your company is using?

CD-ROM

# APPENDIX 1

## QUESTIONNAIRE

This questionnaire is to be used for academic research only.  
Your input is greatly appreciated. Thank you.

COMPANY NAME:-----

**Please Answer the Following Questions:**

1. What are the titles of the multimedia packages your company has developed? (If there are more than four titles to be listed here, please attach a complete list of your products).

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2. Have you developed multimedia packages in **Arabic**

YES

NO

3. If your answer is yes, please indicate the following:-

The Arabic Titles

The Media Used

Authoring Tools

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4. What is the type of **digital audio** used in your company

MIDI

WAV

19. Jennings, Roger, "Discover Windows 3.1 Multimedia", Que Corporation, USA, 1992, p. 700.
20. *Loc. Cit.*, pp. 53-54.
21. "European Commission: Directorate General XIII", *op. cit.*, p. 104.
22. *Ibid.*, p. 112.

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6. European Commission: "Directorate General XIII", **ACTS: Advanced Communication Technologies and Services**, 1994, pp. 42, 43.
7. Smith, *op. cit.*, p. 29.
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9. *Ibid.*, p. 44.
10. Smith, *op. cit.*, p. 28.
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13. *Ibid.*
14. Tway, Linda E., "Welcome to Multimedia", MIS: Press, New York, USA, 1992, pp. 71,72.
15. *Ibid.*, p. 80.
16. *Ibid.*m pp. 8-10.
17. Desmarais, Norman, "Multimedia on the PC: A Guide for Information Professionals", McGraw-Hill, Inc., New York, USA, 1994, pp. 134, x-xi.
18. *Ibid.*, p. xii.

If the stages of the multimedia development are divided within the theoretical context into three stages, the Arab companies producing multimedia applications would be in the second stage, vis-a'-vis applications, compression tools and authoring tools, and in the first stage vis-a'-vis the use of networks in the multimedia field.

## **Key Results**

1. Software implementations of image segmentation, analysis and tracking techniques which demonstrate the feasibility of selected approaches.
2. Recommendations on tracking algorithms and image interpretation techniques.
3. demonstration or simulation of a prototype system, for three dimensional tele-pointing and tele-marking.

## **CONCLUSIONS**

The worldwide development of multimedia applications is growing very fast in all recreational related fields as well as those related to educational, medical, marketing and administrative aspects. These applications are used through different platforms: "stand alone", or "LAN" or "Internet".

As regards the development of multimedia applications in the Arab countries, it is noted that, although Arab multimedia producing companies are taking sound and scientific steps towards the creation of an Arabic multimedia, yet these applications are still limited in scope. These applications are focused on the development of educational multimedia whether for children education or for different age groups in the various curricula. These are beside the development of multimedia applications concerning the presentation of the holy Quran and Islamic jurisprudence books. However, the multimedia applications within the different practical fields are limited. Also, most of the developed Arab multimedia applications depend on the "Stand alone" environment. These applications seldom use the "LAN" or the "Internet", although telephone lines used through the Internet have become available at a low cost, in the Arab world, but not the local telephone lines. Furthermore, there are no common criteria that govern the development process except in the data compression process since some companies used the JPEG and the MPEG-1 which are considered as ISO standard.

## **EXAMPLE 2: ADVANCED IMAGE ANALYSIS AND INTERPRETATION FOR TELEPRESENCE<sup>(22)</sup>**

### **Objectives:**

1. To develop a generic system for the analysis and interpretation of a video-based 3D scene.
2. To develop a video-based system for detection of head position in a telepresence environment.
3. To develop a video-based system for detection of the convergence angle in a telepresence environment.
4. To develop advanced input devices for tele-pointing, tele-marking and telemanipulation.
5. To develop algorithms for recognition of specific user signals such as pointing, gesture, posture lip form and facial expressions in the context of telepresence.

### **Technical Approach:**

1. Develop image segmentation and analysis techniques for precise analysis and interpretation of a video scene.
2. Develop robust and efficient algorithm for tracking of moving objects.
3. Develop techniques for extracting the eye region from facial images and for analyzing that region to detect and interpret the image of the eye-balls.
4. set up experimental systems for three dimensional tele-pointing and tele-marking in video-communications.
5. Undertake controlled usability tests, aiming at comparing various tele-pointing and tele-making models and several versions of input-devices.

- Region based coding
  - Object oriented coding
  - 3D model based coding
  - Multi-scale coding
  - Morphological coding
  - Hybrid wave form / object coding
2. Develop and evaluate computer simulations of second generation source and channel coding algorithms.
  3. Evaluate the complexity of the computing methods used from the viewpoint of VLSI implementation.
  4. Implement selected schemes in prototype hardware.
  5. Establish protocols for subjective quality assessment with limited user populations.

### **Key Result**

1. Proposals for second generation high compression coding techniques appropriate to various kinds of application.
2. Computer simulations of individual techniques.
3. Hardware implementations (dedicated hardware or programmable processing) of selected techniques.
4. Evaluation reports on computer simulations and hardware implementations.
5. Evaluation reports on subjective studies.
6. Contribution to ACTS Impact Assessment and Information Window.

18. Interactive image service architecture.
19. Service interface, user guidance and information retrieval in multimedia distributive services.
20. Copy protection for distribution services.

## **EXAMPLE 1: ADVANCED SECOND GENERATION IMAGE CODING TECHNIQUES<sup>(21)</sup>**

### **Objectives:**

1. To investigate a range of potentially high compression coding techniques and identify the more promising candidates for applications such as very low bitrate mobile video communication and very high definition television.
2. To develop, simulate and evaluate implementations of new advanced second generation image and video coding schemes, based on the requirements of specific pilot applications.
3. To develop procedures for the objective assessment of primitive and picture quality.
4. To perform feasibility studies in order to assure the viability of hardware implementation for a real application.

### **Technical Approach**

1. Examine a range of potentially high compression coding techniques and assess their suitability for particular types of application. Amongst the techniques considered should be:
  - Advanced segmentation and motion estimation.

## **ADVANCED ISSUES OF MULTIMEDIA IN EUROPE**

The European Commission Directorate General XIII, published a book containing the advanced issues of multimedia until 2010.

I will mention these advanced issues in interactive multimedia and give two examples in details as an evidence of quick development of multimedia:

1. Digital television.
2. Multimedia description languages.
3. Image coding for stereoscopic, multiview, 3D and full space television.
4. Image transcoding, post-processing and upstream provision.
5. Audi, speech and language technology for multimedia and virtual presence.
6. Architecture and processing for advanced image processing, coding and transcoding.
7. Advanced image analysis and interpretation for telepresence.
8. 3D model building and image synthesis for telepresence.
9. Communication aspects of virtual presence.
10. Advanced user support for telepresence.
11. Telepresence and multimedia demonstrators.
12. Distributed multimedia systems.
13. Interactive television in a multimedia environment.
14. Modulation and channel coding for integrated broad band applications.
15. Cellular television.
16. Interworking for digital television systems.
17. Architecture and processing for digital television channel coding.

2. **A stable technological road map.** The compression techniques supported in the current products will be available in future generations, thus allowing developers and customers to plan and predict the evolution of their applications over time.
3. **RTV (Real Time Video) capability**

RTV supports on-the-fly capture and playback of video, allowing low-cost in-house development of multimedia applications.
4. **Platform independence.** Many environments, including OS /2, DOS-based Link Way Lives, and DOS / Windows can employ identical DVI-compressed content.
5. **The ability to update DVI applications and content incrementally, which stems from DVI digital technology.**
6. **Convenient content portability on small digit media, such as rewritable optical disks and CD-ROM disks.**
7. **The ability to network DVI content.** DVI content. DVI technology basically consists of software and a set of video processors, the i750 PB/DB (Pixel Processor and Display Processor), that give manufacturers the ability to create a digital, multimedia personal computer or platform. These video processors comprise high speed, special purpose computer chips to compress, decompress, and display video in the personal computer.

According to the analysis of the questionnaire applied in the GITEX'96 exhibition and referred to in the introduction of this paper, the questionnaire indicated that all the companies use CD-ROM as a storage media, and not a single company uses the other types of CD's such as the CD-ROMXA or the CD-5.

1. provides multitasking capabilities with real time response;
  2. has a versatile modular design and can be loaded into ROM;
  3. supports a variety of arithmetic and I/O co-processors;
  4. is independent of the playback device;
  5. can handle multilevel tree-structured disk directories; and
  6. supports both byte-addressable random access files and real time files.
5. CD-ROM XA<sup>(19)</sup> (CD-ROM extended Architecture).

Jointly developed by Philips, Sony Corporation and Microsoft Corporation in 1989 as response to the CDTV introduced by Commodore. CD-ROMXA acts as a bridge between CD-ROM and CD-I. This has the additional benefits over CD-ROM of interleaving sound and video data. A CD-ROM XA disk can be played on a CD-I platform but not vice versa. It is an essential component of Microsoft's plan for multimedia computers.

6. DVI (Digital Video Interactive).

DVI currently appears as the most promising method of rendering hardware-based full motion video on the PC. DVI technology provides for up to seventy two minutes of full screen, full motion (thirty frames / sec) video / audio playback from a CD-ROM drive, rewritable optical disk, hard drive, or Local Area Network. In addition, DVI technology supports real-time full motion video capture and the capture and playback of high resolution still in a range of formats.

DVI technology has multiple advantages<sup>(20)</sup>:

1. A programmable Intel chip set. This programmability allows DVI technology to remain open to multiple present and future video compression standards. A key distinction of DVI technology over solutions that "hardwire" a particular compression algorithm.

dependent upon the constant linear velocity of the drive. AT 1.4 m/sec capacity is 540 MB (63 minutes record time) while at 1.2 m/sec it is 640 MB (74 minutes).

3. **CDTV:** Commodore introduced its CDTV (Commodore Dynamic Total Vision) interactive multimedia player in April 1991. It emerged as the first consumer interactive multimedia player, able to run a new generation of compact disk-based applications. A blend of CD-ROM and Motorola 68000 and Amiga multimedia technology form the core of CDTV.

The CDTV player resembles a conventional audio compact disk player. It connects to a television set and some audio system to become an interactive education, information, and entertainment center from living room. A simple hand held infrared remote control provides access to an entire library of multimedia titles.

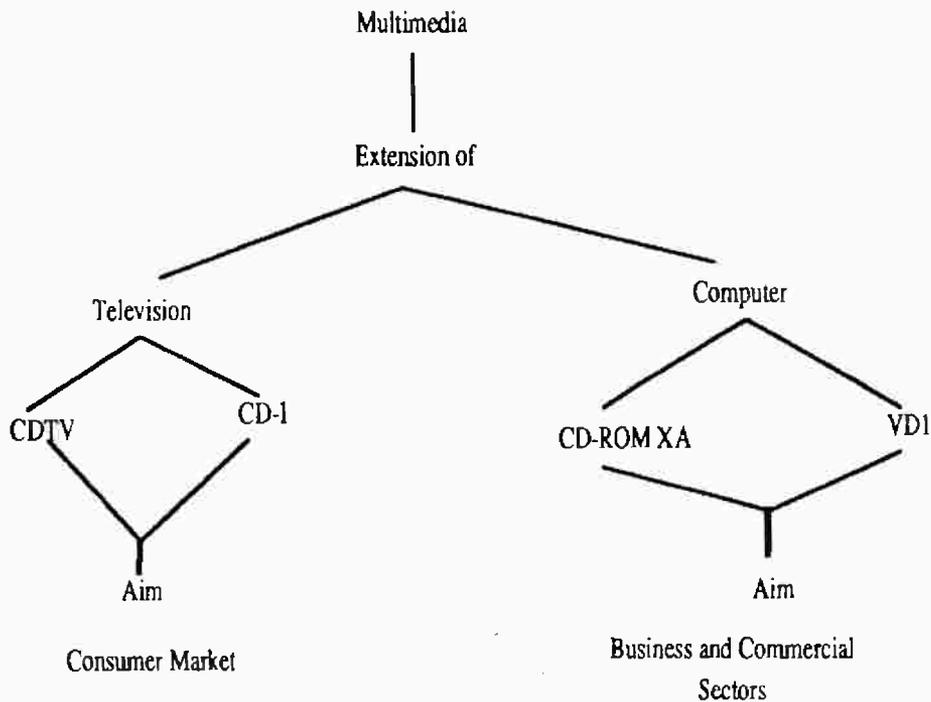
4. **CD-I (Compact Disk Interactive):**

Consists of a computer inside a CD player. The computer in the CD player contains a megabyte of memory and a real-time operating system (CD-RTOS). To use the device, one need only hook it up to a television set. CD-I introduced in October 1991, basically extends CD-ROM, just as CD-ROM extends Compact Disk Digital Audio (CD-DA). CD-I resembles CD-ROM from a technical point of view but CD-DA from the player / product point of view in that it is designed for "plug and play" environments. Like CD-DA, CD-I is interchangeable with other CD-I systems and backwardly compatible with CD-DA and CD-ROM (that is, CD-I players also play CD-DA and CD-ROM disks). In addition, the disks are self-contained meaning that they do not presuppose any other hardware of peripherals other than the CD-I player and a TV.

Because many applications for the consumer market require real time activity, CD-I incorporates a microprocessor and an operating system called (CD-RTOS). This operating system<sup>(18)</sup>:

## MULTIMEDIA PLATFORM

Figure 4 declares the two approaches to delivering multimedia:



**Figure 4 - Multimedia Platform**

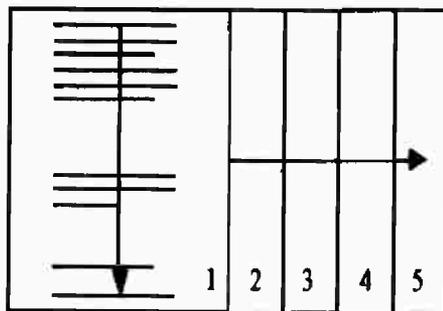
Multimedia information can be stored on<sup>(17)</sup>:

1. CD-ROM (Compact Disk-Read Only).

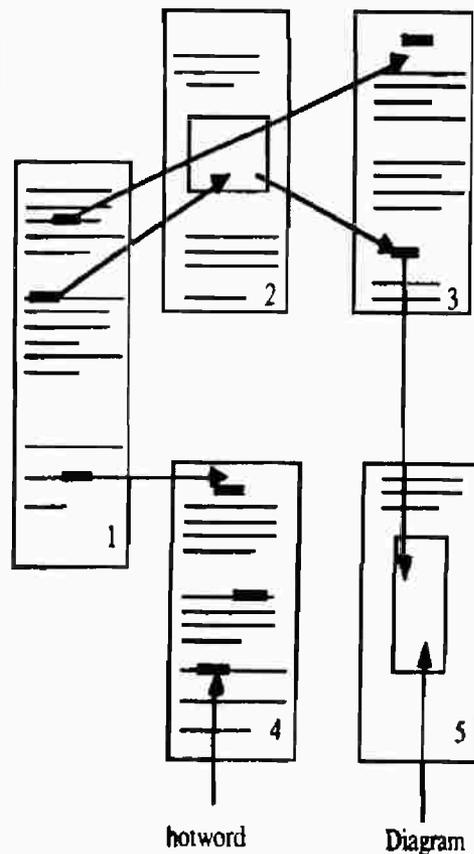
A 4.15 inch laser encoded optical memory storage medium (developed by NV Philips and Sony corporation) with the same Constant Linear Velocity (CLV) spiral format as compact audio disks and some videodisks. CD-ROMs can hold about 550 to 680 megabytes of data.

2. CD-R (Compact Disk-Recordable) is WORM product. A 5.25 or 3.5 laser encoded optical memory storage medium with storage capacity vary

(sometimes called "nonlinear" information access) and different users will want different information at different times. In Figure 3 we see an example of this in which the user may jump from highlighted words or phases to other section of text or diagrams on any page. It is as though all the pages of a book were loose and could be accessed in any order the user chooses.



**Figure 2**  
**Linear Information Access**



**Figure 3**  
**Nonlinear Information Access**

1. One company considered the use of authoring tool as a criterion.
2. Only two companies used common criteria, in the field of data compression, namely the JPEG and the MPEG 3 and 4.
3. The remaining companies did not cite common international criteria.

According to the questionnaire, the findings regarding the operating systems used by the companies are as follows:

- Most of the companies use the windows' operating system. Of these, nine companies use the 3x windows; 8 companies use windows 95; one company uses NT windows; two companies use the DOS as an operating system, whereas only one company uses the MAC or the OS/2 or the UNIX (SUN) system respectively.

#### 1.4 Interactive links:

Interactive links represent an integral part of multimedia(16) because the user can point with a mouse and click on certain screen "objects" such as a button or highlighted text and cause the program to respond in a certain way. Some software uses what is often called "balloon help". With this feature, if anyone move the mouse pointer over a word or illustration that has additional information, an explanatory window automatically opens up without the need of click on the mouse button.

These interactive links, together with the information they connect, are often referred to collectively as hypermedia. More specific terms, such as hypertext (hotword), hypergraphics, and hypersound, indicate what type of information is linked. It is this interactive nature of multimedia that makes it extremely useful in providing information to the user.

Unlike a book (figure 2), which is designed to be read from the top of the page down and from cover to cover (sometimes called "linear" information), multimedia allows users to access information any way they choose

**Table 3 Supportive Software Useful for  
Developing Multimedia Programs**

Software Type	Function
World processor	Develops text
Scanning	Scans graphic images or text
OCR	Interprets scanned characters text
Screen capture	Captures images from computer screen
Conversion	Converts graphics formats
Painting / drawing	Creates and modifies graphic images
"Clip" software	Provides simple graphics, animation, and sound clips
Animation / sound	Creates animation and sound
Communications	Downloads public-domain graphics software; exchange information with other users

2. One company cared to consider quality assurance as one of the multimedia development phases. This may be considered as a positive phenomenon for ascertaining product quality. It is also noticed, in connection with this company, that its phases of revision and tests are numerous.
3. Only two companies cared to underscore the importance of mentioning the design of graphical user interface.
4. Two companies underserved the phases of producing and distributing the product as one of the phases of multimedia development.

As to the criteria that have to be taken into account in multimedia development, only seven companies out of eleven responded to this question. Their answers, however, indicated the following:

- C language
- CENTURA Team Developer
- 3D Studio
- Borland C++5
- Tool Book
- Delphi
- Creative Wave Studio

It is noticed, however, that each company uses more than one authoring tool.

### 1.3.2 Supporting software:

Some authoring tools do not have the capabilities to produce the type of graphics, animation, or sound required by the multimedia application or the developer need some very specialized software to perform tasks not even possible with authoring software such as optical character recognition. Most multimedia developers use a variety of additional software to produce files that they incorporate into a multimedia program. Table 3 provides some types of supporting software<sup>(15)</sup>.

Meanwhile, according to the analysis of the questionnaire applied in the GITEX'96 exhibition and referred to in the introduction of this paper, multimedia development phases were revealed through relevant feedback. Indications are that there seem to be some discrepancies between those who filled the questionnaire vis-a-vis the multimedia development phases. However, the main elements of the relevant development processes are alike and compatible with the common multimedia development taking into account the following:

1. One company cared to mention the compression process in the development phases.

**Table 2 Features of an Authoring Tool**

Text Hypertext Auto-hypertext Text style Text importing / exporting
Graphics Integrated drawing tools Clip art Graphics importing Supported resolution
Animation Integrated animation tools Animation clips Animation file importing Recording and playback capabilities Transition effects
Sound Fidelity Sound clips Sound file importing Recording and playback capabilities
Interactive links Navigational control
Bookmark feature Automatic linking capabilities
Programming environment Scripting language Debuggers Runtime system
Speed
Documentation
Working demoversion
Technhical support

## 5. Facilities interworking between previously completely separate services.

The generalization of digital transmission techniques will make it possible to introduce advanced virtual presence services.

### 1.3 Software:

In the context of multimedia, there are two categories of software:

1. Authoring tools.
2. Supporting software

#### 1.3.1 Authoring tools:

Five main components of multimedia must be taken in consideration when determined the features of authoring tools, text, graphics, animation, sound, and interactive links, and there are also some other features such as the programming environment and runtime capabilities, speed, documentation and technical support. Table 2 summarizes these features<sup>(14)</sup>.

According to the analysis of the questionnaire applied in the GITEX'96 exhibition and referred to in the introduction of this paper, as regards authoring tools and programming language used in the multimedia development phases, the companies who are subject of the questionnaire, the relevant findings are:

- The most common authoring tool used is the video for windows used by seven companies.
- Next to this tool are the following ones in order of preference:
  - The V.Basic: used by six companies.
  - The Visual C: used by four companies
  - The author wave and the micromind director: used by two companies.
- Only one company uses each of the following tools:
  - Astond director

2. Multimedia software development.

3. Delivery tools

From the writer point of view there are five elements of multimedia:

1. Telephone

2. Audio visual (TV)

3. Computer (digital)

4. Software

5. Links.

### 1.1 Telephone and audio visual:

The telephone and television<sup>(12)</sup> started with analog technology. The telephone network developed into a worldwide system for switched point to point communications. Television developed into a broadcast system aimed at a mass audience. The two systems used similar technology for transmission and storage (cables, radio, magnetic recording) but customized to their own specific needs.

### 1.2 Computer (digital):

The digital computing provides the capability to process, switch and store images and sound digitally. This offers a more efficient way of delivering the traditional services but also creates the opportunity for a range of more advanced services.

Digital signal representation and processing techniques make it possible to<sup>(13)</sup>:

1. Increase image quality, definition and realism.

2. Associate multilanguage and surround soundtracks with video streams.

3. Create advanced interactive audio visual services.

4. Transmit moving images over narrow-band networks.

methods of compression assigned to them such as DLL's and Cinepak. Concerning type of digital audio used, six companies use the MIDI and 11 companies use the WAV.

As type of digital video used:

5 companies use the MOV

8 companies use the AVI

one company uses the FLC

one company uses the FLI

one company uses the animation interactive (Astand).

Relating to the multimedia platform, 9 companies use the Stand alone, four companies use the LAN and one company uses the Internet. Meanwhile, the protocols used in those companies having networks are the TCP/IP, IPX / SPX and ISDN.

## **HOW INTERACTIVE MULTIMEDIA WORKS**

All interactive multimedia systems are required to handle massive amounts of information - be it text, graphics, animation, sound or still or moving pictures, as follows<sup>(10)</sup>:

1. A scenario has to be setup to design the interactive navigation system.
2. The producers must convert the visual or sound information they receive from analog to digital signals. Then they must store this information.
3. They must transmit and process it (i.e., convert the signals back to analog from digital).

## **MULTIMEDIA ARCHITECTURE**

### **1. Elements of multimedia:**

There are three elements of multimedia<sup>(11)</sup>:

1. **Multimedia hardware, operating system and graphical user interface.**

## 7. Evolution of multimedia stages.

There are three of multimedia stages explore in the following table.

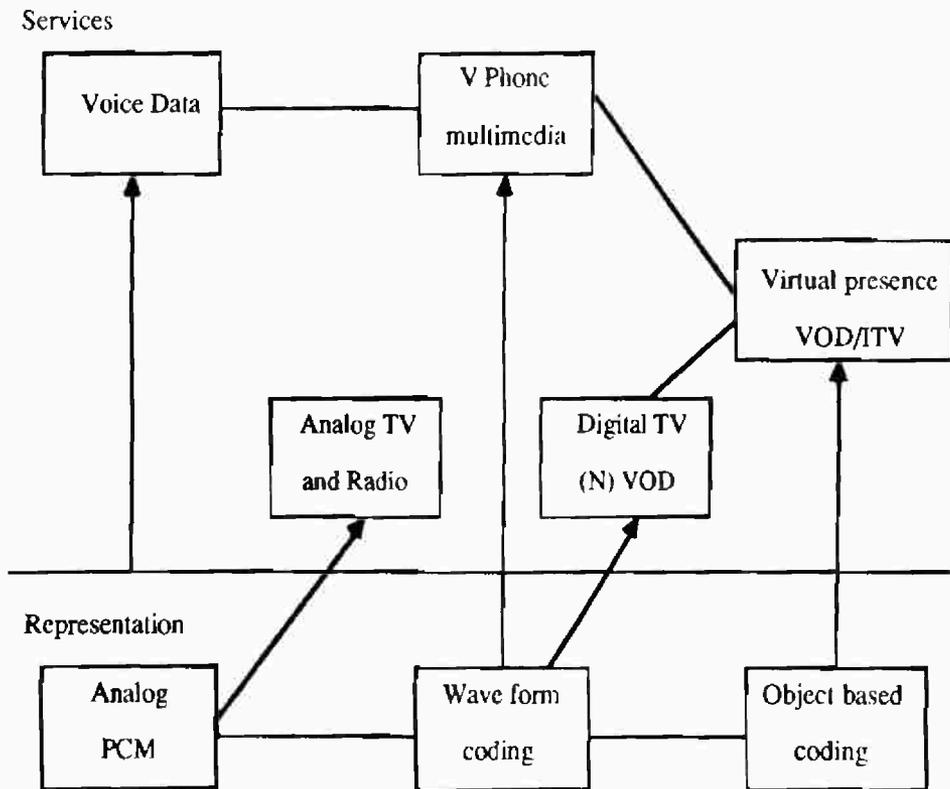
**Table 1- Multimedia Stages**

Stages	Processor	Application	Compression Tools	Network	Authoring Tools
First	Intel 80386 and Motorola	Image and animation	JPEG (Joint Photographic Expert Group) video compression techniques	Local area network based on ethernet and token ring	Hypermedia authoring tools
Second	intel 80486 and MC 68040	Moving and still images, 16 bit audio	JPEG and MPEG-1 (Moving Picture Expert Group) video compression	FDDI (Fiber Distributed Data Interface network)	Object oriented multimedia authoring tools that incorporate text, graphics, animation and sound
Third	Pentium and power PC	Full motion VCR quality video, moving to NTSC/PAL	MPEG -2, -3, -4	PSTN/ISDN network	Integrated object oriented multimedia authoring tools

Meanwhile, according to analysis of the questionnaire applied at the GI-TEX '96 exhibition and referred to in the introduction of this paper, the applications referred to in Table 1 are produced by most of the companies. These companies are subject of the questionnaire, since they produce multimedia containing texts images still images, animation and sounds but without full motion video's applications.

Regarding compression, tools, four companies do not use them, whereas three companies use the JPEG; one company uses the MPEG-1; another company uses the MPEG-2. Also, there are other companies which use other

PSTN/ISDN networks. The fixed network (PSTN /ISDN and CATV) will develop limited broad band and two way capabilities (ADSL, return channel on CATV etc.) therefore enabling the uptake of advanced services such as video phone, multimedia communication, interactive TV (ITV) or video on demand (VOD). Digital technology and satellites services will deliver more channels allowing near VOD (N-VOD) to be offered. Multimedia newspaper may also develop. Satellites will continue to provide N-VOD and also possibly take a share of the mobile communication market.



**Figure (1) Evolution of Multimedia Communications and Representation**

- b- image processing, such as in the field of medicine where a multimedia information "package" contains images to be manipulated by the user.
4. A third branch emerging slowly where applications are commercially led (i.e., mass market is envisaged comprising potential buyers for a multimedia product developed on a workstation). It will not be long (probably before the end of the decade) before this workstation-based application can be delivered direct to the consumer via ISDN or broad band communication networks. This would mean that the product would be accessible to many users simulatenously.
  5. It has been predicted that local dissemination platform in the shape of stand alone systems will have their share of the market halved by 1997 and that the market share of distributed platform dissemination via ISDN will mushroom from practically zero to take 50 % by that time. For this delivery method to take off two crucial elements are needed:
    - a- the establishment of transnational and compatible digital networks;
    - b- the emergence of leading edge users.
  6. By the year 2010<sup>(8)</sup> it seems reasonable to assume that there will be many more TV programmes available to the customer and that many of these will be interactive in nature. The boundaries between computing, communications and broadcasting will have largely been eliminated and user friendly multimedia terminals with flat panel displays will provide access to a wide range of entertainment, communication, infomation and education services. Broad band connection to both workplace and home will eliminate the local loop "bottleneck". service designers will be able to trade bandwidth and coding complexity to achieve the desired service features and usability. A graphical representation of a likely evolution scenario for the convergence of customer services and accedd network is depicted in Figure1<sup>(9)</sup>.

The bulk of today's TV services are delivered over terrestrial networks whereas phone and data transfer services are mainly relying on the

(e.g., text, presentation, graphics, animation, voice), and it is allowing information to be linked by association<sup>(5)</sup>.

#### **4. Importance of interactive multimedia services**

Interactive multimedia services have the following importance<sup>(6)</sup>:

1. Interactive television, combined with widespread use of video conferencing and the ability to access multimedia databases from the home, open new possibilities in areas such as education, retailing and medicine.
2. In almost every business sector, distributed multimedia services will:
  - a- provide universal access to huge information banks;
  - b- reduce travel through telepresence or remote shared work spaces;
  - c- enhance personal communications through advanced mobile system.
3. Multi-lingual services will be a powerful force for economic development and social cohesion.
4. A rapidly developing multimedia sector will create new employment opportunities.

### **EVOLUTION OF MULTIMEDIA**

Multimedia evolved through these steps<sup>(7)</sup>:

1. In the 1980s multimedia applications were used extensively in the educational and professional training fields to equip students and workers who needed to get to grip with new technology.
2. By using multimedia techniques the training could be tailored to specific groups of workers and delivered on site.
3. In the early 1990s multimedia has grown away from its training and educational bias into applications serving business, such as:
  - a- in a museum or tourist office (called "point of information");

Multimedia is a computer facilitated integration of multiple information formats. As such, multimedia includes the use of two or more media forms including static media: text, data, graphics, still image, and dynamic or time varying media: animation, full motion video, speech, and non speech audio<sup>(2)</sup>.

## **2. Interactive multimedia is defined as**

"A specifically designed way of combining sound, still and motion pictures, graphics and animation, and data and text together with the interactive capabilities of a computer"<sup>(3)</sup>.

## **3. Hypertext vs Hypermedia**

Hypertext may be defined as the concept of identifying relationships among units of text-based information and providing computer supported navigational paths to this information by traversing through pre-defined networks. In other words, hypertext can be thought of as a computerized network of nodes or database objects and links or arcs used to traverse between nodes. Hypermedia extends the concept of hypertext to include multimedia in addition to simple text document display. Multimedia greatly enhances the explanatory power of these systems and allows a wider range of information to be extracted and conveyed to users. The term hypermedia thus contains two distinct concepts. The first is the notion of navigating through a network of nodes. We use the term hyper-navigation to denote the action traversing through a hypermedia network. The second distinct concept is that the nodes of the network may be multimedia objects (i.e., text, graphics, animation, images, full-motion video, sound, etc.)<sup>(4)</sup>.

Frequently, the terms multimedia and hypermedia are used interchangeably, however, hypermedia is defined as a kind of multimedia management and delivery system that links two or more media in an associative, nonlinear way, through a software application program. Hypermedia have several information structures where links are explicit, it also a form of multimedia

to identify relevant technical aspects on the basis of practical application. The questionnaires are distributed among multimedia producing companies in Egypt and similar companies in the Middle East as well as those companies producing Arabic multimedia on a global level. The questionnaire was distributed at the 16 th GITEX exhibition held in Dubai, November 3-6, 1996. The exhibition paraded major world and Middle East computer companies, with ultra modern computer and programming technology on display, ranking third among the best and biggest computer exhibitions worldwide.

More than 400 exhibitors and programmes' developing companies participated in this exhibition that attracted more than 100,000 visitors with total sales of about 50 million UAE Dirhams in 1996. The prime consideration in the distribution of the questionnaire was that the main activity of a company is only the evolution of multimedia programmes. Hence, the questionnaire<sup>(\*)</sup> was distributed to 16 specialized multimedia companies<sup>(\*)</sup>, of which 11 companies<sup>(\*)</sup> returned the questionnaire while 5 others declined.

Meanwhile careful considerations were exerted, making sure that filling the questionnaire was done by either the titles developers, if available at the venue, or by the technical supervisors in these companies where programmes actually took place.

## **BASIC CONCEPTS OF MULTIMEDIA**

### **1. Multimedia is defined as**

"Multimedia is at the combination of two or more component technologies such as audio, video, image, graphics, and alphanumeric data"<sup>(1)</sup>.

\* See Appendix 1 (The Questionnaire).

\* See Appendix 2 (Names of Companies and Officials who returned the questionnaire and were interviewed).

\* See Appendix 3 (The multimedia titles produced by these companies and an abstract thereof).

## INTRODUCTION

There is not the least doubt that we are now at the threshold of the multimedia era. The multimedia evolution taking place in this domain is clear since it is used in many fields, such as education, training, marketing, industry and administration systems. Multimedia, however, depends on interaction between text, sound, graphic images and motion, through a single application, thereby rendering it more attractive, to its users, as an information system.

Meanwhile, fast-paced evolutions taking place within personal computers industry and increased storage capacity of the storage media, especially the CD-ROM, have become one of the key components of the personal computers. In addition to current changes in semi-conductors, and the evolutions that have taken place in the field of programmes such as in data-compression, the authoring tools and object-oriented programming have completely paved the way for the preparation of various multimedia applications.

However, it is noticed that ongoing evolution in this aspect of computer sciences in the Arab countries, is not a match to and lags behind in the current development compared with foreign countries that have greatly advanced in this field.

In this light, this paper is an attempt to identify the status quo modalities of the Arabic produced multimedia, and whether this evolution takes into account technical rules related to the development of multimedia programmes in the foreign countries that have advanced in this domain.

This research relied on study of available literatures that are related to multimedia as a theoretical context of the paper. Subsequently, a questionnaire was designed and distributed among multimedia programmes producing companies so as to know how far this industry has developed. It is also

## **CHAPTER 12**

# **INTERACTIVE MULTIMEDIA DEVELOPMENT IN THE ARAB WORLD**

By

**Dr. Alaa Eldin Mohamed El Ghazali**

### **ABSTRACT**

This paper expounds the evolution of the interactive multimedia in the Arab countries using an applied theoretic context. The theoretical aspect, however, includes:

1. Introduction.
2. Basic concepts of multimedia
3. Evolution of multimedia
4. How interactive multimedia work
5. Multimedia architecture
6. Multimedia platform
7. Advanced multimedia issues in Europe

In order to explain the findings of the applied aspect through theoretical handling, a questionnaire is devised in order to identify the extent of multimedia evolution in the Arab states. This questionnaire was distributed at the GITEX'96 exhibition in Dubai, among a sample of multimedia producing companies in Egypt, Saudi Arabia, Lebanon, the United Arab Emirates (Dubai), Iran as well as the Arabic multimedia producing companies in the United States and the United Kingdom.