



ICSP 2003

ICIS

International Conference on Signal Processing

Zehra ALAKOÇ

*Thank you for participation and contribution to the
“International Conference on Signal Processing”
24-26 September 2003, Çanakkale, Turkey*


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ICSP-2003

Eylül 24-26, 2003, Çanakkale, Türkiye

BİLDİRİ KİTABI

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Dear Reader,

The International Conference on Signal Processing (ICSP' 2003) organized by the Department of Computer Engineering of Çanakkale Onsekiz Mart University in collaboration with the International Computational Intelligence Society- ICIS was held September 24-26, 2003, in Çanakkale, Turkey. The Conference venue was the Five-Star Kolin Hotel – Convention Center, located on the coast of the Dardanelles. The ICSP Conference has been the comprehensive technical conference focused on signal, speech, and image processing and its applications. The Conference aimed at covering all aspects of signal processing theory and applications. Sessions included presentations on new research results in the field of signal processing.

The International Conference on Signal Processing provided a medium for the scientific information interchange between theoreticians, researchers, developers, engineers, and practitioners to address the important issues in signal processing. The main goal of the conference was to promote research and developmental activities in signal processing and related fields across the world. The ICSP Conference sought to foster the interdisciplinary exchange of ideas leading to significant advances in signal processing. Therefore, the Conference provided a truly unique forum for presentation and collaboration across disciplines. The ICSP Conference sought high-quality original papers that contribute to this goal. All topics relating to signal processing were welcome and new, unusual and hybrid approaches were particularly encouraged. Both theoretical and applied papers were solicited.

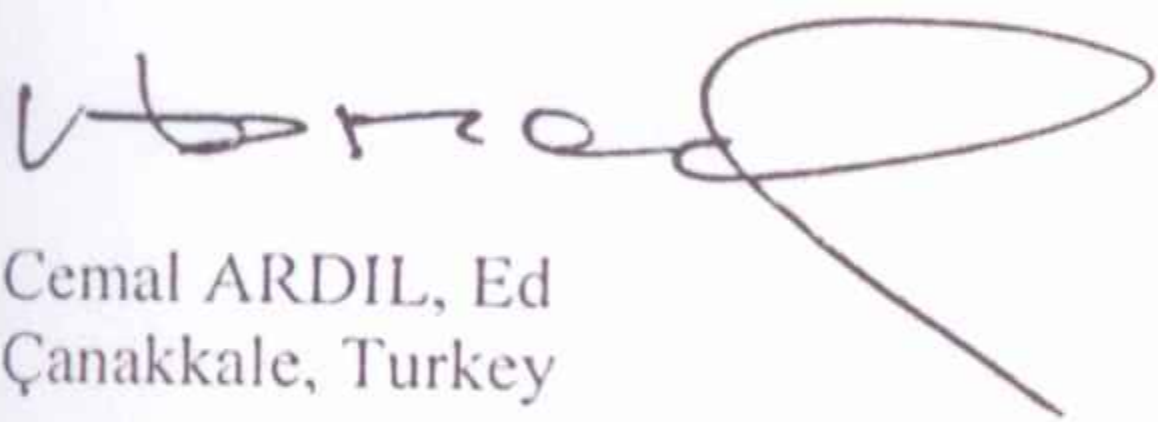
Conference Topics Included (but not limited to):

Image and Multidimensional Signal Processing
Speech Processing
Audio and Electroacoustics
Sensor Array and Multichannel Signal Processing
Signal Processing Theory and Methods
Signal Processing for Communications
Design and Implementation of Signal Processing Systems
Machine Learning for Signal Processing
Signal Processing Education
Internet and Multimedia Communications
Industrial Technology Track

The accepted full papers for the ICSP 2003 Conference were published in the International Journal of Computational Intelligence (IJCI) in electronic version. The Conference full papers were recorded in the CD-ROM format of the IJCI journal and these CD-ROMs were distributed to abstract/indexing institutions worldwide. The full papers are also available online at the IJCI's web site (<http://www.ijci.org>). This issue of IJCI journal includes the abstracts with keywords of the accepted full papers. I would like to offer many thanks to my colleagues for participation and contribution to the International Conference on Signal Processing. The members of conference organizing committee express their gratitude to the Rector Prof. Dr. Ramazan AYDIN and the Dean, Faculty of Engineering & Architecture Prof. Dr. Salih Zeki TUTKUN for their support.

With my warmest regards,

24 September 2003



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USAGE OF WEB PAGES AND MULTIMEDIA OBJECTS

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Key words: Web pages, multimedia, audio and picture files

ABSTRACT

Today information is shared quickly and effectively through web pages. By the web pages including multimedia objects, information has become more effective, interactive and is understood easily.

I. WEB PAGES

www, web, or W3 (World Wide Web), is a hyper media system which help us to reach the data in different formats such as text, picture, video, audio and animation in a compact and interactive way. Hyper media gives us an opportunity to call (navigate) a document from another document (the documents one within the other). Here, each object can call another object (link). The link, can be anywhere within the same document as well as it can be in another place physically (in any computer on internet). All these different objects can be used together with a suitable standard and be viewed with a web browser. Another function of the web is to contain other inter services in itself (ftp, gopher, news, wais etc.). Web applications (web pages) are viewed with web browsers (Browser, explorer). Web pages include hyper links to other pages and different types of objects[1].

Web browsers show the information in the web sites connected on the screen. The information on the web does not only consist of texts but also very different types of data and multimedia elements such as certain types of picture, audio and animation. In the beginning these were text, standard audio file (Wav) and picture file (gif), then these are added with different types of data such as Video formats (.mov, .mpeg, .avi, .mpg, .dat), different picture formats (.bmp, .jpg, .jpeg, .gif, .tif, .rle, .tga, .png), audio formats (.mid, .au, .wav, .mp3, .wma, .vqf) and some other formats (Live3D, Shockwave, RealAudio). The computer has to be loaded with different programmes to view this information in different formats. As the using of data in different formats on the web becomes widespread, instead of using auxiliary applications, program accessories called Plug-In developed in Web Browsers. For example: When an archive including MIDI formatted music files is opened, if the MIDI-Plug-In is loaded, these types of files can be listened without any need for the other programs. Or, when a site including Quick Time (.mov) files is connected, if the Quick Time Plug-In is loaded, without leaving the web site these movie files can be watched (mostly at the same time the download started).

II. MULTIMEDIA

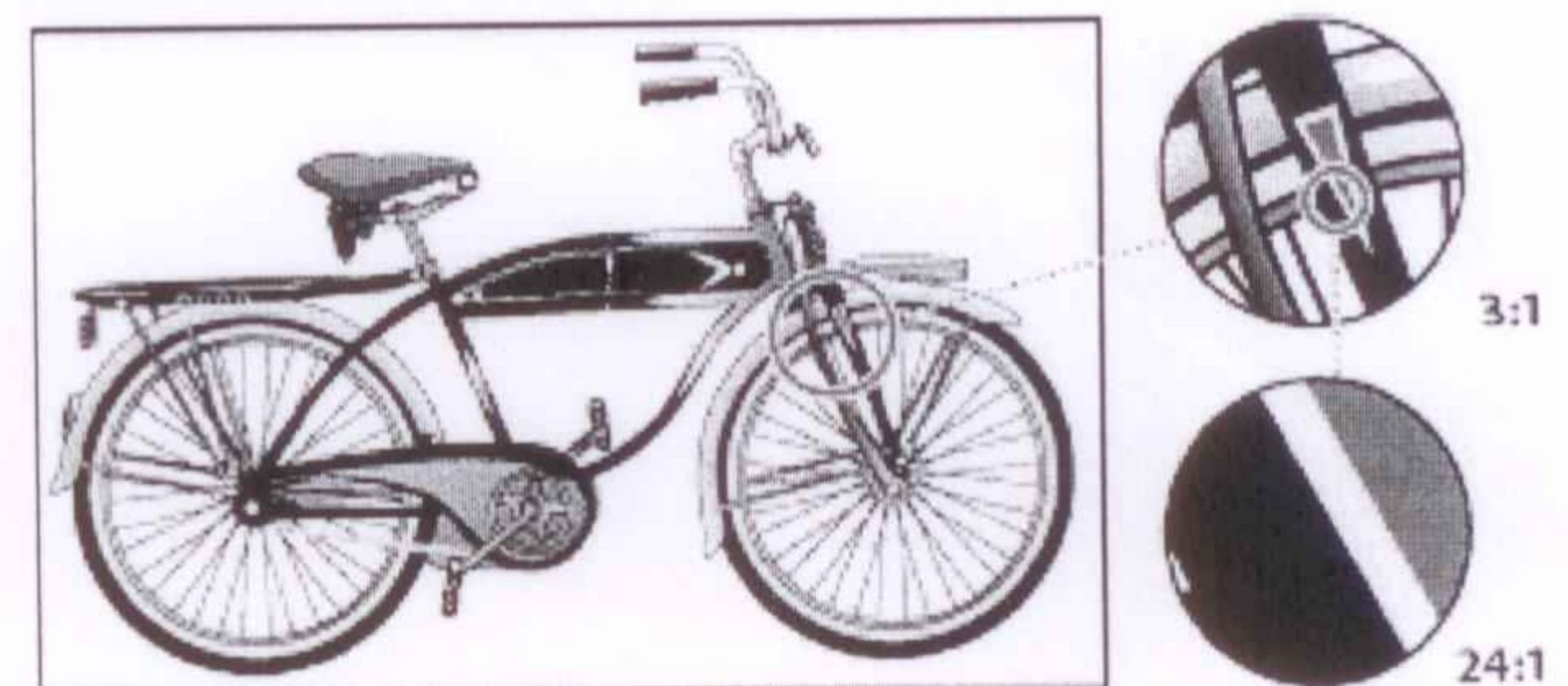
Today, the multimedia elements are the most important elements of the web pages. Although there are many definitions of the term multimedia, we are going to use two of the below.

As we define the media as an environment in which the information flows ; the multimedia means the processing and the viewing of the different medias, such as text, photograph, video, audio and animation, by the computer. For an application to take part in the multimedia category, it has to be used at least with two of these medias. In interactive multimedia the user is not passive watcher but an active participant. He or she has many different chances to reach the information such as by using links, to guide it by entering data or by touch screens and live participation through video conferences. [2]

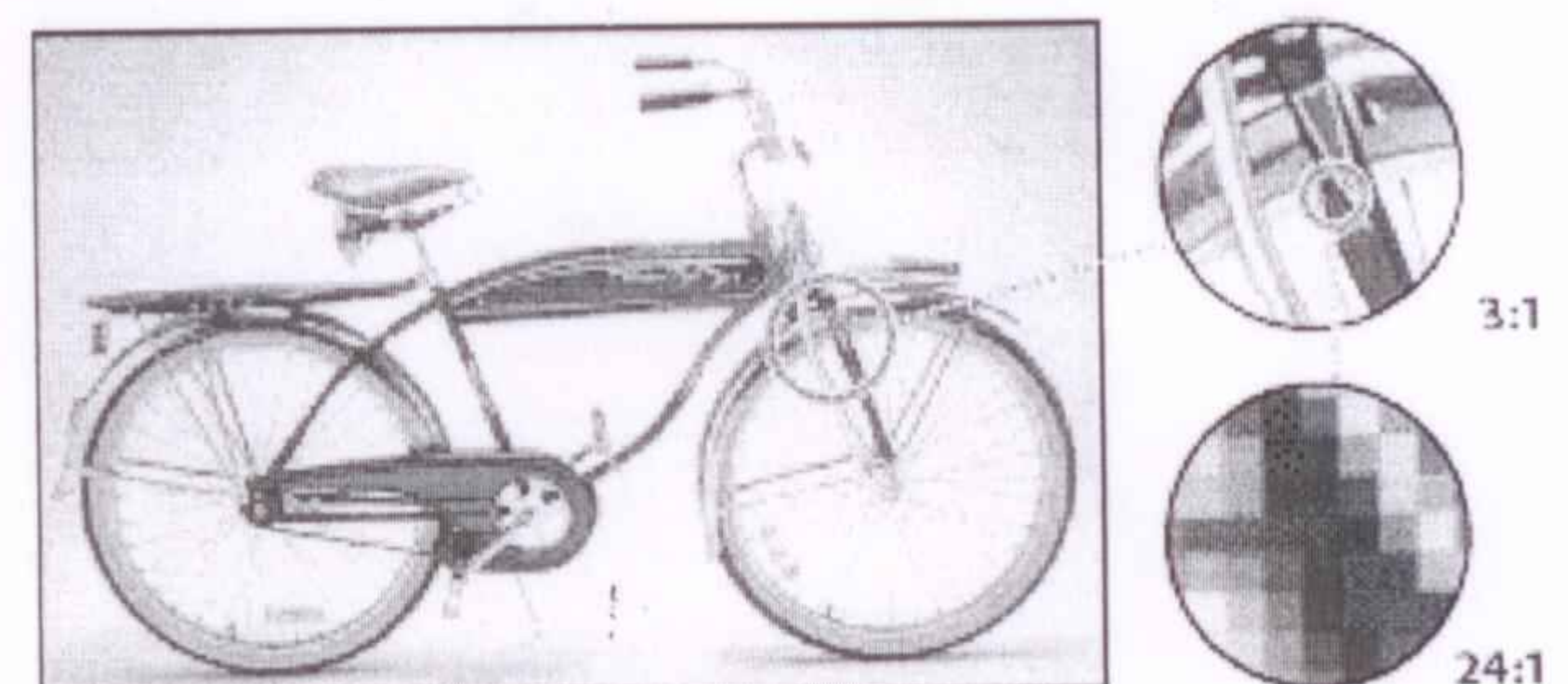
Multimedia means multiple media. Multimedia, in a general meaning, is a user interface supported with the using of tools like text, audio, video, graphics and animations in a computer based application [3].

III. TYPES OF GRAPHIC VIEWING ON COMPUTER

Graphichs are shown in 2 different types on the computer screen as vectoral and bitmap.



Vectoral graphics, are the formats consists of the lines which are flexible and can be painted. And these cover less space in zoom in and out without breaking the picture. As it is seen in the example above, when a certain part of the bicycle is zoomed in 24 times, the result will not be broken.



Bitmap graphics consist of pixells. Web documents usually contains bitmap images. Bitmaps cover more space as compared to the vectoral ones and in zoom and out it causes breakings. As

shown in the above example, it is obviously seen that when a certain part of the bicycle is zoomed in 24 times it is broken and the pixels appear. [4].

IV. WHAT IS BITMAP?

There are millions of tube shaped dots on a computer screen. These dots are called pixel. Each pixel may have a different colour and brightness. The number of pixel viewed on a computer screen is called resolution [5]. Bitmap is the name of the general formats including colour information of each pixel constituting the screen to view an image. GIF, JPEG, BMP, PCX are the sample Bitmap formats. To view the bitmap files on the screen and to take outputs from the printers some special programmes such as Paint, Photo Shop, Xview and ACDSee are needed.

Bitmap formats create the picture with a constant description depending on the resolution of the picture (Raster technique). If the picture is scaled in this case (zoom in / zoom out), most of the details may be lost. In vector based graphic formats, loss is prevented in scaling since the descriptions are relative (CAD formats, Post Script (PS, EPS) formats etc.).

Resolution in Bitmap graphics

On the vectoral or bitmap objects, the number of the dot or pixel on each line gives the resolution degree of the graphic. These are the changing values for the screen viewing and printer outputs.

Pixel calculation

Pixel value is calculated according to the length and the width of the bitmap objects. These values are changeable depending on the computer's screen resolution. For example, on 13 inch computer screen working with the resolution of 800 pixel width and 600 pixel length, and with these pixel values (width and length) as a document covers full of the screen, another document with the same values covers less space on a computer featured as 1152 pixel width and 870 pixel length.

Image resolution

The ideal resolution for the computer screens is 72 pixel/inch. If the picture worked on is pixel based and has resolution of 72 pixel/inch, it means these values have the optimal resolution on the screen. To give more than this value makes the files bigger unnecessarily, this is why to give a resolution values to the files more 72 pixel/inch is not necessary.

For example: A picture file with width and length 1 inch, resolution 72 pixel/inch and the screen resolution 800 x 600, covers $72 \times 72 = 5184$ pixel space. In the same document, without changing the width and length, if the resolution increased to 300 pixel/inch, the file covers 90,000 pixel space. As the 72 pixel/inch is the suitable resolution for the screen resolution, for the 90,000 pixel document covering more space than a 5184 pixel document causes unnecessary big size and viewing the image later. In general, for all the computer screens the average image resolution should be between 72-96 dpi.

Monitor screen resolution

In PC and Mac OS monitors, general resolution is between 60 dpi and 133 dpi (dot per inch) 72 dpi is average valid resolution.

Printer resolution

Laser printer output values are like 300, 600, 1200 dpi. For these values to be high means that the quality of the issue such as writing, picture etc. printed on the paper will be high. For example, as we do an increase on the screen from 1% to 100% and as we compare the results of a printer with 300 dpi and a printer with 1200 dpi, we see that in 300 dpi trams are bigger but in 1200 dpi, trams are smaller and more sensitive. The important point here is not to confuse with the resolution values of the subject on the screen and the printer output.

For example; If we send a file with 72 dpi resolution to a printer with 300 dpi, the output will be broken but, if we send it a printer with 1200 dpi, the result will again be broken but in more sensitive trams. If we want better results in outputs, we should work with high resolution and use a printer with higher resolution. 300 dpi is the international graphic resolution. A resolution higher than this is needed when dealing with more professional works. Otherwise, the size of the file will be bigger unnecessarily and the result would not be better than expected. The resolutions over 300 dpi are used by the graphic designers and the similar occupations.

V. PICTURE FORMATS

Bmp, gif, jpeg and tiff are the most important picture formats. They differ in main features such as coding, compressing and algorithm. Advantages and differences of these format types as compared to one another are as follows.

BMP (bitmap) : The most fundamental picture format is BMP. BMP has versions changes depending on the operating system. Especially for a X-Windows user and for a MS-Windows user or OS/2 user the bmp is different. BMP format on X-Windows supports only two colours. BMP format in MS-Windows or OS/2 called XPM in X-Windows. BMP on MS-Windows is very quick format on which 16 or more colours can be saved and any compressing can not be done. In bmp, the size of the picture is determined by the number of the colours in which the picture is saved not the number of the colours inside the picture. As the number of the colors are $= 2^n$, For example, A BMP file with 800x600 resolution and 16 colours, $2^n = 16$ $n=4$ bit=1/2byte, on the computer it covers $800 \times 600 \times 1/2 = 240000$ byte space. A file saved as 256 colors will cover $2^n = 256$, $n=8$ bit=1 byte, $800 \times 600 \times 1 = 480000$ byte space.

GIF (Graphics Interchange Format): Although they are in a very quick format, BMP formatted pictures are not preferred in web pages since they use so much space on hard disk. If the picture file, used in a web page, includes more than 256 colours, using this file as GIF is the optimal solution. Gif files have got a very good compressing algorithm and also their imaging speed is very high. GIF files are limited to 8 bit and 256 colours. This is why GIF files have at most 256 colour deepness. GIF formatted picture files are the standard picture formats for the pictures viewed in web and web browsers.

The files saved as GIF, in photos and colorful images give more unsuccessful results as compared to JPEG format. Cartoon-like images, simple linear images, company symbols and signatures can be given as examples of GIF files. Also an animated GIF file can be prepared by joining a couple of GIF files. Transparent GIF file in which the colours do not over ride, can be made as taking one colour transparent in the image.

There exist two different versions of GIF picture format as 87a and 89a. The 89a version gives the opportunity of place more than one GIF formatted picture in one GIF file and animate them. Moreover, GIF89a version provides the feature of interlaced layer image saving which is used in the pictures on the internet. So, the user see the a picture in GIF format on the internet as each time one layer and has an idea about it before the full picture becomes clear.

JPEG (Joint Photographics Experts Group) : JPG is a format and defined as with ISO standard and it has different coding systems. If the picture to be used has more than 256 colours, it is not possible to use GIF format. If this file is saved as BMP, it covers more space on hard disk. In this case, instead of BMP, it would be a better alternative to use JPEG format. However, it should be noticed that JPEG will reduce the quality in the application containing less colours and does not provide an important change in the file size.

In standard JPEG format, compressing is applied with reducing a bit the quality of the picture. So, the size of the file is decreased. Especially in 24 bit true color applications, it is not possible to understand that the quality of the picture is decreased. In these types of applications JPEG is preferred. Compressing rate of the JPEG can be chosen (between 0-100) but generally it is compressed between 5 and 95. The values over 95 can result in detail loss, the values under 5 does not decrease the file more. The second one is the 24 bit > 8 cycle. JPEG, like GIF, is a standard format viewed by web browsers.

JPEG format provides 24-bit color deepness. This value provides an opportunity to use enough qualified photos and pictures for the web site. When the file is compressed, each pixel on it saved according to its brightness. Colours and the differences are saved by rolling up not in detail. Saved file is not the file with all of the details are coded. This is why, the program opens the file which is each time saved as JPG, and compiles the information. The file can be viewed differently in separate programmes with little changes.

The quality of the each time calculated recreated picture is determined by the ratio of compressing. In most of the today's picture processing programmes, the user is asked about the compressing rate. When some changes done on the JPEG files, in fact, the original image will not be change because that the same of the previously viewed file are not viewed but the interpretation of the codes. Instead, an image of a compiled and interpreted information is taken. This is why, resaving a JPEG file, if not necessary, does not give good results. The colours in a code opened file may seen as blocks and the colours may override. This is why, it is difficult to save the pictures which are divergent with clear distinctions and this covers more space. To sum up, JPEGs are the ideal saving formats for the photos having no certain limits and multiple colours joining gradually. For example, for JPEG picture format a picture of parrot with many colours gives excellent results.

TIFF: (Tagged Image File Format) : It has 1, 8, 24 bit formats. All have two different kinds as compressed and not compressed. 1 bit one is used in file communication in fax machines. When dealing with too much colours, if the time is important and the space is not, TIFF picture format can be used. It provides less zoom out as compared to JPEG, but it gets an advantage of speed.

VII. Video Formats : MPEG, AVI, Quick Time, FLI

Video formats are the formats which can show the scenes one after another continuously like a cinema movie. The most important animated image formats are MPEG, AVI and Quick Time.

MPEG : Video Pictures Extended Group. This is an ISO video and audio compressing standard. It provides saving and loading of the moving images in the environments such as Video and CD. Compressing rates are up to 1:50 (MPEG-2). They have become almost the standard video format for the web browsers.

AVI : AVI, is the video format developed by Microsoft. All of the screen resolutions supported by the 24 bit true color, platform and the voice can be given with this format.

Quick Time (MOV) : Quick Time is a video format developed by Apple. The biggest advantage, as compared to AVI, this is supported by many different platforms. It carries similiar characteristics to AVI.

Animated GIFs

Animated GIFs consist of more than one GIF in a GIF file and these are shown in a certain order. These files are viewed in web as animated. Animated GIFs are at the standard of GIF 89a. The scenes within the file, when the speed is set, can be moved in a cycle. Animated GIFs make the web pages more dynamic and vivid this is why these are the important elements of web pages.

Real Audio/Video

Real Audio is a technology which provides continuous voice transmission on internet. This format has replaced with the more space using formats such as "WAV" and "AU". With its algorithms, voice data can be compressed in very small units. Real Audio format is especially used commonly by the radios broadcasting live on internet.

MP3 Voice Format

MP3 is a voice compressing format and standard in the level of MPEG Layer 3 standard. With this format, the songs in CD quality can be compressed approximately with the ratio of 1/12. For example, if a song in a song CD about 60 MB and 5 minutes is compressed and transformed into MP3, its size can decrease till 5 MB without loosing the quality. In this case, with this format into an MP3 CD, a record about 12 hours long can be compressed. To listen MP3 files on the computer, programs with which these kinds of files can be listened, called MP3 Player are needed.

VII. SIZES OF VIDEO AND AUDIO FILES IN WEB PAGES

It is very important for the video and audio files used in web pages to be transferred quickly over the net; the downloading time in which the last user reaches these files should be as short as possible. It is directly related with the sizes of the files. To take the file size under control must be careful at some points, the image resolution, number of colours used in the image, image time, image dimensions and the quality of the voice (mono / stereo etc.) should be taken under consideration [6]. File transfer speed depends on the bandwidth and business of the lines.

Audio Files

The characteristics of the audio files can be explained as follows:

- **Frequency:** the value determining the quality of the sample (11, 22, 44 KHz)
- **Mono/stereo:** The value giving the voice deepness (1 or two channels)
- **Resolution:** Determines the level of the record (8 bit-256, 16 bit-64K)

The size of an audio file is determined according to the values below:

k = number of channels (mono - 1 channel, stereo - 2 channels)

y = frequency value as KHz

z = time (second)

b = bytes (for 8 bit 1 – for 16 bit 2)

File Size = k * y * z * b

For example; Size of a file with 44 KHz, stereo and 16 bit resolution and 1 minute long, will be (2k*44000hz*60sn*2=10,560,000 bytes) approximately 10 MB.

b) Video files (Video)

Characteristics of video files are as follows:

- **Frame Rate:** frame rate per second
- **Spatial Resolution:** Size of an image or picture.
- **Colour Resolution:** Number of colours shown on the computer screen at one time.
- **Image Dimensions:** Image quality can be determined according to the content and the image dimensions are the ideal values for the application.

The size of a video file is determined according to the values below:

b = image dimensions (width * height)

k = frame rate

r = colour deepness (as byte)

z = time (as second)

File Size = b * k * r * z

For example; size of a file with 30 frame rate / second, 24 bit colour (3 bytes, 320x240 and 1 minute long, will be , except the voice size, (60 second * 30 * 3 bytes * (320 * 240) = 414,720,000 bytes) approximately 396 MB.

VIII. CONCLUSION AND SUGGESTIONS

One of the most important decisions for a web designer is to decide how and when to use video, audio and the picture files. There are many points to be considered before adding such files.

- ✓ Web page should be designed as such that when the user clicks on a link the relevant file should open.
- ✓ The user should be informed about the file size and the download time. The file transfer rate depends on the bandwidth and the business of the lines. This is why it is important to give the user details about the transfer time.
- ✓ Video and the audio file should only be used as they are needed.
- ✓ The necessary programs to open these files should be provided to the user or the user should be informed about how to get these programs.
- ✓ When preparing the video and audio files, the sizes should be taken into consideration.
- ✓ Video and the audio file should be provided in a standard format to match all the platforms.
- ✓ Knowing the multimedia and the relevant subjects makes easier to add multimedia features into the web pages.

Developing and the changing information and technologies are put in the web sites with multimedia softwares as audio- video, graphic and animation. New technologies and the information should be change into a permanent application with the power of interaction.

It should not be underestimated that there may occur some problem on the designing of the web pages containing audio and video files. The reason underlying these problems is the need for extra storage space. This is why, in creating audio and video files, optimal compressing techniques should be used. Then, these files should be compressed. There is no ideal way to determine the parameters while creating and compressing the files. This is why, the quality of the results shows differences depending on the personal experiences and the preferences. [7].

An effective web page design does not mean a certain order, illustration or colour choice. It also does not mean only a graphic or media but mixture of all. To design an effective web page, being a good observer comes in the first place. It has to be paid attention to the harmony of the theme, graphics and the spaces. [8]

If big pictures are going to be used, they should be transformed into JPEG format and reduced in quality. JPEG pictures are loaded faster than GIF pictures since they use less space on hard disk. As the interlaced GIF files uploaded to web pages gradually, the picture becomes slowly and it makes the picture appear as if it is loaded faster.

Most people come to a conclusion by saving the picture as JPG and GIF separately and comparing the image qualities and the sizes. But, you must sure that you have saved the original copies of the picture as JPG and GIF. It can not give you a good result to save into another format previously JPG and GIF formatted file. [9]

As compared to GIF format, JPEG formatted file is more compressed, this is why, the file size covers less space as compared the same view GIF format. So it looks advantageous,

it has some disadvantages. GIF files can be viewed as more sharp and vivid than JPEG files. The reason for this is that JPEG format is a loss graphic format due to the compressing. JPEG files create little dots which can not be seen white spaces in high resolution but in 256 colour takes attention. JPEG format should be applied on the graphic files which are bigger and have less white space. If your file size exceeds 20K use JPEG, if not use GIF format.[10]

KAYNAKLAR

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