School promoting tool
Multimedia project – Documentary film

Student authors: Ilche Acevski[1], Valentina Acevska[2], Mimoza Jankulovska[3],
Mentor: Igor Nedelkovski

Abstract – **Advertising and marketing are entering every sphere of our lives. Schools are also adapting their approaches in order to attract more students. This movie is developed for the needs of Technical school in Bitola to increase publicity about school and its activities.**

Keywords – **Advertising and marketing, School, Camera, Movie.**

I. INTRODUCTION

In a process of movie development digital DV camera, 8mm camera, Vidac Vmagic capture card with automatic digital video recorder, digital image processing, multicamera, animations and special techniques were used. Employed software was Sony Sound Forge, Adobe Premiere Pro, Adobe After Effects, Adobe Photoshop, DVD-Lab Pro 2.

II. TECHNIQUES

A. AD Conversion

After writing the scenario, materials for the film (photos, video, audio) have to be provided first. In many parts of the movie, analog to digital conversion was used (scanning of old photos and convert them into digital format for further processing and making animation, voice recording, and processing of audio from old VHS tapes, transferring video from VHS to digital format, etc.). Therefore will be discussed some techniques for processing signals from the aspect of AD conversion. To create a digital signal, need to convert the continuous data into digital form. This involves sampling and quantization.

Student autors:

[1]Ilche Acevski is with the Faculty of technical sciences, Ivo Lola Ribar bb, 7000 Bitola,Macedonia, E-mail: iacevski74@gmail.com.

[2]Valentina Acevska is with the Faculty of technical sciences, Ivo Lola Ribar bb, 7000 Bitola, Macedonia, E-mail: valle.mk@gmail.com.

[3]Mimoza Anastoska Jankulovska is with the Faculty of technical sciences, Ivo Lola Ribar bb, 7000 Bitola, Macedonia, E-mail: jankmj2@yahoo.com.

Mentor:

Prof. Igor Nedelkovski is with the Faculty of technical sciences, Ivo Lola Ribar bb, 7000 Bitola,Macedonia, E-mail: igor.nedelkovski@gmail.com.

The main idea with sampling and quantization is that a continuous image, f(x,y), need to convert to digital form. Continuous image may be with respect to the x, y coordinates, but also in amplitude. To convert continuous image to digital, have to sample the function in x and y coordinates and also in amplitude. Digitizing the values from the coordinate is sampling. Quantization is digitizing the amplitude values. A detailed discussion is given in reference [1].

B. Digital image processing

In the history section of the film and cooperation with other schools and organizations, scanned and digital images, corrected before doing animation are used. Processing of color images could be divided in two main categories: full-color and pseudo-color processing. In the first area, the images usually are taken with a full-color scanner (full-color sensor). In the second area, the problem is in a color assigning to a special monochrome intensity or variety of intensities. In a wide scope of applications, like internet, publishing, visualization, today are used techniques with full-color image processing. "Although the process followed by the human brain in perceiving and interpreting color is a physiopsychological phenomenon that is not yet fully understood, the physical nature of color can be expressed on a formal basis supported by experimental and theoretical results" [2]. If color photo is given, like in Fig.1, there are multiple ways to create a grayscale photo, given in Fig. 2. Some popular methods are:

By setting a properties in the camera menu to get a grayscale photo. This is exactly a built-in color method in camera filter with de-saturation. With this method the color information is removed from picture taken by the camera.

With the technique of the Channel Mikser often comes to misunderstanding. There is no need the RGB percentage to be equal to 100%. It can be according to the will of the person who processed the photo, and should look as he wants.

Another method is the method of desaturation, but during this, picture remains flat. A pixel can be desaturated by finding the midpoint between the maximum and the minimum of (R, G, B), like in Eq. 1. When using this technique it is necessary to reduce the level of saturation to -100%.

$$(R, G, B) = (Max(R, G, B) + Min(R, G, B)) / 2 \quad (1)$$

Grayscale filters can be found embedded in many software products as a professional Photoshop. With these elements is easy to create a grayscale photo.

Fig. 1. Color photo

Fig. 2. Grayscale photo

Advantages of using these tools is that can very easily with one click to get a gray image from the color image. Although all may do good job, some filters are better than others.

C. Video

It is well known that the film is a sequence of 24 frames per second. This frame rate per second is determined so that the eye can recognize the images as something that looks like a real motion. So far this is the only way to produce the film, because no one has ever was able to produce moving images in any other way, so if the eye and brain can not recognize the movement in the rapidly changing images, it is a real problem. At lower speed of 24 frames per second can be seen flickering and shaking. Flicker occurs even at this speed, but by increasing the frame rate increases the cost for obtaining the movie. To avoid these, the frame rate could be increased but this would push up film stock costs. With a rotating shutter which blanks the screen once during each frame and one more between frames, the flicker rate could be increased to 48 per second, what is a better way to do that.
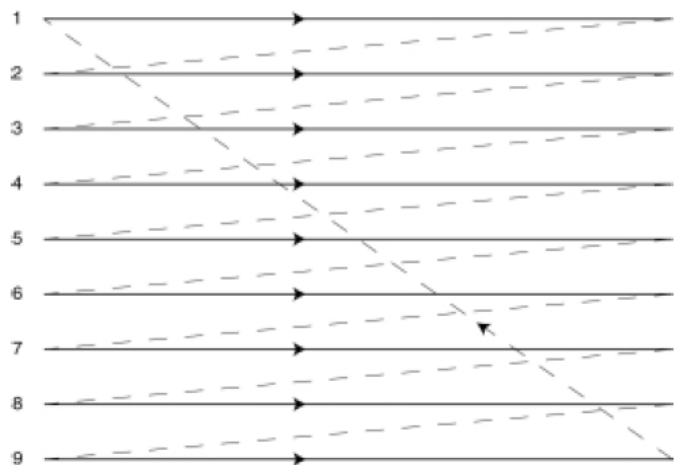

Fig. 3. Progressive scan

The picture looks stable, because the persistence of the eye, when viewing can holds the repeated image long enough, until it come the following image. But when it is a bright images on, at 48 flicker rate per second, could be noticed flickering. Monitors usually have a refresh rate of 75 HZ or more, which is the flicker rate for an image that is easy and nice for watching longer period.

When there is a live action, film is divided into a sequence of still images that can be captured and projected. The television process breaks down the image still further so that it can be sent along a wire, or broadcast. Picture in the camera is scanned by an electron beam that traces out a path which begins at the top of the picture and go down to the end-bottom. The brightness of each segment can be transduced to a voltage and sent to the wire. In Figure 3 can be seen that the electron beam start at the top left and scan the first line of the picture. When it came at the end of the line it goes back quickly to start on the next. When it is done with the entire image, it starts all over again.

"The electron beam in the video monitor or television receiver traces out exactly the same path, controlled by synchronization signals, and reproduces as closely as possible the levels of brightness of the original image on a phosphor-coated screen. The pattern that the electron beam traces out is called a raster" [3].

Like in the film, that takes a number of pictures per second to give the illusion of continuous motion. Because the mains frequency in our country is 50 Hz (60 Hz in North America, Japan etc.), easiest way is to use this as a reference point and use half of the mains frequency, as the frame rate (25 Hz or 30 Hz), rather than the 24 frames per second of film. The flicker rate need to be increased. It must be done in the same way like a shutter in a film projector. At the first place, half of the vertical resolution is scanned, with gap in between adjacent lines, and then going back to the top for filling in the other lines that were missed out, what it means that half of the picture is transmitted at the begining, and then the other half, after the first half. The eye's persistence of vision married everything together and completes the illusion. To throw in some of the technical terms, in the following text, each picture half is called a field, and the complete picture is a frame.
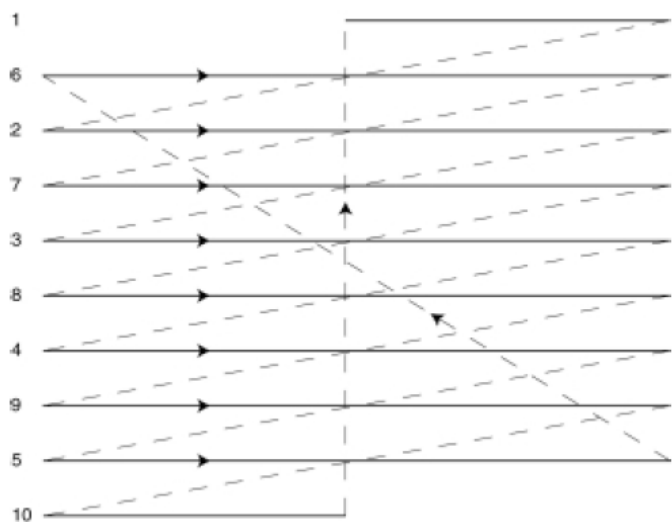
Fig. 4. Interlaced scan

Figure 4 shows an interlaced scan. If higher ratios of interlacing is used, than those with the 2:1 ratio, that is theoretically possible, there will be the noticeable individual lines that start to flicker and also moving vertical lines that will appearing to fragment, spoiling the picture, continuous motion and illusion.

"Interlaced pictures are the way SD cameras have been processing images for many years, and accordingly will get that similar look even on an HD camera. Progressive shots have no fields, as interlaced do; they simply have all the information in one frame and can give a good film look. Additionally, you can also vary the frame rates" [4].

PAL vs NTSC: The colour signals from the picture are transmitted together on the same frequency that is the one of weaknesses of the NTSC system. In this system colour signals are separated only by phase, what means that if there is some phase problem in the transmission path, the total colour bias of the picture will be changed. As the result of this NTSC system's never have the same colour. This problem is not shown in PAL system (developed by Telefunken in Germany). PAL system corrects this problem by alternating colour phase carriers in each line. In PAL system, any errors in phases are average out rather than change the complete colour of the image.

MPEG2 is technique in which a variety of techniques are applied and used to produce a data stream. MPEG2 could be understand by a wide variety of equipment (MPEG, is shortening from Motion Picture Experts Group.) But MPEG2 doesn't specify the equipment itself. Any encoder or decoder designed for video compression, since it can work with an MPEG2 and produce data stream, is good enought. This allows further research, even after the standard is set, and manufacturers can produce better equipment for producers and consumers. This is a contradictory with uncompressed digital video (AVI), where the picture quality is standard defined (best quallity of all given format) and away from the processes like A/D and D/A conversion. MPEG2 works with preferences such as resolution, bit rate, image size, and with the data stream nature of the MPEG2 itself. This means that MPEG2 isn't involved in the equipment for make it to work.
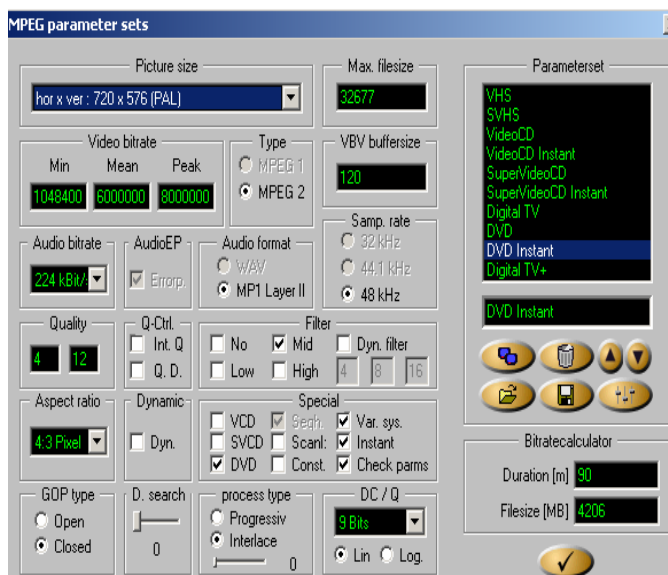

Fig. 5. Motion Picture Experts Group-MPEG parameter sets

Fig. 6. Digitized video in real time to high quality MPEG-2

Vidac Vmagic Capture Card digitize analog video sources internally in PAL and NTSC formats, and compress the digitized video in real time to high quality MPEG-2, Fig. 5 and Fig. 6. VMagic offers the hardware compression of analog SD signals and the coding of standard definition digital and high definition (HD) signals up to a resolution of 1080p30 or 1080i60 including image pre-processing (deinterlacing, filters, mirrors, overlay, etc.), decoding and video output via S-Video, HD-SDI and DVI. A detailed discussion for Vidac Vmagic is given in reference [5].
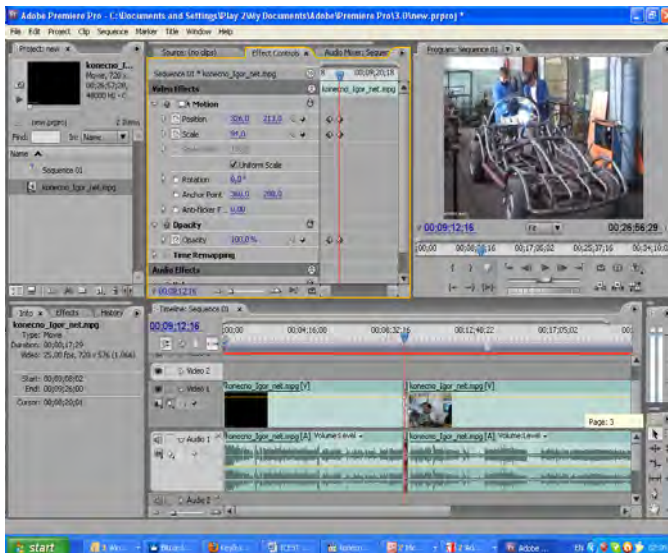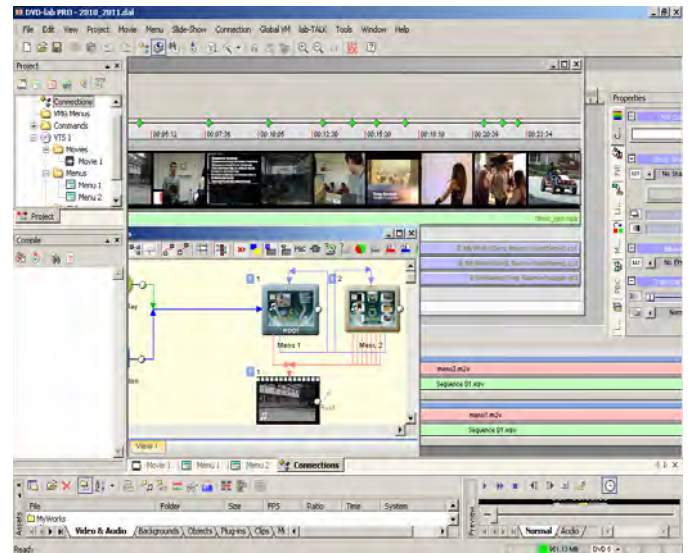
Fig. 7. Keyframes in Adobe Premiere

Fig. 8. DVD–Lab Pro 2

D. Audio

Sound Forge software has a complete and familiar set of tools for recording, editing and analyze audio. Sound Forge can produce music loops and samples, restore and digitize old recordings and prepared sound for multimedia and video. Recording and editing multichannel audio files is easy. With Sound Forge editing mono, stereo, and multichannel audio files (up to 32 channels) down to the sample level is nice and easy job. More detailed information is given in reference [6].

Commands like cut, copy, paste, mix, and crossfade audio are used. Perform precise event editing and create fades, crossfades, and mix audio with ease. There are drag and drop function to move audio between channels and can work on one file while processing others in the background. Most of speech was recorded straight into sound card, and then together with processed speech from VHS and DV camera, mixed with chosen background music.

E. Production

For changing the overview of a video or audio effects during time, are used keyframes in Adobe premiere. Keyframes are used for volume, opacity, brightness, scale, speed, position, colour balance, etc. There must be created more than one keyframe, and then set the desired effect values at each keyframe. Premiere will made by itself, a continual change between neighbour keyframes (interpolation). If one keyframe is created where the volume is -30dB and another keyframe 7 seconds later where the volume is +30dB. This will be interpolated with a smooth and continuous 7-second volume increasing. There are two ways in the Adobe Premiere to work with keyframes: In the Effect Controls window and in the Timeline [7]. This is shown in Figure 7.

DVD edition of this film contains English, German and Macedonian subtitles, which increases the range of those who can investigate the movie. For that purposes DVD-Lab Pro 2 [8], was used, Fig. 8.

III. CONCLUSION

During development of this documentary a lot of different techniques were used, and different software through various stages of processing, as explained above.

This movie was presented in several formal occasions and also is uploaded on the official web site of the school http://gorginaumov.edu.mk/?page_id=590. In DVD It serves as a good advertisement of the school and has already attracted bigger number of students and different stakeholders interested in technical area.

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