

Video Capturing and Presentation Tools for e-Learning

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Producing content for the purposes of e-learning sometimes one has to capture real or screen processes in video. In a post-production process these recorded videos often have to be synchronized with the slide representation given in parallel during the video capturing process, and also the respective audio information has to be added. The resulting multi-medial content should be published in several file formats to meet the operating system and software environment circumstances of the potential users best.

As one example one may consider the situation of a lecturer who is presenting slides, is commenting them speaking about the presented subjects, and who's picture is taken in form of a video recording in parallel. Another situation arises in software industry where demonstration videos on the usage of software products for standard workflow situations are common. Such demonstration videos may also serve as teaching material of courses which might be also presented as e-learning materials. They contain a series of screenshots or a video taken from the screen of a computer that is enriched by elements of augmentation and by a commenting voice. Sometimes further information has to be included to provide accessibility for visually impaired persons. As a third example serve industrial workflows where workers are trained on the job providing access to a multi-medial information system right at the working places. So they can quickly obtain information on work processes watching short commented video sequences on these processes on demand. As presentation environments may serve information systems on the web, CD or DVD productions, interactive kiosk systems in public places or on fairs, handheld TV, or similar.

Looking around for standard software products assisting capturing and post-production processes as described above one finds a few high-quality products on the market. At HTWK Leipzig the software GWOTS is used to record lectures, i.e. speech, HTML presentation of learning content and video stream of the speaker. The basic idea of GWOTS was first realized as a software product at the University of Kiev-Mohyla Academy in Kiev, Ukraine, and it was reengineered By Andreas Rebs at HTWK Leipzig in 2003. a more detailed account to GWOTS is given below. Other more commercially available products are TurboDEMO by www.turbodemo.com, Camtasia Studio by www.techsmith.de, Lecturnity by imc AG, Bulent's Screen Recorder or Snag-it as shareware, Captivate by Macromedia (i.e. the former software Robo Demo), Articulate Presenter and Articulate Quizzmaker by www.articulate.com, and some others. Skills and time investment are always necessary for getting into each tool. The effective usage is different for any product. Especially adding voice to a video or multi-medial pre-product needs talented persons as speakers and many trials to record a „correct“ version for official release. So the first decision has to be made comparing the actual needs to the features of the available and affordable tools.

As an alternative one may consider to produce a synchronized presentation from the ingredients video, audio and artificial artefacts relying on the Synchronized Multimedia Integration Language (SMIL), an XML application the engineering of which is supervised by the W3C and supported by the Real Player of RealNetworks. SMIL is most useful for software engineers who are capable to deal with media synchronization in a programmers way in detail. However, the use of SMIL presentations is limited since there are not any standard cross-media publishing tools available producing other useful formats from them like Flash or universally executable Java files. So the study of SMIL programming is left to the reader.

GWOTS – recording and publishing lectures

GWOTS is a video, voice and HTML presentation capturing tool that allows editing of the captured material and publishing the results as a website. The software has been engineered by Andreas Rebs at HTWK Leipzig. GWOTS relies on the Windows Media Encoder 9 by Microsoft which can be added to any Windows XP environment for free downloading it from Microsofts web pages. The computer system has to be provided with DirectX 9 and with an Apache web server to make the video capturing camera, the microphone and the software GWOTS work properly.

Recording takes place on the computer used for the presentation of the lecture or talk in the classroom. The lecture has to be prepared as a series of HTML-pages with arbitrary web content. It is shown in the right large window of GWOTS. The speech of the lecturer is captured as part of a WMV-format video file. The quality of audio and video recording can be selected from options provided by the Windows Media Encoder. Different qualities can be stored at the same time relying on multi-layer technology. As a result of the recording of a lecture one has three sets of files – an XML-file containing the necessary parameters and file names of the resulting presentation, a WMV-file with the audio and video data of the lecture, and a set of HTML-files of the presentation given at the lecture, relying on absolute links.

In this state GWOTS offers an opportunity to edit the multi-medial presentation before storing it finally for the web. Editing has to take place on the same computer as recording. The editing process with GWOTS aims to produce a self-contained HTML-presentation with integrated player reference for playing WMV-files in a separate window in the upper left corner of the resulting web page. As an anchor for the editing process serves the XML-file created during the presentation process which has to be loaded and which contains all necessary links and parameters to make the stretched for presentation work. As a tool for splitting WMV video files serves the integrated into the Windows Media Encoder HTML-WMV-editor. As the master time line serves the timeline of the WMV file recorded during the presentation. The marked moments in time when HTML-slides have been changed serve as break-points to divide the recorded WMV-file into a bunch of WMV-files, each connected with a (number of) HTML presentation sheet(s). The author may add titles to the resulting presentation web pages. The whole final self-contained HTML-presentation is generated and stored in the predefined location at the end of the process. A file named index.html serves as the starting point of the HTML presentation package. Loading a final-state presentation through the internet the band-width of the data connection matters only for the audio-video part stored in the WMV-format files. The HTML-formatted presentation sheets usually do not need much transfer capacity.

Beside the great advantages of GWOTS for a lecturer to record and edit his/her lectures by him-/herself on the own computer, and to publish them thereafter at a well-known before network location, there is some potential for improvements of GWOTS. For example, a replacement of hard coded links of the published representation by relative links would enable a flexible portation of the resulting e-learning unit to other network locations or to CD or DVD, resp., without loss of functions. At present the publication process has to be performed as many times as disk storage locations have been planned. Storage on flexible media is not functionally possible at present. To avoid extensive reengineering of an existing final-state disk-based presentation on a programmers level for relocating it at some point of time, one has to preserve the raw recordings in their initial state separately. So more and more disk space of the presentation computer of the lecturer gets occupied, or a conscientious book-keeping of storage locations has to be performed sending them temporary to other storage devices. Nevertheless, GWOTS is a great tool to produce multi-medial synchronized lectures accessible through the internet.

TurboDEMO – creating software demonstration material

TurboDEMO creates demonstrations and tutorials in Flash, in Java, as executable files and as AVI or ASF formatted video files directly from the computer screen of the actual computer. The software supports capturing, editing and publishing for multi-medial presentations. SCORM compliance is provided for the final state of presentations, so they can be included into most e-Learning Management Systems (LMS) as basic units. TurboDEMO creates demonstrations from computers with MS Windows OS, but also from those running Linux or MAC OS. For the final-state presentations produced with this software enhanced compression for the demos and tutorials is realized. For the exploitation

of TurboDEMO no programming knowledge is required. Final-state executable presentations manage to store one minute playback within 100 kB data.

In difference to GWOTS TurboDEMO records series of screen shots of what is in the selected screen area. The screen shots can be generated in predefined time rates, or manually clicking with the mouse. The editing function focuses on the production of tutorials and presentations based on series of screen shots. There do not exist any video editing features. Video is only one of the export formats. During the edition process text in bubbles, coloured or transparent text areas, animation of objects can be added, and further graphics and SWF-files can be incorporated, together with a timeline. Also, speech and/or background sound can be added. During the editing process a number of special features can be applied to the resulting presentation, e.g. change of the mouse cursor appearance, incorporation of elements of interactivity with action commenting messages, incorporation of hot spots into the resulting video frames, special effects like roll-overs and zoom-out effects for text or video areas.

Publication is thought of as a cross-medial process. The final presentation can be published in the formats Flash (SWF), Java/HTML, executable file for any operating system, animated GIF, Windows Media Player video format (ASF), AVI-video without compression, PDF and as a series of separated screen shots. Furthermore, TurboDEMO supports automated final production steps for the creation of web sites and interactive CDs, as well as the deposition of final-state presentations to folders on a disk. As an add-on the software PowerCONVERTER is provided by the same company separately. It converts MS PowerPoint presentations (PPT) to Flash presentations (SWF) preserving all the animation features existing in MS PowerPoint. The compression rate is significant. There are two versions – one for MS PPT 2000, the other one for MS PPT XP and 2003.

Camtasia Studio – screen recording and video production

Camtasia Studio is a screen-recording software for MS Windows systems. Presentations can be recorded either on the full screen of the actual computer, or in a window of it, or in a screen area. The pictures of the resulting video file are of excellent quality admitting only small data volumes. A timeline is added to the video, however no audio recording takes place in this first step. In the post-production process the video file can be modified cutting it and adding voice streams to it. In places augmented cursors and acoustic imitations of mouse clicks can be enclosed, and for some screen areas zoom-in effects may be animated. Also, still graphics and text headlines may be incorporated. In transition places between two video files various transfer effects can be realized. For stretched for Flash presentations interactivity features can be built in.

Audio recording, edition, mixing and deletion can be arranged using a built-in audio editing tool. Camtasia Studio allows to add at least two audio tracks to the video file in the post-production. The post-productio itself is very flexible since codec and quality parameters can be selected for both audio and video from a variety of options. Also, the frame rate and the colour depth of the video can be readjusted.

The list of available output formats includes AVI format video files, Flash files (SWF), Windows Media files (WMV), QuickTime movies, RealMedia movies, executable files, animated GIF files, Macromedia Flash Video files (MFV), and more formats. So the resulting video can be preformatted for ready to use publication in the web, on CD or DVD, as a PDF file, for example.

Camtasia Studio is in particular suitable to prepare software and work procedure presentations, animations, dynamical scenarios like interactive online trainings, interactive video-tutorials, and other material for e-learning and business. Other areas of application are usability testing of software in a lab where the actions of the testers are recorded from the screen for later evaluation, as well as video supervision and monitoring in real environments using electronic cameras or web cams.

One of the great advantages of Camtasia Studio is the existence of a number of plug-ins. Just to name some of them: Effects for Camtasia Studio, Templates for MenuMaker, Camtasia Player, Camtasia Studio Components for Macromedia Flash MX.

Conclusions

There are several situations in business, production and e-learning environments when information is best presented by an enriched video. The selection of a software suitable for the actual purposes has to be made analysing the needs, the cross-medial publication aims and the targeted transfer lines and application systems. There is not any universal tool in the market yet. The available commercial tools all cost about 350-400\$ per license what points to a market structure dominated by companies applying this type of software in their business and marketing processes. The academic world uses this type of software still on an experimental basis. However, as time goes on and broadband connections become available to the public this type of e-learning material production will gain importance.

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