Automated Hypermedia Authoring for Individualized Learning

Miloš Liška[12], Vít Rusňák[1], Eva Hladká[12]

[1]Faculty of Informatics, Masaryk university, Botanická 68a, Brno, Czech republic
[2]Cesnet z.s.p.o., Zikova 4, Prague, Czech republic
E-mail: {xliska, xrusnak, eva}@fi.muni.cz

We propose a paper devoted to automated system for authoring of hypermedia lectures recording. Lectures recordings proved to be a valuable learning material for students as well as for the teachers over last five years [1]. With increasing number of recorded lectures the automation of the lecture acquisition, processing and publication becomes an essential requirement. An automated system for lectures recording was presented in [1] and is used extensively for lectures video acquisition and processing. However, a raw video does not provide a sufficient learning material. In this paper we will present an extension of our lectures recording system towards interactive hypermedia authoring.

Nowadays the lecture is usually based on the use of modern computer presentation and projection facilities (PowerPoint and PDF slides or even interactive whiteboard). In addition to the teacher the presentation introduces valuable source of information which is necessary to acquire and embed into the lecture recording.

Each presented lecture recording is about 100 minutes long and there are up to 13 lectures in one particular course. This means that it is almost impossible to search for some concrete subject within the recordings. Solution of this problem is to add textual metadata information (indices) to each lecture recording and a time information pointing to the lecture video. Manual indexation of the recorded lectures as proposed in [1] is a lengthy, soul-destroying and with large number of recorded lectures completely impossible task.

In the paper we propose automated acquisition, processing and embedding of the presentations into the recorded lecture and especially utilisation of the presentation for automated indexation of the lecture. The presentation is captured using VGA framegrabber or on-screen video converter and converted to a set of static images. A relative time information is captured together with each slide of the presentation. Since the image quality of captured presentation slides is excellent and suitable for further processing, we adopted and utilised Optical Character Recognition (OCR) to extract the indices from the presentation and create references to the lecture video automatically. For our purposes the OCR must support national an special (mathematical) character sets and must be trained to recognize variety of different styled presentations. End user is than able to search through the indices, find the concrete subject and directly replay the respective part of a lecture. A platform independent lecture recordings player was created supporting video, embedded presentations and indices. Technical details, pitfalls and experiences with a system supporting this way of lectures authoring will be presented and discussed.

Proposed automated indexation system is well scaling on large presentations and is a performance modest add-on to our previous system for automated lectures video acquisition and processing.

[1] Hladká, E., Liška, M., Matyska, L.: Multimedia Support for Individualized Learning. In *Proceedings of the Fifth International Conference on Information Technology Based Higher Education and Training*. Istambul, Turkey: IEEE Catalog Number 04EX898, p. 4-9, 2004.