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AREA OF EXPERTISE:	Image and video prosessing
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DATE OF DISPUTATION:	18th of June 2013

DISSERTATION TITLE: *Media content analysis for creation and annotation of video learning objects.*

Summary

The thesis proposes a conceptual framework for the creation and development of multimedia learning objects for e-learning. The framework provides image and video processing algorithms to analyze lecture videos. The videos are analyzed for text visual quality, lecture content classification, instructor action classification, semantic understanding, handwritten text recognition, keywords selection and meta-data extraction.

We made several novel contributions in lecture video segmentation, quality estimation and evaluation, meta-data extraction, video indexing, structuring, and semantic analysis of lecture content. The proposed methods and techniques will assist content owners create video learning objects by automatically extracting useful semantic information. These methods can easily be extended to other types of videos, e.g. surveillance, news, documentaries and sports. The keyword selection methods may also be helpful in finding solutions for monitoring user posts, comments, and feedback on various social fora.

The proposed techniques generate effective reusable video learning objects for flexible education. Distant and flexible education is becoming an everyday activity in most educational institutes. Flexible education provides students with flexibility in terms of how, when and where to study compared to ordinary on-campus education. Lecture videos are widely used for distance education. Most of today's lecture videos however remain in general unedited and are thus not easy to navigate. Such videos are therefore not captivating enough to keep the students attention and focus on the instruction it may contain for long. Thus, their effective use remains a challenge.

In our contributions we proposed a framework for e-learning community to create, store, and annotate lecture videos to address this problem. The research has produced five conference papers, one workshop and one submitted article along with four related conference papers. In conclusion, we strongly believe that the methodology and techniques developed can be used, as an application independent framework for those involved in lecture video analysis, to create effective video learning objects.