Research Interests

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My field of expertise and research interests can be summarized as follows: Semantic Web, Linked Data, Adaptive Hypermedia Systems, Personalization, Semantic Annotation and retrieval of Videos/images (semantic multimedia), Information Retrieval, Fuzzy Theory, Information Extraction.

Currently, we are working on a project that automatically analyses surveillance videos using computer vision techniques for automatic detection of abnormal events within the crowd (this part of the project is performed by colleagues in METU-NCC). Then, I annotated those surveillance videos using a novel semantic metadata model for search and analysis of abnormal crowd behaviors. I will apply fuzzy inference to extract information about crowd activities. Then, a user interface will be developed in order to allow complex analysis of large surveillance video data.

In another current project, we are investigating how to improve classification accuracy of video sport events classification. Classification part is performed by colleagues in METU-NCC. I will apply inference techniques to improve the automatic classification accuracy. Then, I will annotate video segments using Semantic Web technologies.

Currently, I have PhD and master students working on crowd behavior analysis and semantic annotation, and adaptive game-based e-learning using Semantic Web technologies.

In one of my previous projects, I investigated efficient and adaptive search mechanisms. The World Wide Web contains enormous amount of knowledge. The main challenge is accessing the right information at the right time. The current search mechanisms provide flat ranked results lists, which may not be the best way to access to the Linked Data. In my work, I investigated innovative search mechanisms, which can support better organization and adaptation of search results that suits to the needs of the user. In particular, a concept-based search engine was developed, which automatically categorizes the search results into concepts (using UMBEL conceptual vocabulary) and presents the results using concepts and conceptual lenses. Then, the search results are personalized according to a novel personalization approach which is based on the interactions of the user. I applied results-re-ranking, concept-based search re-ranking, query expansion, etc. techniques in this approach.

In one of my projects, I introduce an automatic metadata extraction framework, which can extract multilingual metadata from the enterprise content, for a personalized information retrieval system. In addition, I introduce two new ontologies for metadata creation (DocBook Ontology and Resource Type Ontology) and a novel semi-automatic topic vocabulary extraction algorithm. The framework applies document analysis and fuzzy inference to extract metadata from the document content, document structure and document context using the developed ontologies and existing vocabularies. The tool is implemented as a Web-based application, which uses XML DOM to parse/analyze semi-structured documents.