

***The University of Alabama
Department of Computer Science
Colloquium Series Speaker***

**Dr. Chengcui Zhang
Computer and Information Sciences Department
University of Alabama at Birmingham**

**Unsupervised Learning-Based Spatio-Temporal Vehicle Tracking and Indexing for
Transportation Multimedia Database Systems**

**Friday, October 14th
11:00 a.m., HO 108**

Abstract:

One key technology of Intelligent Transportation Systems (ITS) is the use of advanced sensor systems for on-line surveillance to gather detailed information on traffic conditions. Traffic video analysis can provide a wide range of useful information to traffic planners. In this context, the object-level indexing of video data can enable vehicle classification, traffic flow analysis, incident detection and analysis at intersections, vehicle tracking for traffic operations, and update of design warrants. In order to develop a transportation multimedia database system (MDBS) with the necessary capabilities, the following research issues will be investigated: (i) How to identify vehicle objects in a video sequences under different conditions? (ii) How to store and organize the rich semantic multimedia data in a systematic and hierarchical model? (iii) How to index spatial and temporal relationships of vehicle objects? and (iv) what kind of information is needed for multimodal transportation? In this talk, I shall describe a learning-based automatic framework which can support the multimedia data indexing and querying of spatio-temporal relationships of vehicle objects in a traffic video sequence. The spatio-temporal relationships of vehicle objects are captured via the proposed unsupervised image/video segmentation method and object tracking algorithm, and modeled using a multimedia augmented transition network (MATN) model and multimedia input strings. An efficient and effective background learning and subtraction technique is employed to eliminate the complex background details in the traffic video frames. It substantially enhances the efficiency of the segmentation process and the accuracy of the segmentation results to enable more accurate video indexing and annotation. Four real-life traffic video sequences from several road intersections under different weather conditions are used in the study experiments. The results show that this framework is effective in automating data collection and access for complex traffic situations.

Dr. Zhang's Bio:

Dr. Zhang is an Assistant Professor of Computer and Information Sciences at University of Alabama at Birmingham (UAB) since August, 2004. She received her Ph.D. from the School of Computer Science at Florida International University, Miami, FL, USA in August, 2004. She also received her bachelor and master degrees in Computer Science from Zhejiang University in China. Dr. Zhang has authored and co-authored more than 40 research papers in journals, refereed conference/symposium/workshop proceedings, and book chapters focusing in the areas of: multimedia databases, multimedia data mining, image and video database retrieval, and GIS data filtering. She is the recipient of several awards, including the UAB ADVANCE Junior Faculty Research Award from the National Science Foundation in 2004, UAB Faculty Development Award in 2005, and the Presidential Fellowship and the Best Graduate Student Research Award at FIU. Dr. Zhang has also served as a referee for database journals, conferences (e.g., IEEE TKDE, KAIS, VLDB) and she is currently serving as a program committee member for IEEE International Symposium on Multimedia (ISM2005), IEEE ICDE International Workshop on Multimedia Databases and Data Management, 2006, The 2005 IEEE International Conference on Information Reuse and Integration.