

**NUS Graduate School for Integrative Sciences and Engineering
Research Project Write-up**

Title of Project : Active Media Sensing

Name of Supervisor : Mohan Kankanhalli

Contact Details: mohan@comp.nus.edu.sg

Short Description

We would like to develop the theoretical foundation, algorithms, architectures and prototypes for active multimedia sensing. In particular, we would like to focus on:

1. *Multimedia Monitoring Framework:* The use of multiple cameras is the current trend in surveillance research. However, it utilizes a single medium i.e. video. Multiple media can be extremely useful because each media can potentially capture a different aspect of the environment. For example, infrared cameras are necessary in a low-illumination environment. Therefore, our focus will be on providing a comprehensive framework for the monitoring problem from the multimedia perspective. Even biological systems employ multiple sensing modalities. Multimedia streams (arising from a diversity of sensors such as audio, video, infra-red, motion detectors etc.) usually possess a tremendous data volume with lot of redundancy and noise. Each media type is spatio-temporal in nature having both correlation and complementarities. These characteristics give rise to interesting research issues such as how to filter relevant data from the huge volume of multimedia data. Also, how can one to maximize the efficiency with the minimum of resources. It also leads to the question of how to optimally assimilate the information from the various sources.

2. *Biologically Plausible Models:* The first investigation will take an emulation approach and not a simulation approach. But given that biological systems do employ active multisensory systems, it would be useful garner ideas from animal behavior as well as cognition to build mathematical models of actual biological system behavior. This can help us biological systems better and potentially help us build better engineering systems.