

# Distributed Camera Surveillance Network for Multi-Object Tracking

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# Motivation

- We already had a background in Signals and Systems
- Preliminary research led us to one of Professor Asif's projects which involved signal processing coupled with computer vision
- It is a great opportunity to assess the commercialization of our project in the field of security and surveillance
- Greater flexibility for the end user in analyzing captured data streams
- It is a degree requirement

# Background

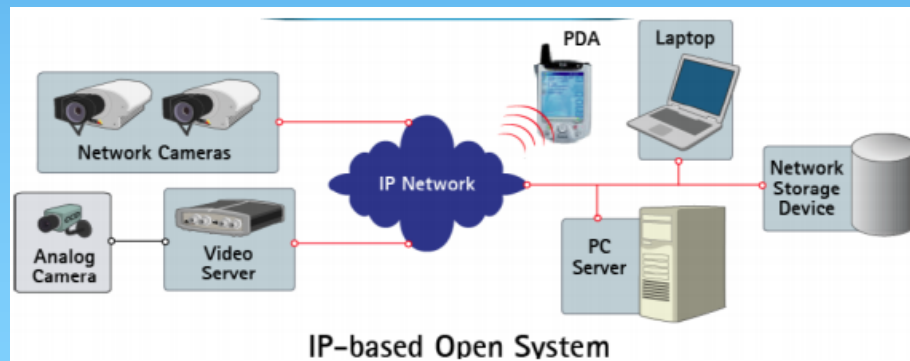
- Existing technology involves storing and analyzing video streams at a central location
- Current setup introduces latency and is not conducive to real time surveillance
- Manual handling of individual data streams is tedious and time consuming

Source: <http://www.ianvisits.co.uk/blog/2008/06/27/too-many-security-cameras-or-too-much-hype>



# Idea

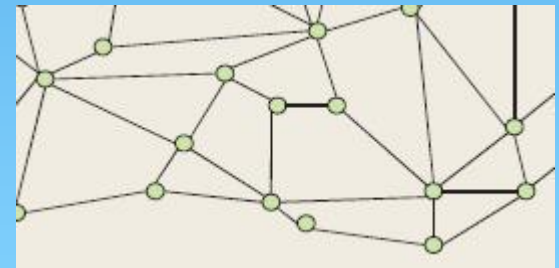
- Distributed network topology – Each camera is a processing node in the network; No fusion center
- Develop and extend estimation/tracking algorithms to track moving targets in a single/multiple video footage
- Obtain a global reference frame
- Establish communication to share local estimates
- In essence, a SMART surveillance system



[1] E. Fullerton and J. Blen, The EMEA and World Markets for CCTV and Video Surveillance Equipment, IMS Research reports, 2006. Available online: <http://www.vdtsi.com/milestone/13.pdf>

# The output of this project

- Design decentralized, non-linear estimation/tracking algorithms in DCN
- Local parameter estimation by camera nodes
- Design networking protocol to refine neighboring cameras estimates
- Arrive at a global estimate using consensus algorithms
- Track target in a single mosaic video



Nodes representing cameras in DCNs

# Conclusion

- Through our project, we provide a novel solution to maximize potential of existing surveillance systems
- Facilities needed: Access to Signal Processing and Communication lab
- Expected delivery: April 2014