

Project Title	Distributed Camera Surveillance Network for Multi-Object Tracking.			
Group # 1 Team Speaker: Varun Kalia		Name of Students	Field of study	Email (York)
	1.	Tayo Kadiri	Computer Eng.	tkadiri@yorku.ca
	2.	Varun Kalia	Computer Eng.	v5kalia@yorku.ca
	3.	Raiyan Awal	Computer Eng.	rmawal@yorku.ca
	4.	Manfred Adan Lopez	Computer Eng.	manadan@yorku.ca

Abstract (Max. 300 words): Describe your project.

Multi-camera networks are increasingly being deployed recently on a large scale in a wide range of applications including surveillance, security, disaster response, and activity recognition. The existing state of the art technology involves storing and analyzing the captured video streams at a fusion centre, which is central to the video surveillance networks. Such a setup is not conducive to real-time surveillance due to latency introduced on account of transferring streams to the fusion centre. Another challenge is introduced due to manual handling of the separate streams, which undermines the potential of such networks.

This necessitates the need for development of distributed camera networks, which dynamically use reconfiguration and consensus algorithms to allow for refined estimates of object tracks. In our project, we probe the integration of the analysis and sensing tasks more closely to enable maximum network throughput taking leverage from existing systems and implementations. In essence, the processing will be distributed amongst all the cameras and only distilled information will be shared to arrive at a global analysis of a scene. We will automate the current technology in hardware in a cost efficient manner to provide the end user with greater flexibility.

We address the surveillance problem of tracking a target over a network of video cameras with partial overlaps in their coverage. We focus on decentralized, non-linear estimation/tracking algorithms in distributed camera networks, where a group of spatially distributed camera nodes observe a dynamical environment with the objective of estimating/tracking moving targets cooperatively without the need of a fusion center. In the proposed distributed surveillance setup, each camera node estimates certain parameters of the based upon its own set of observations. The local estimates are then shared with the neighboring cameras in an iterative, decentralized, gossip-type fashion, and an overall estimate is computed across the network using consensus algorithms.

Finally, the estimated parameters are used to track the target in a single mosaic video assembled from the individual camera video feeds available across the network. Through numerical experiments, we show that the proposed approach is fairly robust, even when using a single camera.

Tasks: Describe the role of each students (each 50 words Max)

Name of Student	Role
Tayo Kadiri	Software Developer and Tester - Responsible for programming and logic aspects of the project; testing offline tracking and verifying results.
Varun Kalia	Project Manager and Network Protocol Developer - Responsible for managing all aspects of the project including assembling our reports/presentations and to make sure deadlines are met; designing communication protocols for the camera networks.
Raiyan Awal	Software Developer and Tester - Responsible for implementation of the system and testing its components to validate software quality.
Manfred Adan Lopez	Design Specialist and Webmaster - Responsible for website design; primary assistant in developing the hardware/network and software components of the project.

Provide the information of your project adviser:

Adviser Name	Affiliation (e.g. Professor at EECS, York University)	Email
Dr. Amir Asif	Chair of the EECS department at York University	asif@cse.yorku.ca

Essential Steps: Describe the main activities of your project by addressing the role of students that you mentioned above. (for example: # 1: is search for information (1weeks) , #2 is the design of hardware for ... (2weeks), # 3...)

	Activity	Names of students involves	Time Duration
#1	Literature Review	Raiyan, Tayo, Varun, Manfred	2 weeks
#2	Collection of Data	Tayo, Varun, Manfred	1 week
#3	Initial System Design; Cost Analysis	Varun, Manfred	2 weeks
#4	Designing Tracking algorithms for a single video feed	Raiyan, Manfred, Varun	3 weeks
#5	Extending the developed Tracking algorithms to multiple video feeds	Raiyan, Manfred, Varun	3 weeks
#6	Off-line testing of the tracking algorithms	Raiyan, Tayo	2 weeks

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#7	Distributed implementations of the tracking algorithms	Manfred, Raiyan, Tayo, Varun	3 weeks
#8	Real time testing of the distributed tracking algorithms	Raiyan, Tayo	2 weeks
#9	Resolve connectivity issues and designing networking protocols for camera networks	Tayo, Varun	2 weeks
#10	Real time implementation of the design	Raiyan, Tayo, Varun, Manfred	3 weeks
#11	Trouble shooting	Raiyan, Tayo	2 weeks
#12	Report Writing	Varun, Manfred	2 weeks
#13	Presentation	Raiyan, Tayo, Varun, Manfred	1 week

Do you need financial support?

If yes, How much ?

If yes describe the need for the financial support (50words).

In total, the projected budget for the project is \$2100 as outlined below.

Financial support will be needed to purchase at least 3 high quality video cameras at \$250 each and 3 video servers at \$250 each. Additional equipment needed will be 3 wireless cards at \$200 each to support connectivity.

Do you need specific facilities?

If yes, What ?

If yes describe the need for the specific facilities (50words).

Access to Signal Processing and Communication Lab.

Background: Mention the name of main courses you have been taught at York University and help you to complete this project.

Name of course	If you have already taken (Y/N)	Related to Activity # (refer to above table of activities)
1. Signals and Systems	Y	#4 - #8
2. Introduction to Engineering Design	Y	#3, #10, #11
3. Engineering Projects: Management, Economics and Safety	Y	#3
4. Professional Engineering	Y	# 12, #13

Practice		
5. Communication Networks	Y	# 9

Overview Image: Add a figure that can describe your project. If you use an image from Internet, you need to mention the Internet address. You may draw the figure using computer tools.

