DIGITAL IMAGING IN ASSESSMENT OF CONSTRUCTION PROJECT PROGRESS

Yuhong Wu, MS Candidate
Hyoungkwan Kim, Assistant Professor

Department of Civil & Environmental Engineering
University of Alberta

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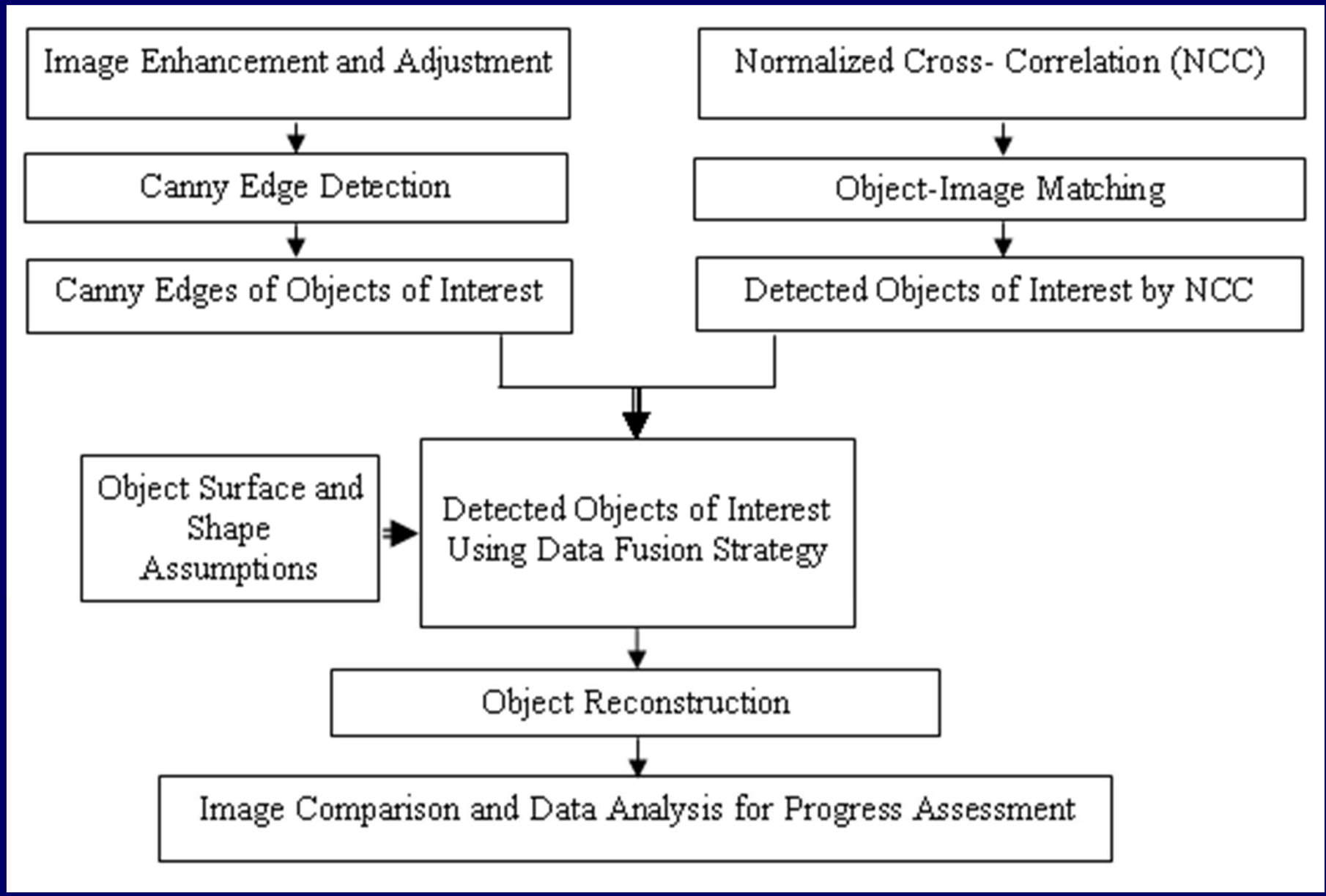
Introduction

A construction project

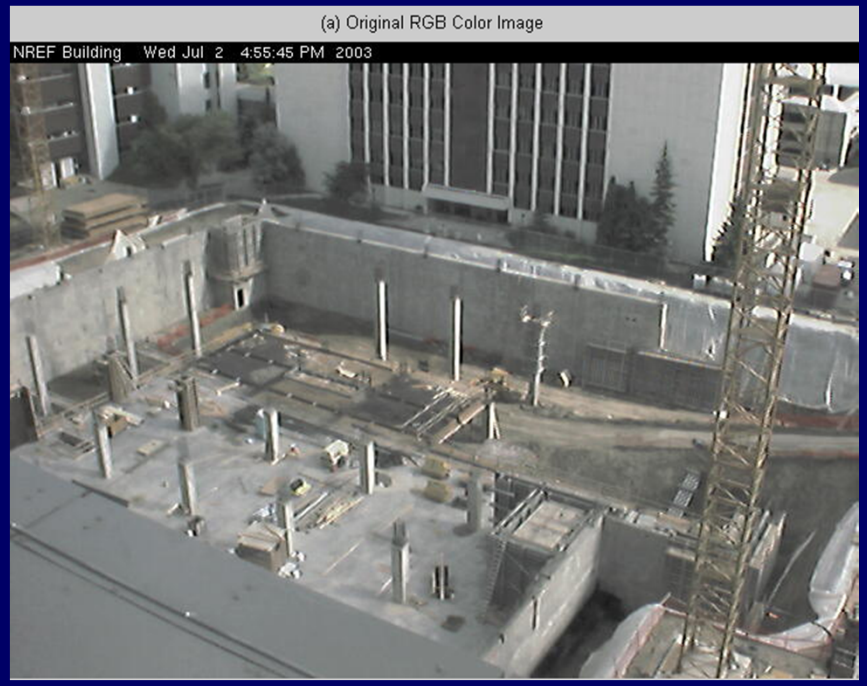
- is a complex development
- needs ongoing reassessment of the site condition – project progress measurement.

Digital imaging can be a solution?

Proposed Method



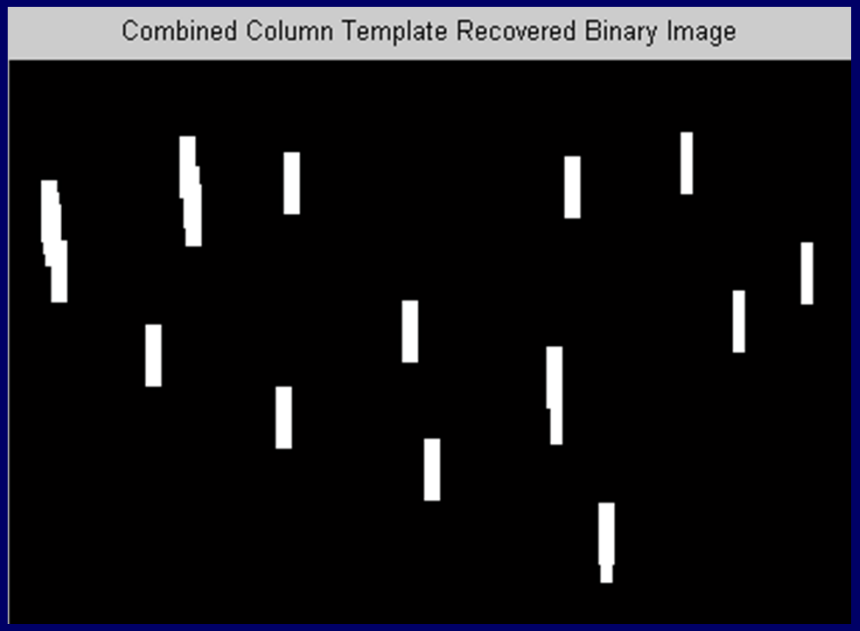
Object Segmentation



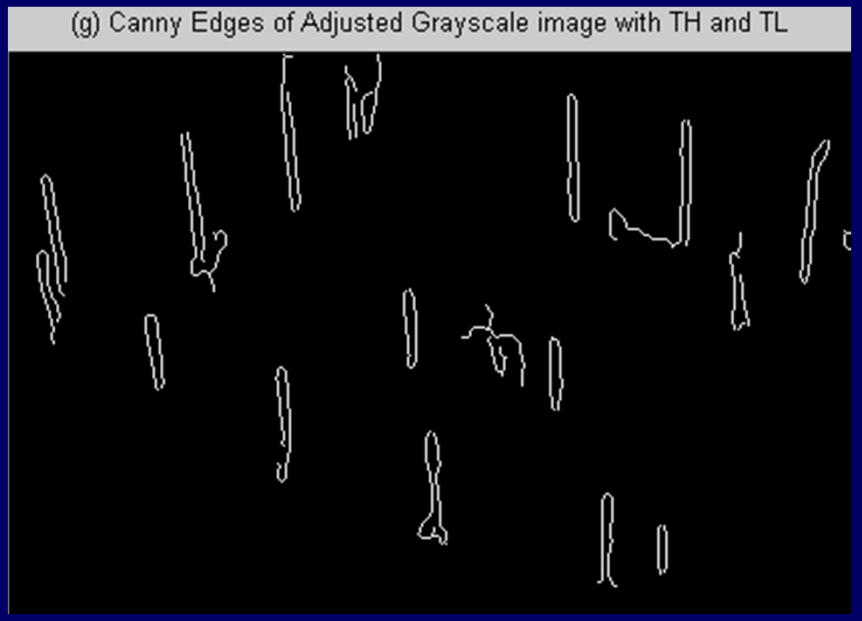
(a) Original Color Image

(b) Grayscale Image

Object Segmentation (Cont'd)

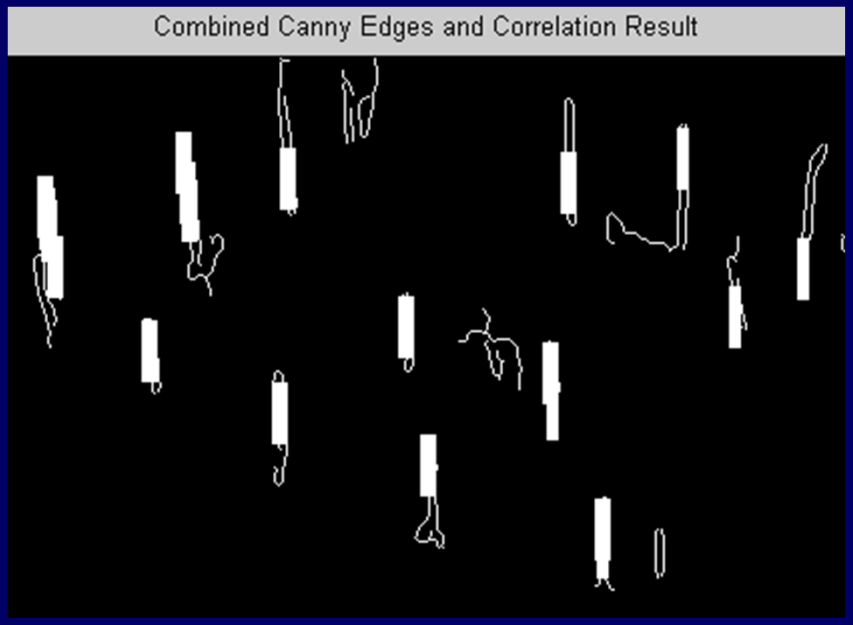


(c) Objects Detected by NCC

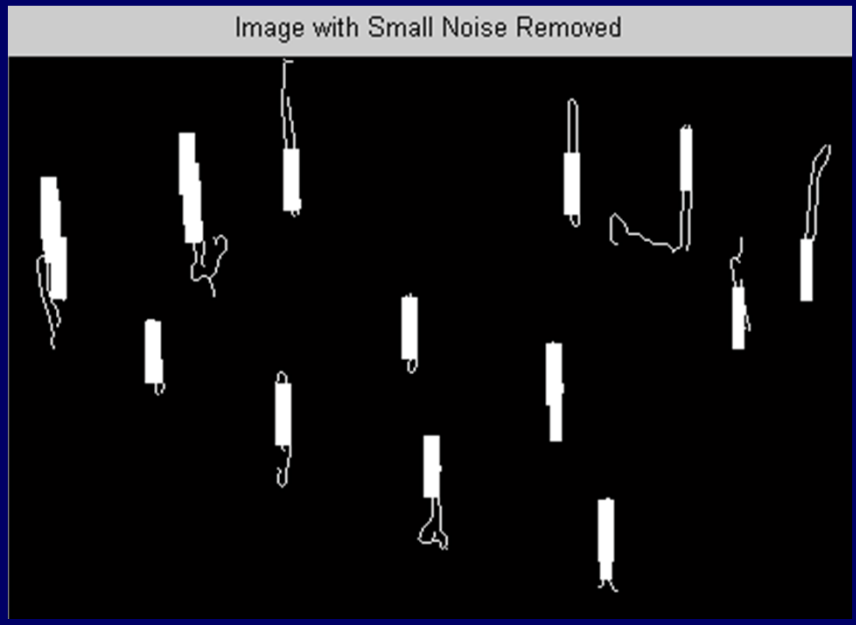


(d) Canny Edges

Object Segmentation (Cont'd)

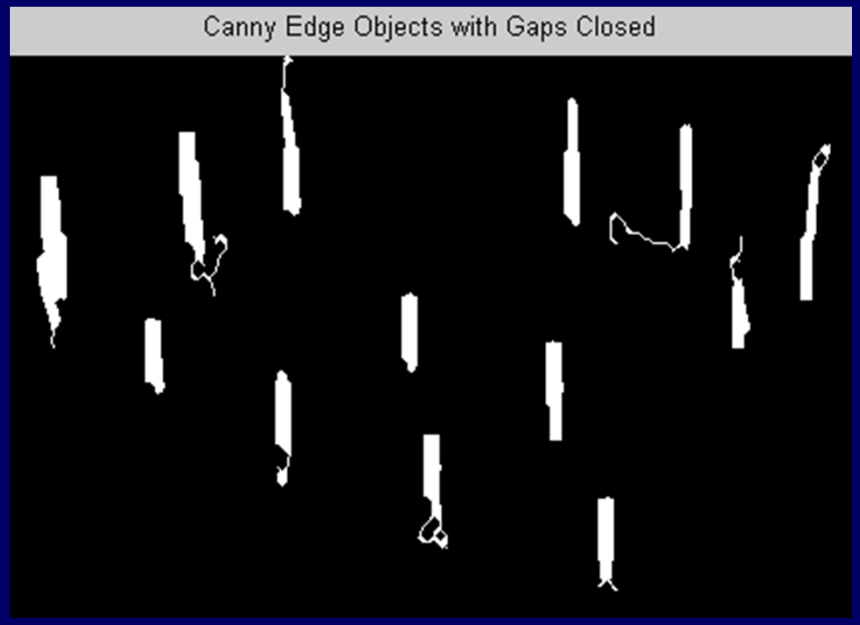


(e) Combined Result of Canny Edges and NCC

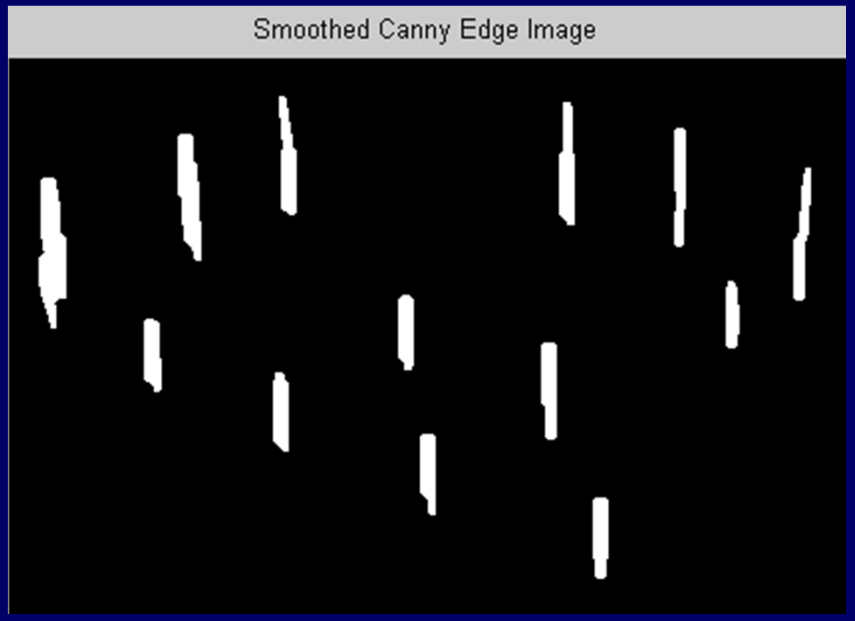


(f) Image with Small Noise Removed

Object Segmentation (Cont'd)

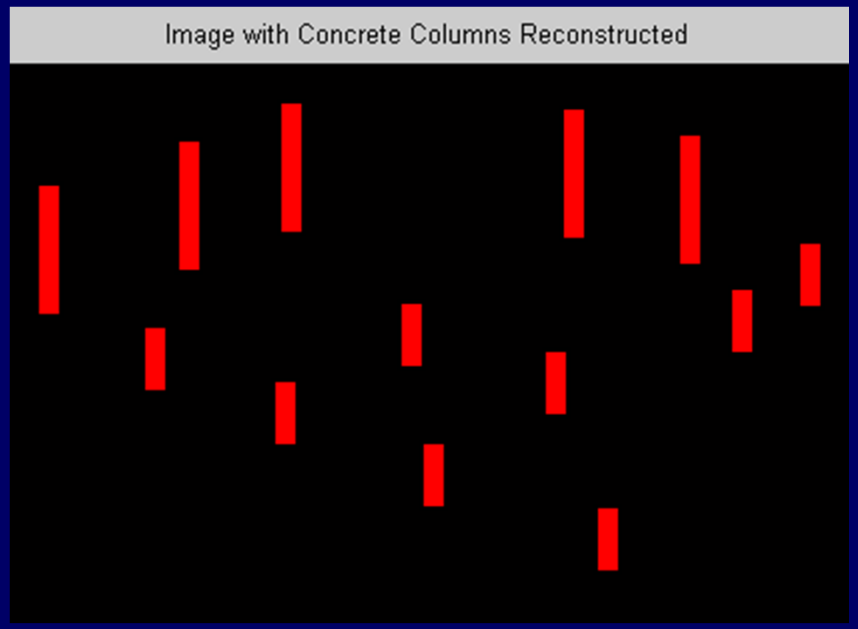


(g) Image with Gaps Closed

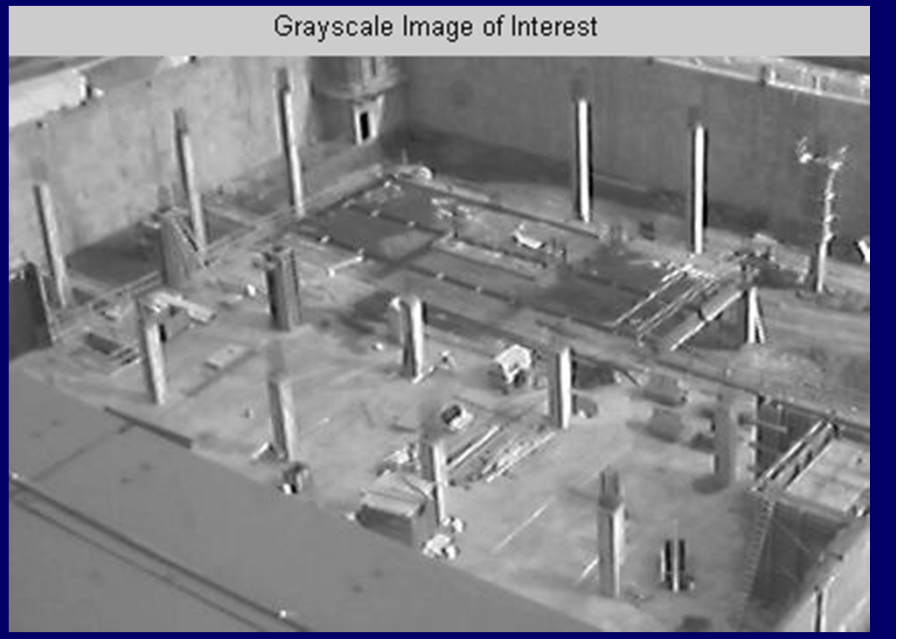


(h) Smoothed Objects of Interest

Object Segmentation (Cont'd)

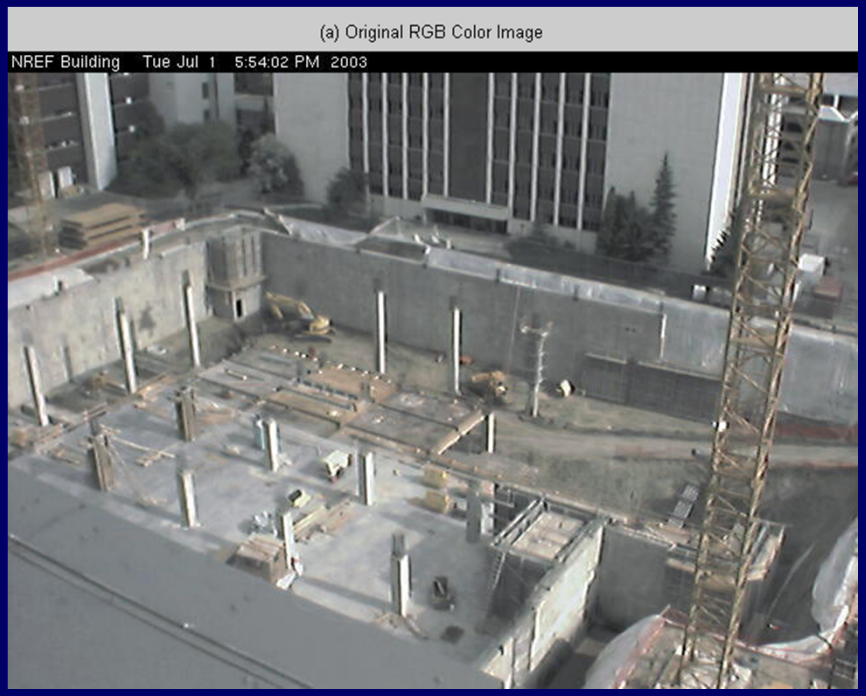


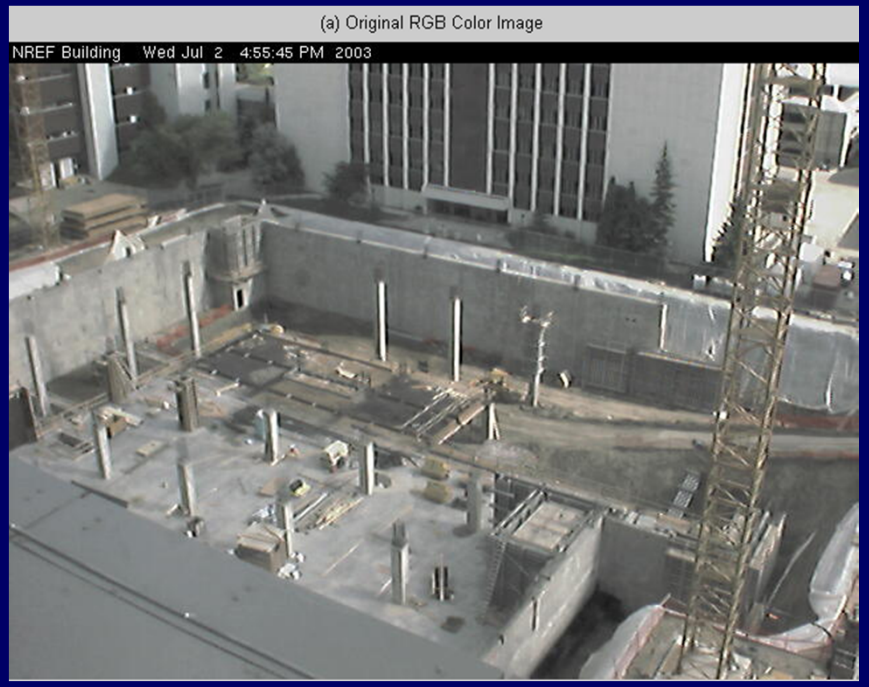
(i) Reconstructed Objects of Interest



(j) Grayscale Image

Automatic Image Comparison for Progress Assessment





(a) Color Image on July 1St, 2003

(b) Color Image on July 2nd, 2003

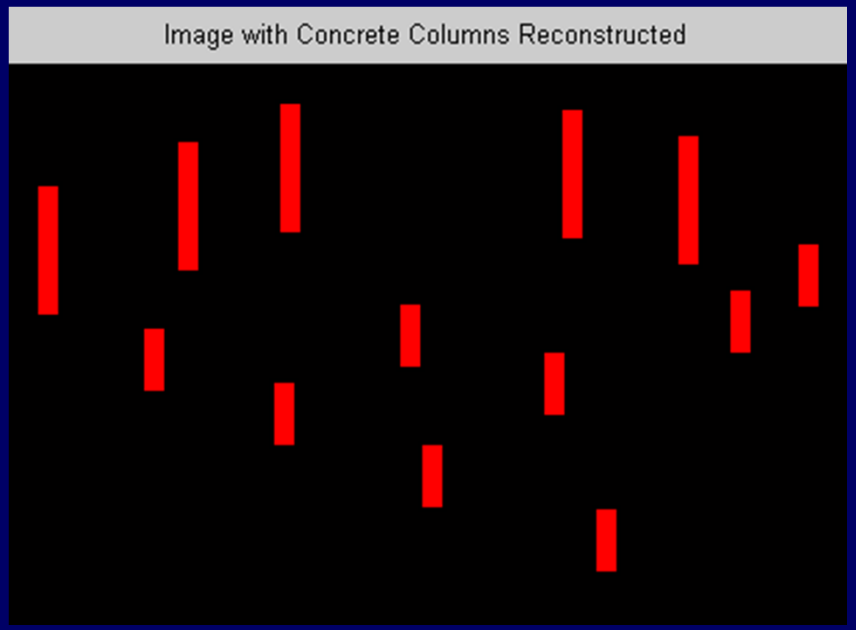
Automatic Image Comparison for Progress Assessment (Cont'd)

(c) Grayscale Image on July 1St, 2003

(d) Identified Concrete Columns on July 1St, 2003

Automatic Image Comparison for Progress Assessment (Cont'd)

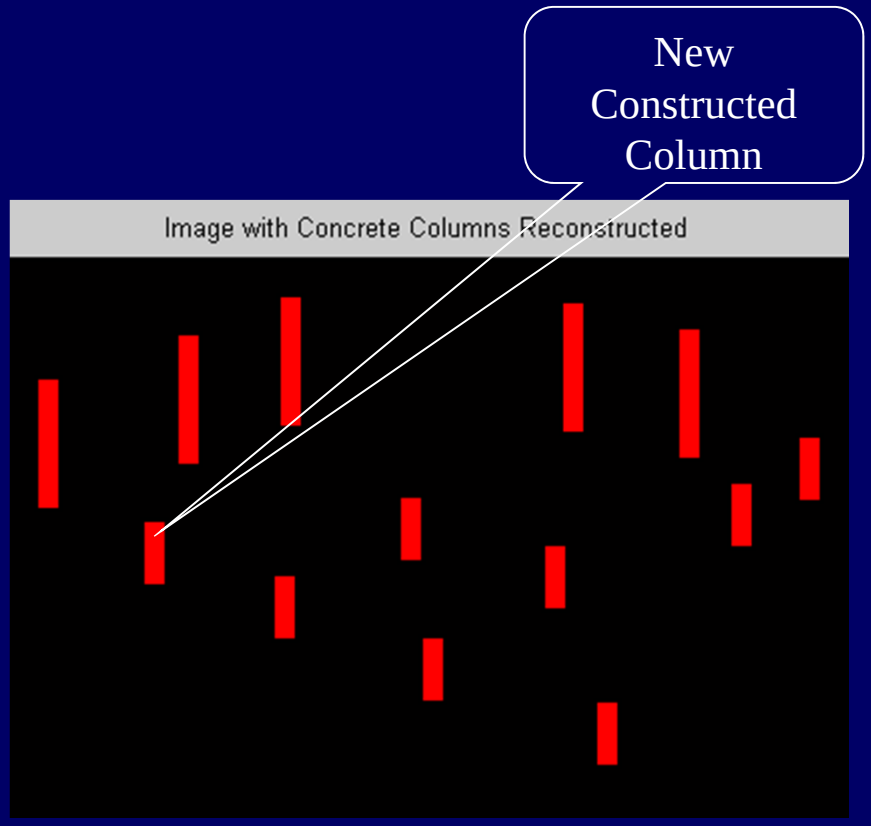
(e) Grayscale Image on July 2nd, 2003



(f) Identified Concrete Columns on July 2nd, 2003

Automatic Image Comparison for Progress Assessment (Cont'd)

(g) Identified Concrete Columns on July 1St, 2003



(h) Identified Concrete Columns on July 2nd, 2003

Experiment Result
(Example: Concrete Columns)

Accuracy of the Proposed Object Segmentation method

- 90% of the concrete columns in digital images were correctly detected.

Conclusions

The proposed method showed a promising result for automatic construction progress control using digital imaging.

Further studies are needed to address issues such as :

- different weather conditions
- blockage of the line of sight
- proper image resolution
- optimum camera locations