Computer Vision System Toolbox
# (Ⅱ)

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Objective
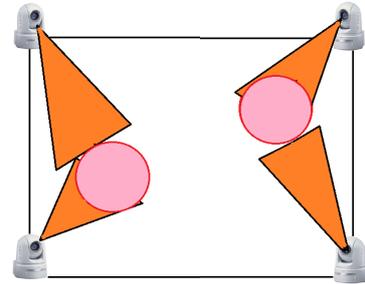
What is a criteria for deciding important areas?


Optical Flow

[240 × 320]　　[240 × 320]

RGB to intensity — Color Space Conversion — uint8 — Convert Image to double — Image Data Type Conversion — double — Optical Flow (Lucas-Kanade) — Optical Flow — Display

$$I(x, y, k) = I(x + \Delta x, y + \Delta y, k + 1)$$

k-th captured frame　　(k+1)-th captured frame
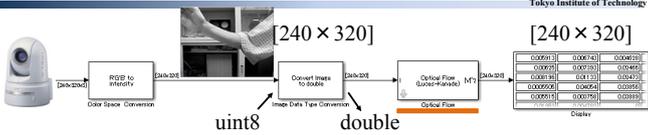
Function
Estimate velocity of each pixels.

Tunable parameter
Smoothness factor

Output
Each pixels' velocity
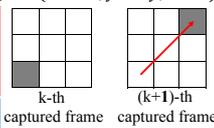
Frame rate:30fps

Corner Detection

[240 × 320]

RGB to intensity — Color Space Conversion — Corner Detection — Metric — Display
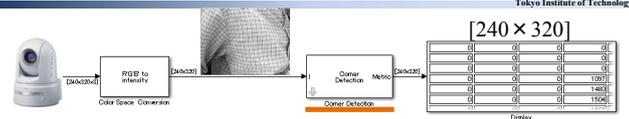
Local Intensity Comparison

Definition of corner
Corner has N contiguous bright or dark surrounding pixels.

Tunable parameter
Intensity comparison threshold Corner's angle

Output
Each pixels' corner metric Corners' location

Frame rate:22.5fps

Edge Detection

[240 × 320] × 2

RGB to intensity — Color Space Conversion — Sobel — Gv, Gh — Edge Detection — Display / Display1

How to detect edge
Compute gradient magnitude in each direction.

Tunable parameter
Computational method Edge's degree

Output
Each pixels' gradient values Binary image of edge

Frame rate
Gv&Gh: 1.6fps
G45&G135: 4.1fps

Trace Boundary

RGB to intensity — Color Space Conversion — Autothreshold — BW — Trace Boundary — Pts — Start Pt / Constant — Start points [1 × 2]
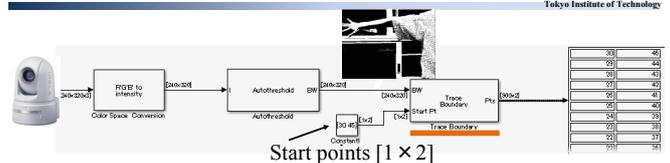
How to trace boundary
From start point, trace a boundary between nonzero pixels & zero pixels.

2 types of connectivity

Tunable parameter
Connectivity of boundary Trace direction　Initial search direction

Output
Boundary points

Frame rate:30fps

Template Matching

[240 × 320]   [187 × 283]
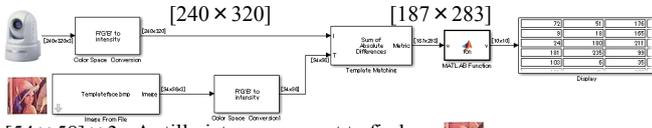
[54 × 58] × 3   A still picture you want to find.

Template

How to find template
**Compute the match metric value
at every pixel.**

Tunable parameter
**Computational method
Search region**

Output
**Each pixels' match metric
Template's upper left corner's location**
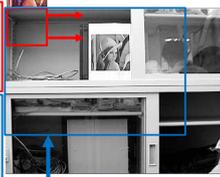
Default search region

Frame rate:0.068fps