

Motion

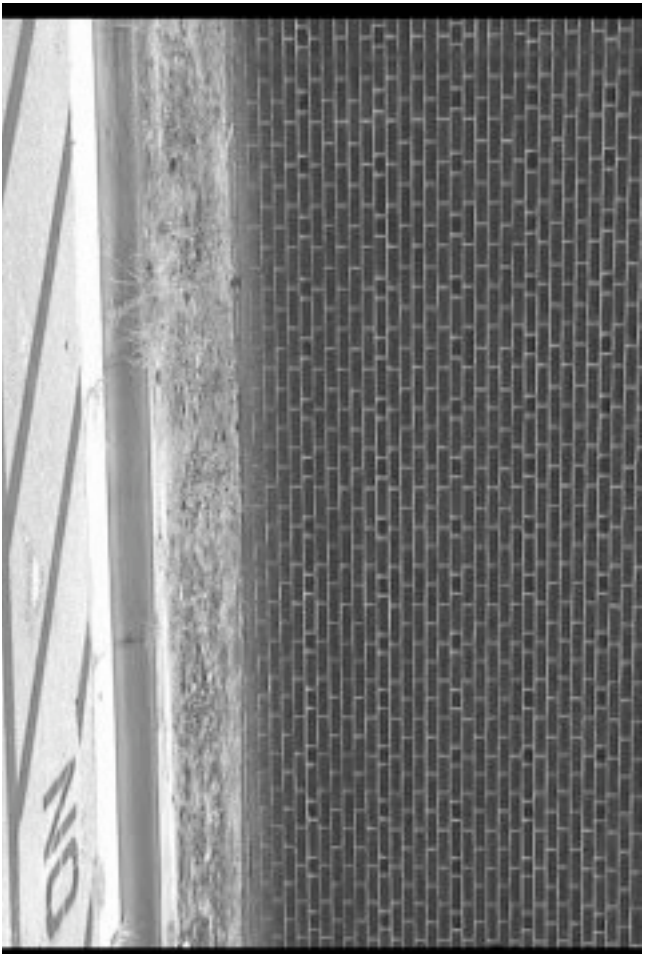
Imaging Configurations

- Stationary camera stationary objects
- Stationary camera moving objects
- Moving camera stationary objects
- Moving camera moving objects

Motion

- Motion Detection
- Motion Measurement (optical flow)
- Tracking
- Structure from motion (derive 3-D motion & shape)
- Motion Recognition
- Motion-based Recognition

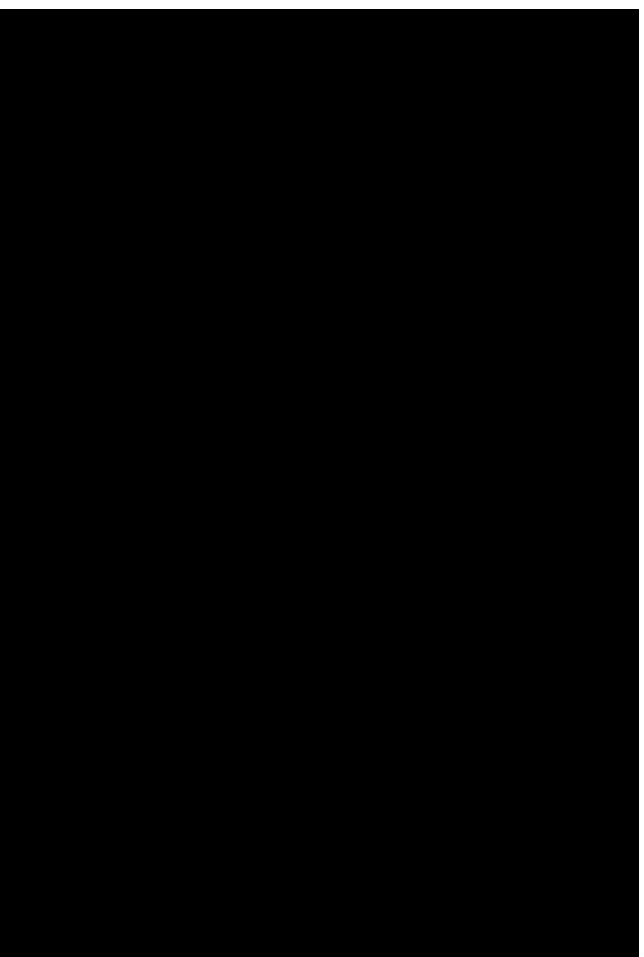
A Video Clip



Consecutive Frame Difference



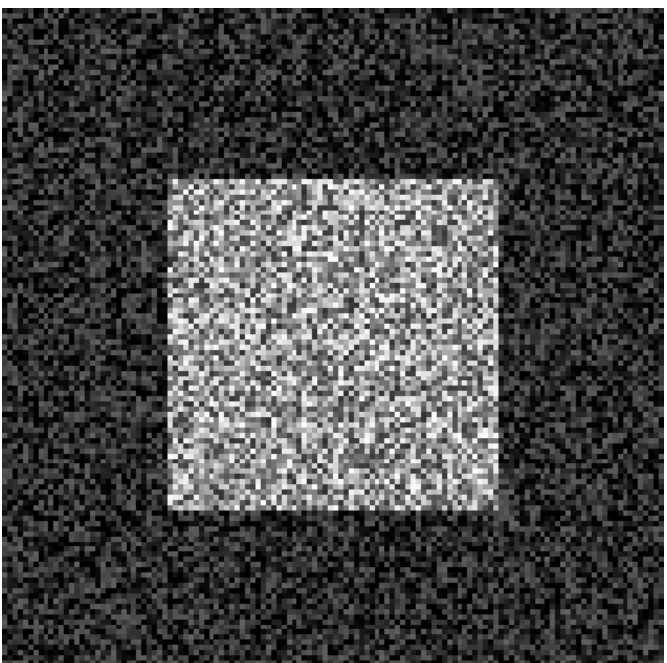
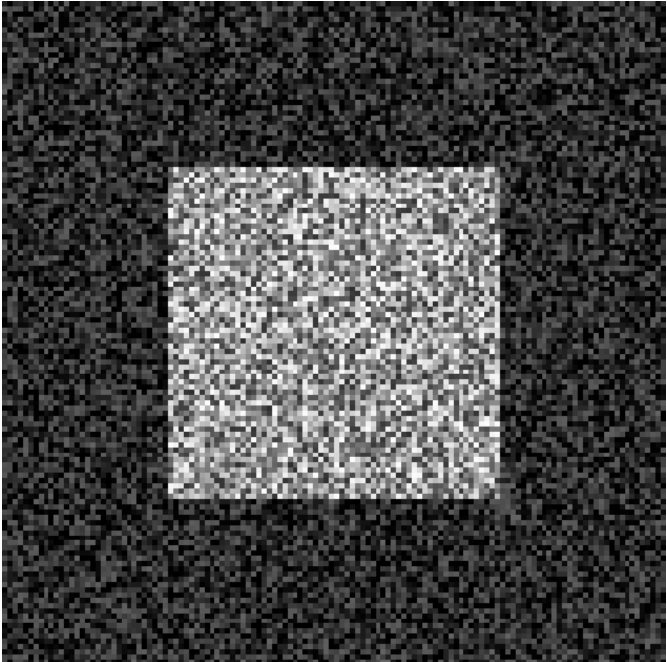
Background Difference



Optical Flow

Measurement of motion at each pixel

Synthetic Images



Results

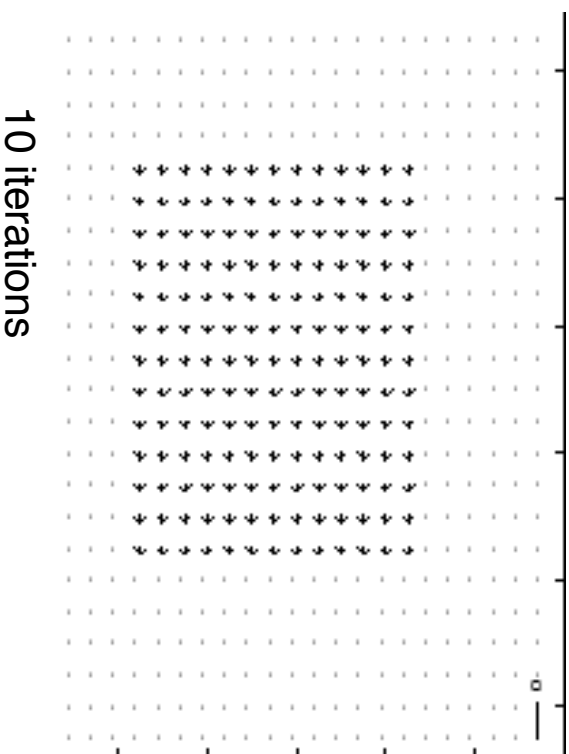
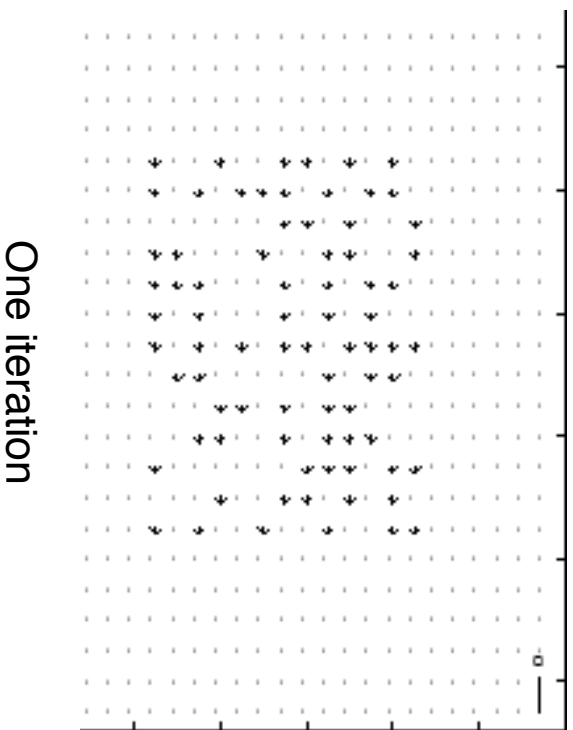
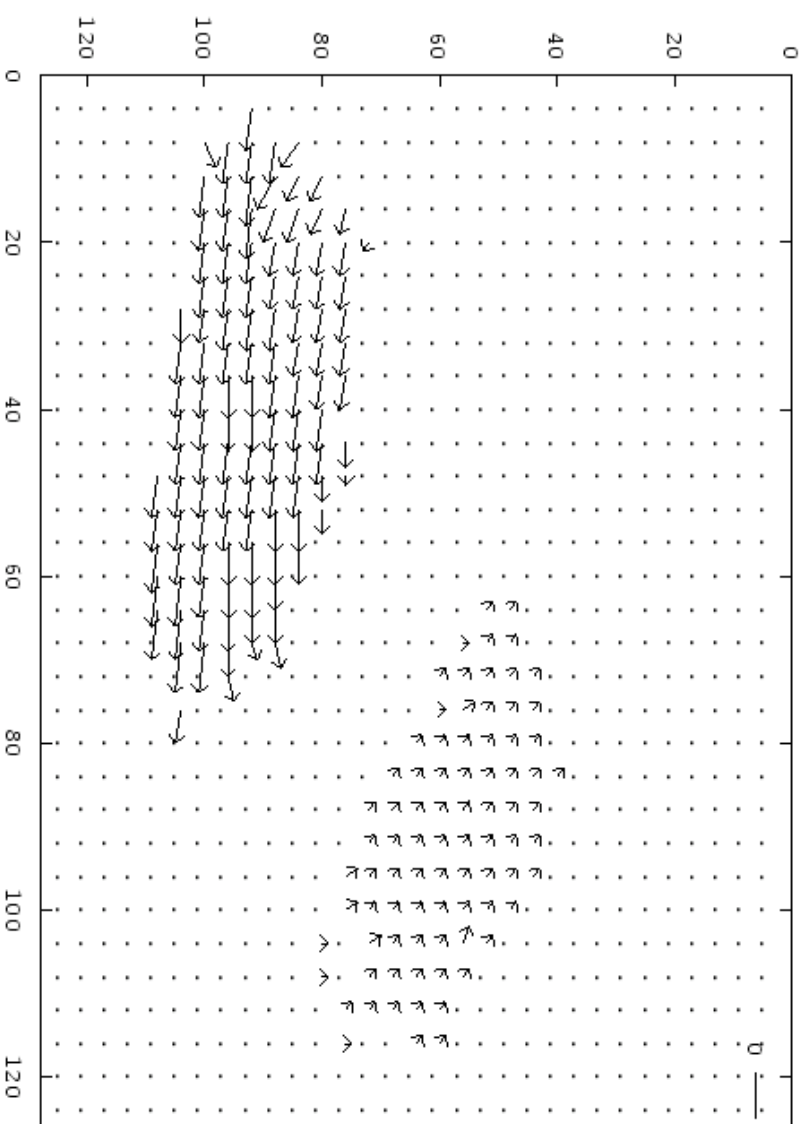


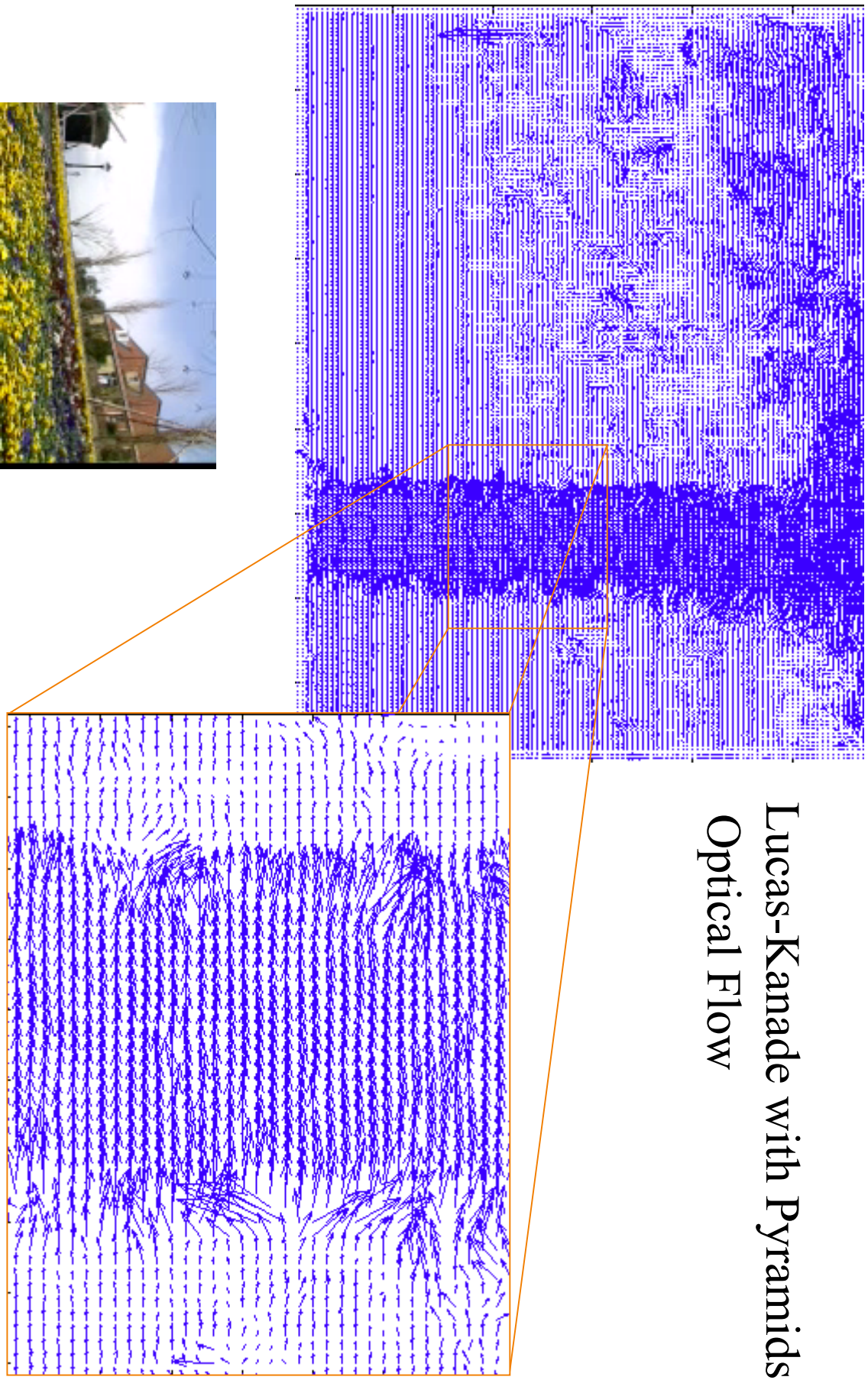
Image from Hamburg Taxi seq

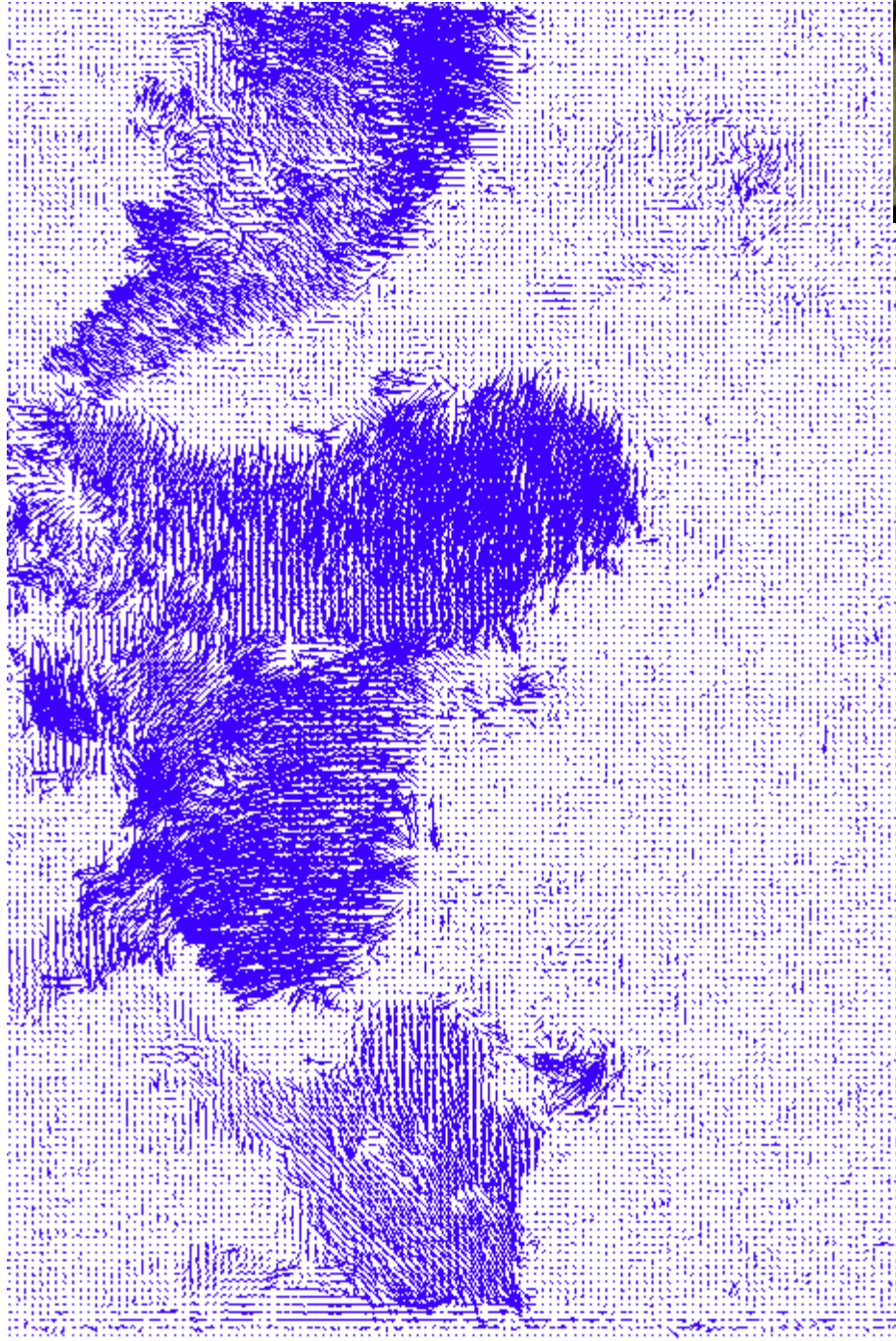


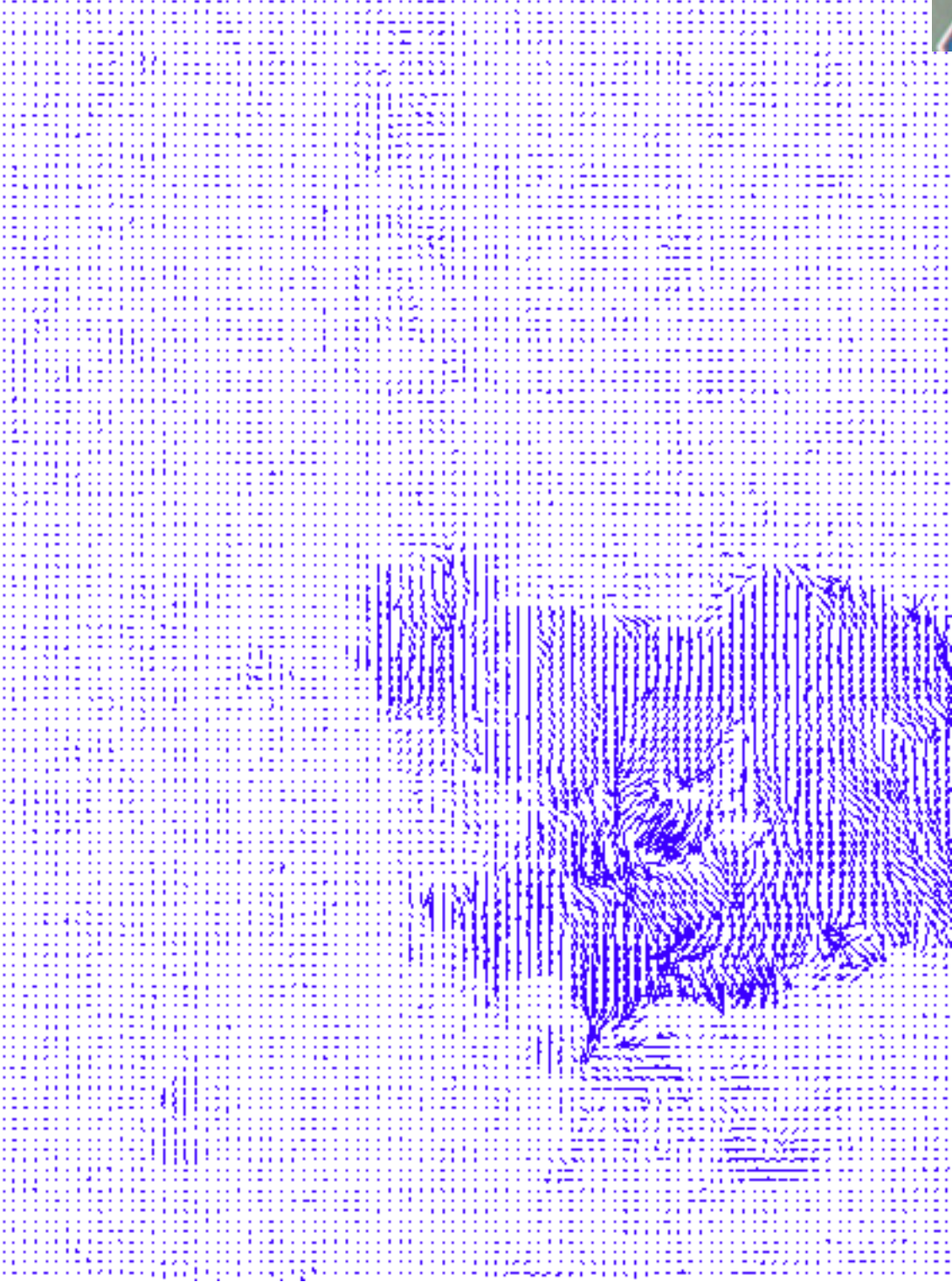
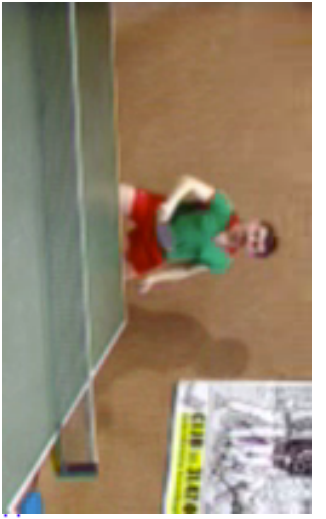
optical flow



Lucas-Kanade with Pyramids Optical Flow







Video Mosaics



Scientific American Frontiers



Scientific American Frontiers

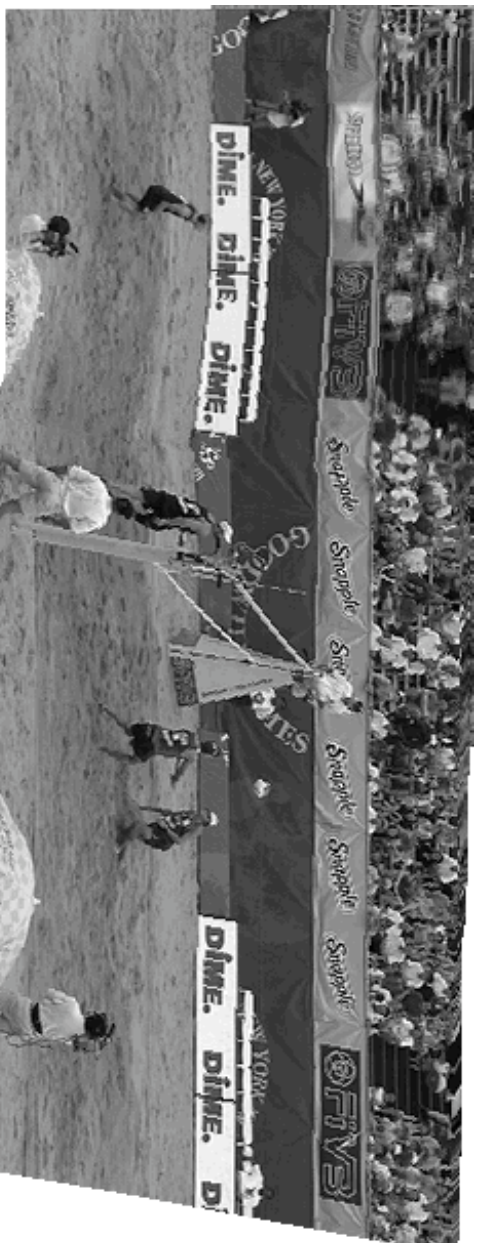




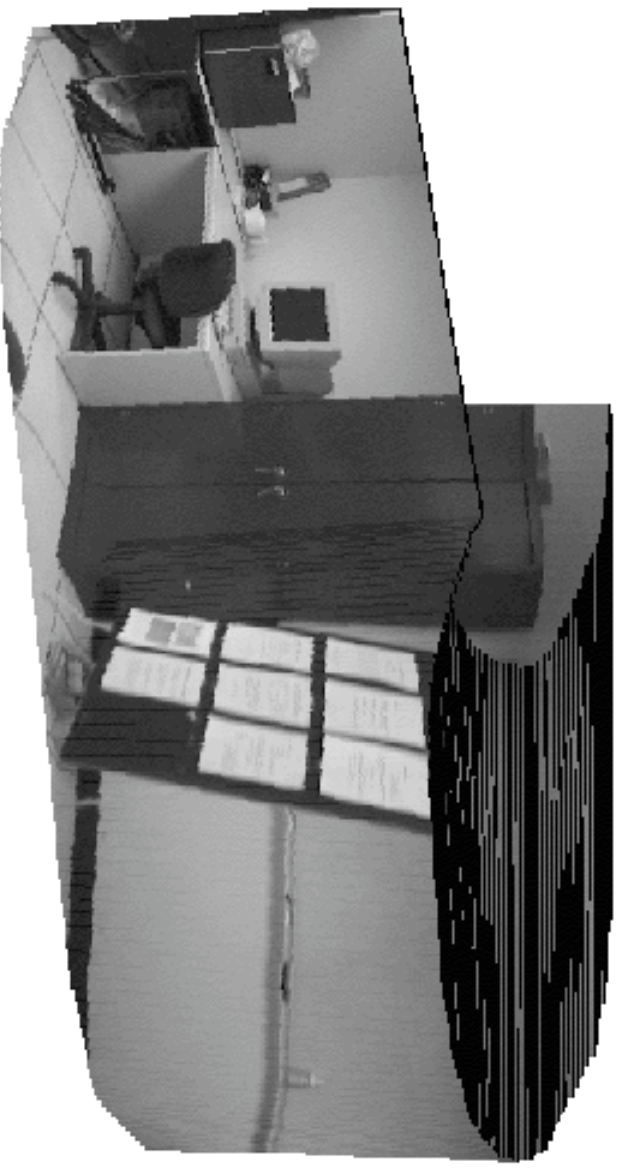
Video Mosaic



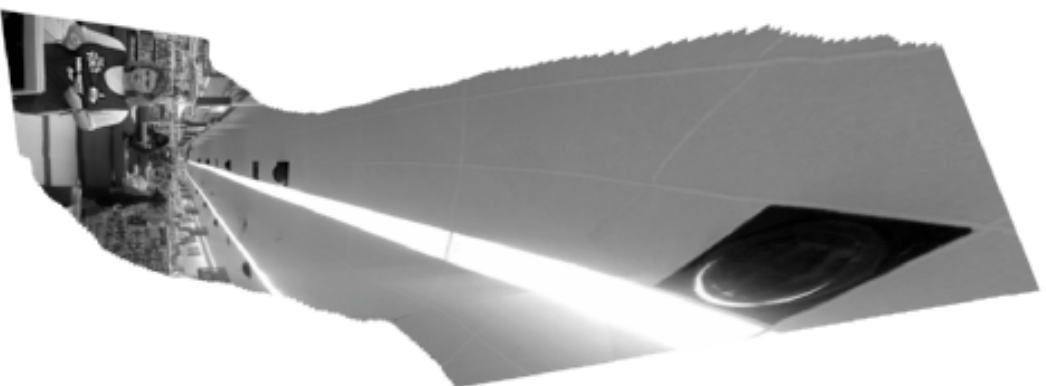
Video Mosaic



Video Mosaic



Wal-Mart



Steve Mann

<http://wearcam.org/pencigraphy/>

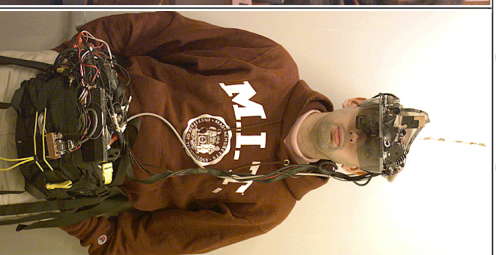
Author's 'wearable computer/personal imaging' system



^(a)
1980



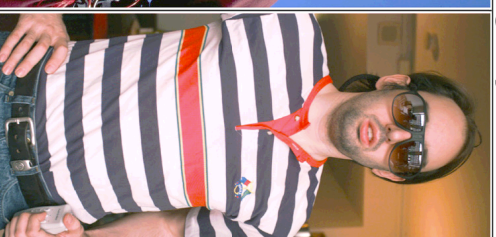
^(b)
Mid 1980s



^(c)
Early 1990s



^(d)
Mid 1990s



^(e)
Late 1990s

Head-mounted Camera at Restaurant



MIT Media Lab

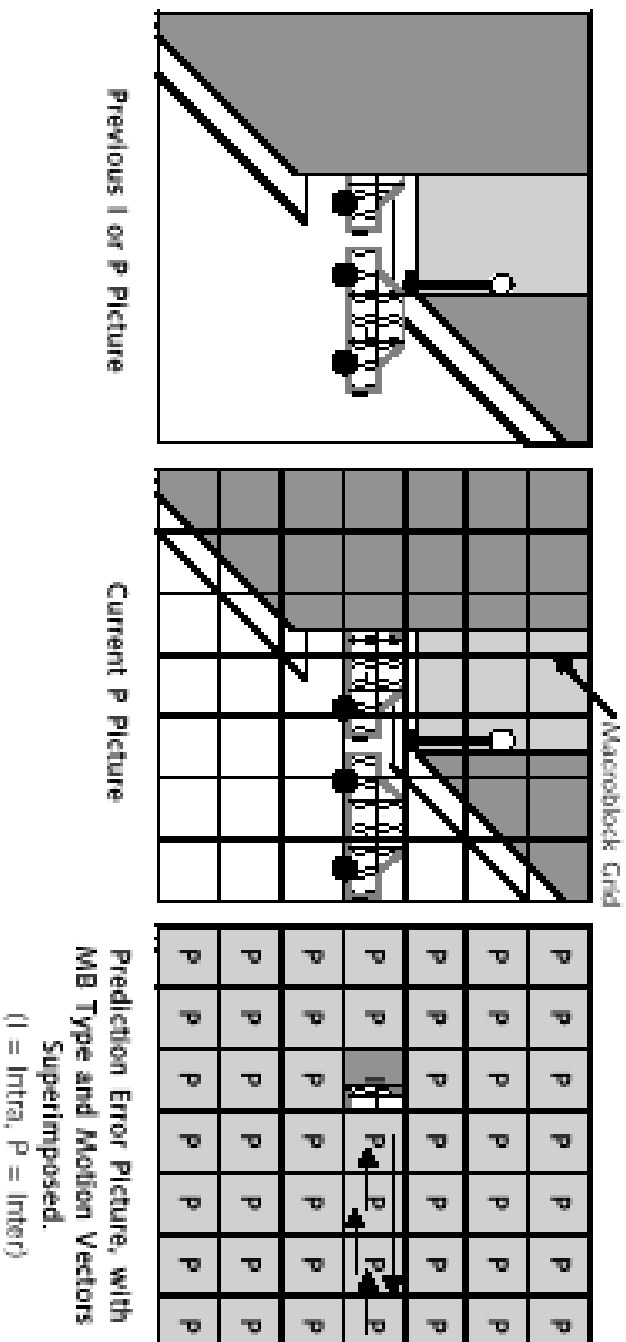


Video Compression

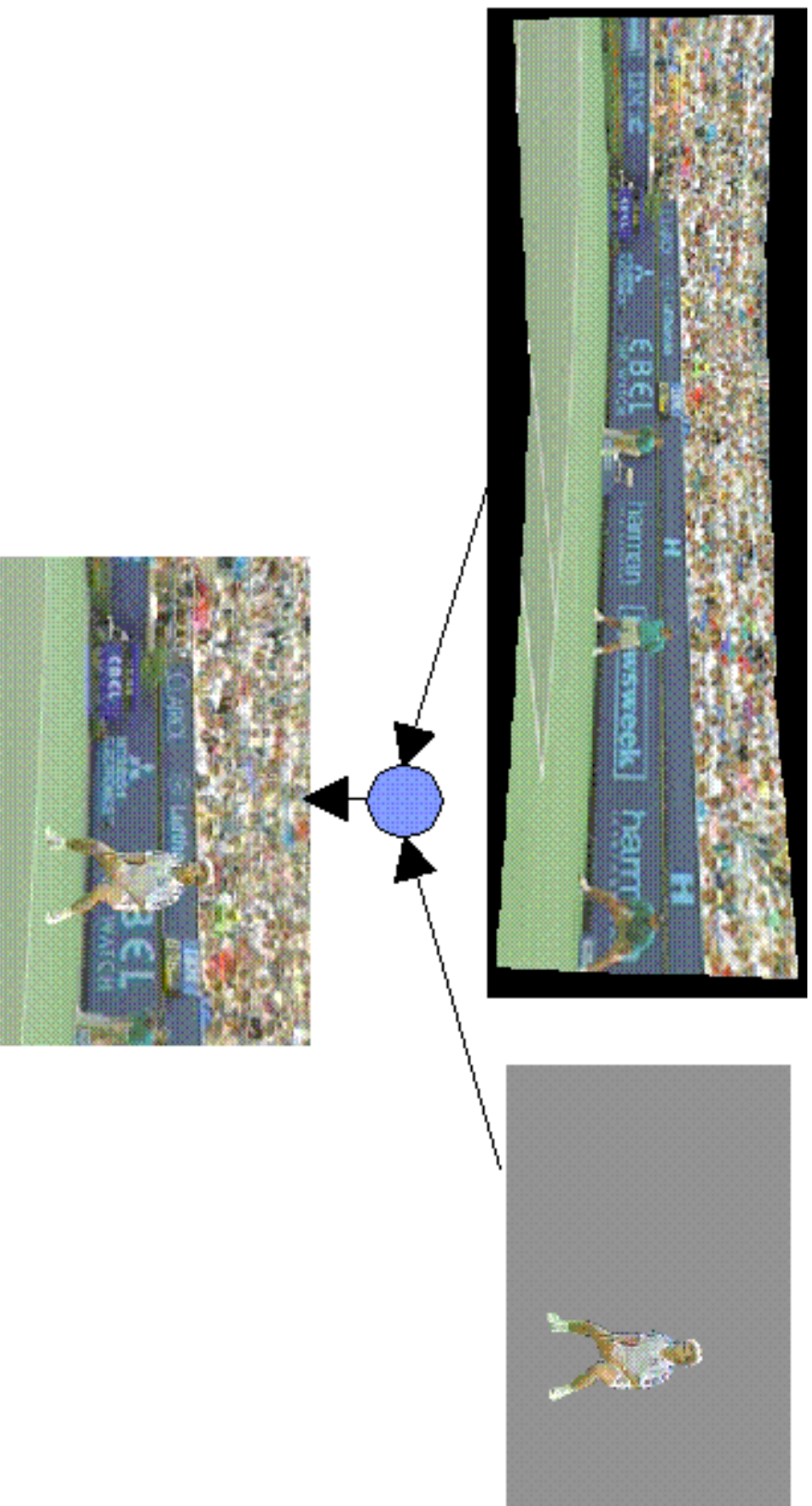
Example

Example of Forward Motion Estimation

For Best Coding Efficiency, Prediction Error should have low energy.

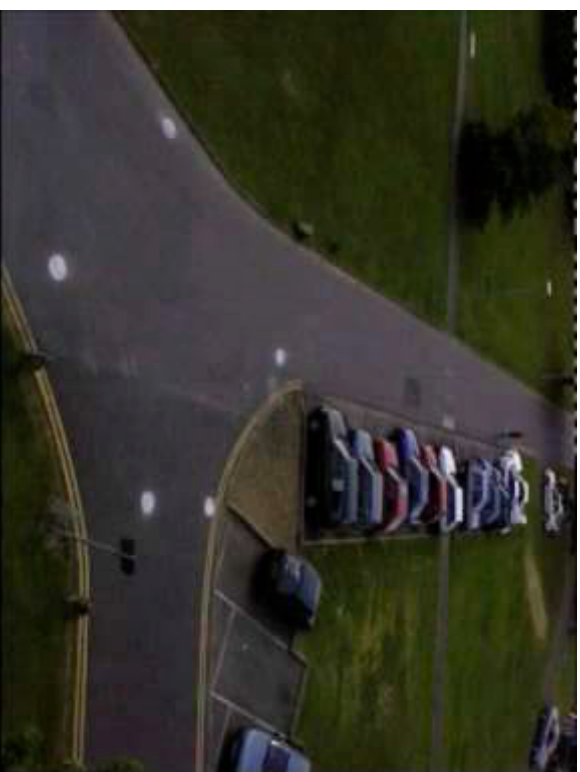


Sprite



Tracking

Tracking & Object Detection In Single Camera



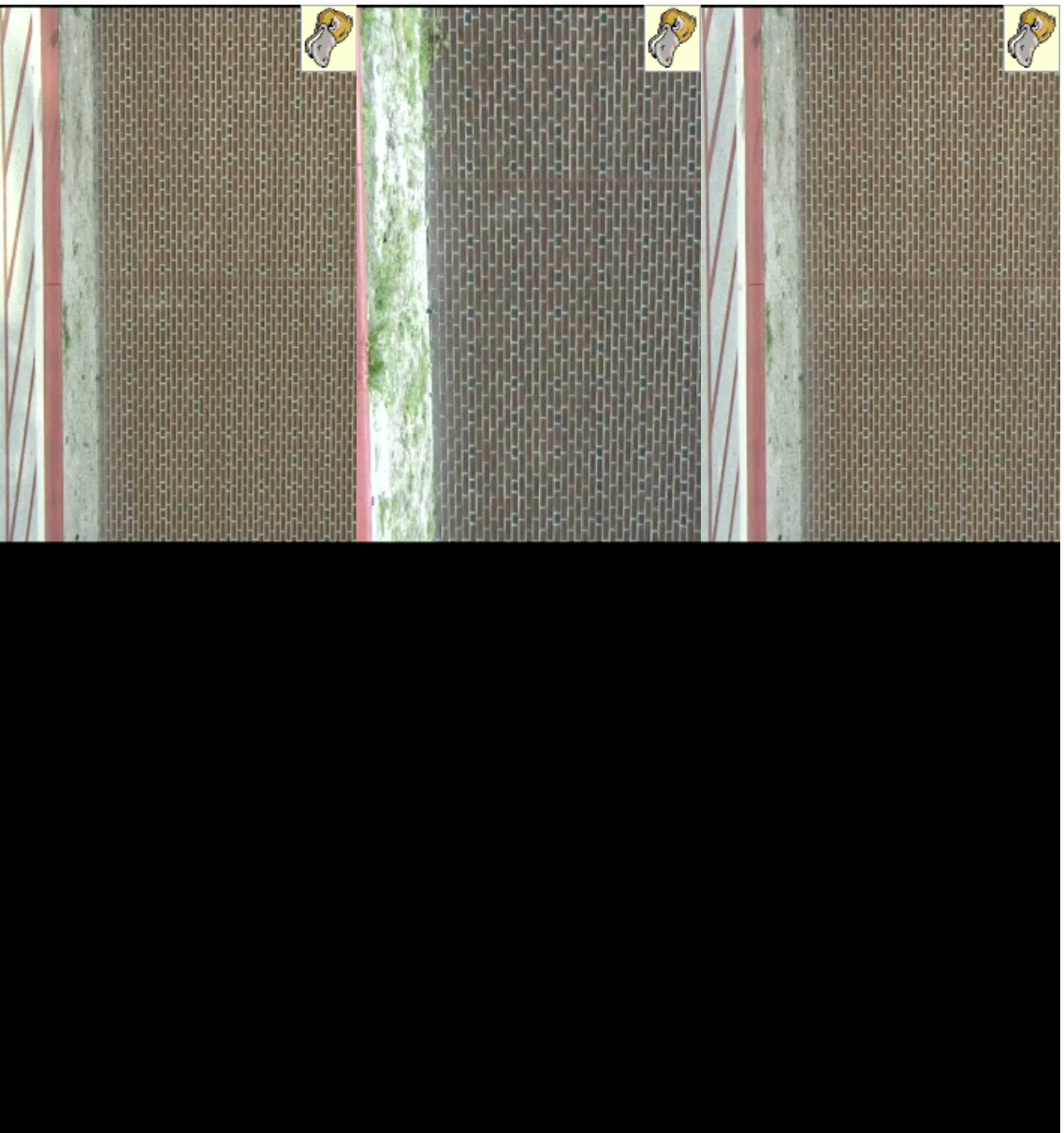
PETS-2001

Motion Recognition

Activities



Detecting *Violence*



Video Registration

IRS-1C - Washington, DC

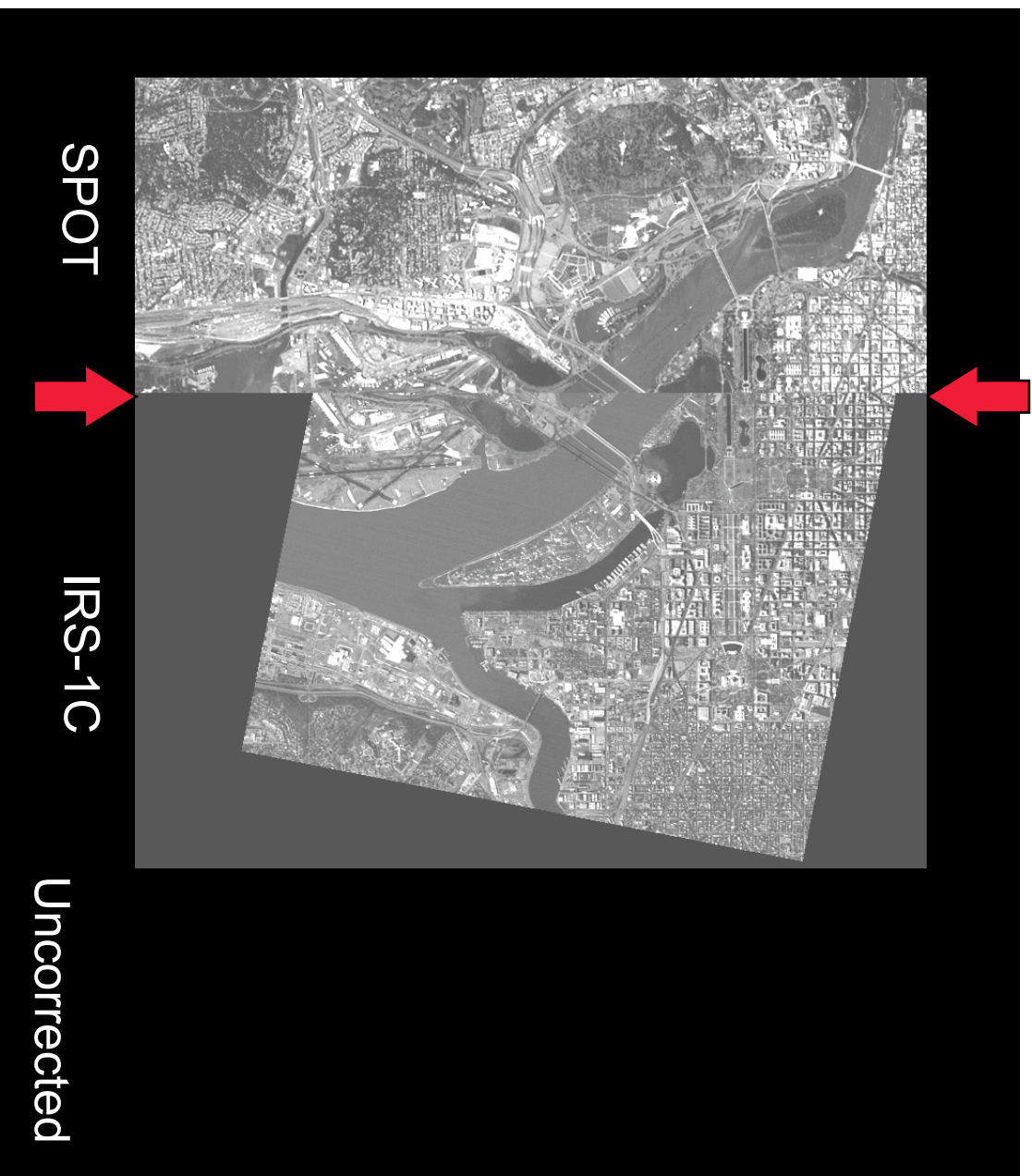


SPOT - Washington, DC



SPOT / IRS-1C

Uncorrected



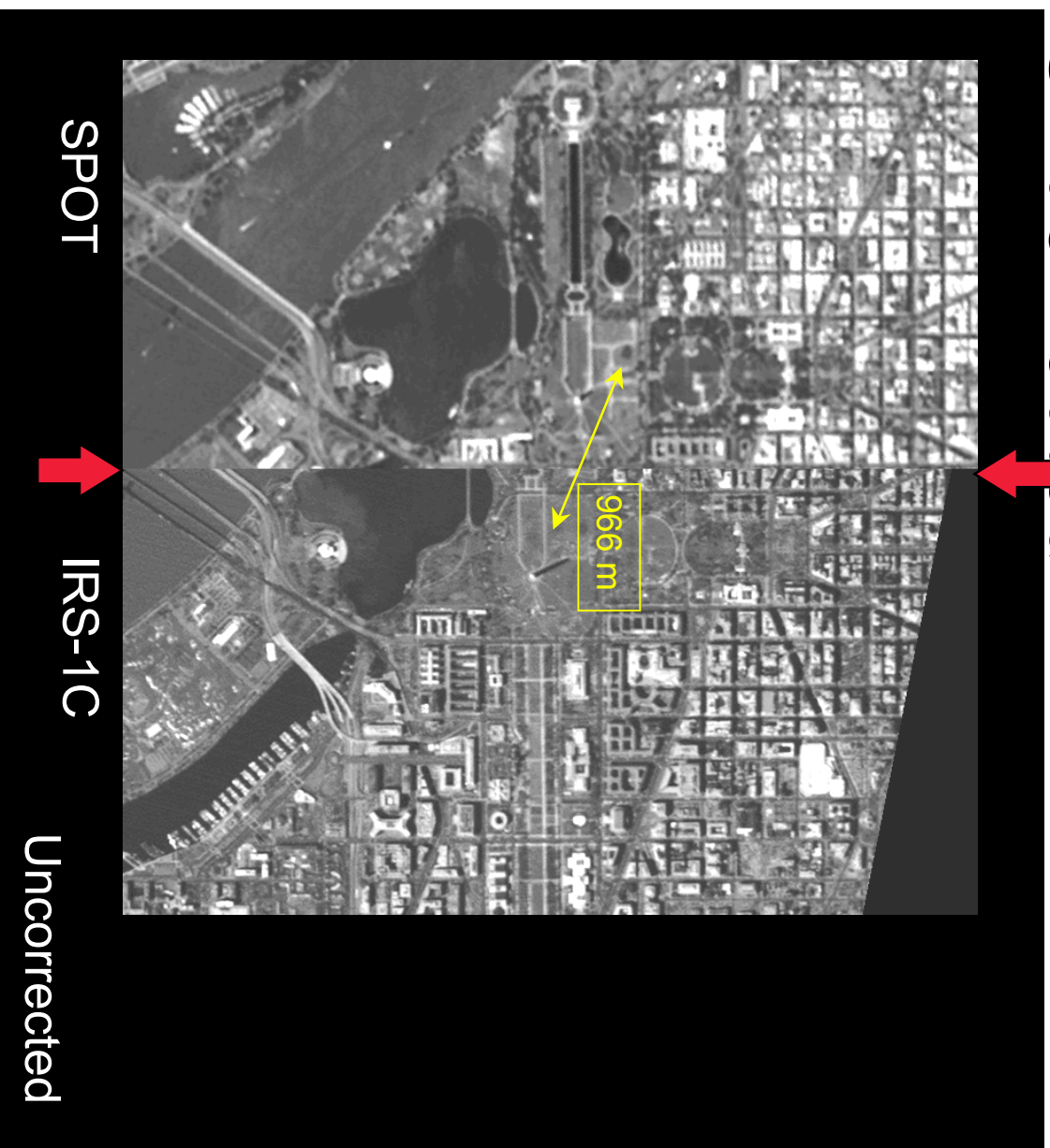
SPOT

IRS-1C

Uncorrected

SPOT/IRS-1C

Uncorrected



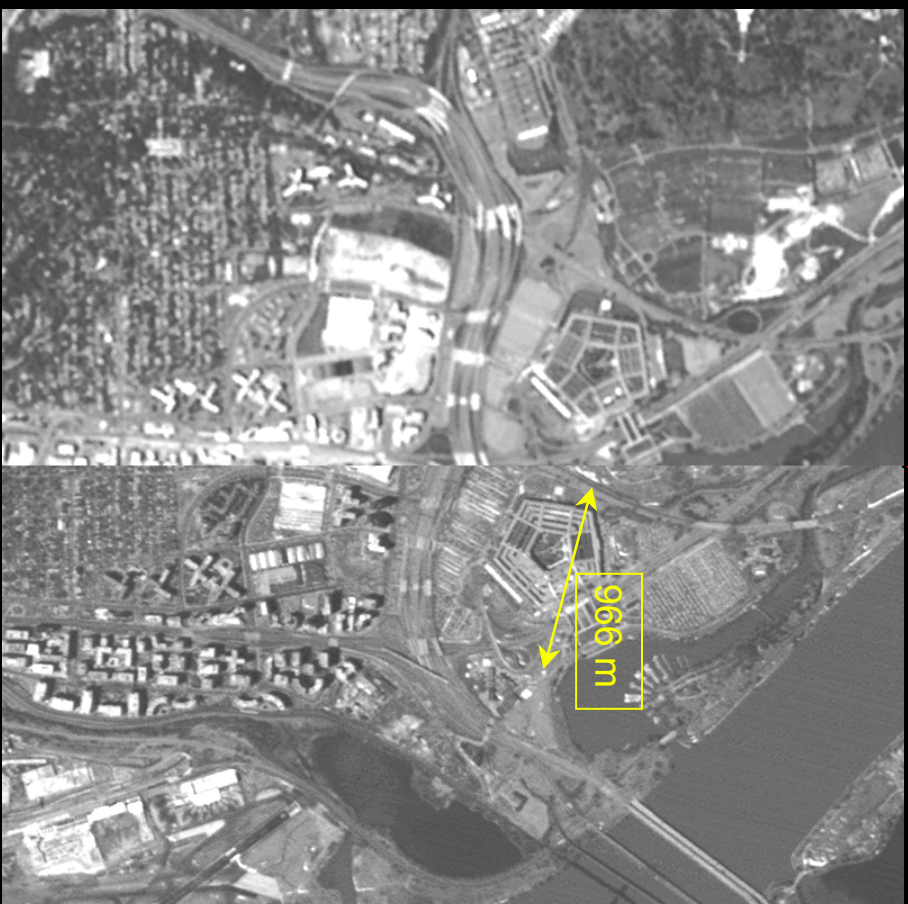
SPOT

IRS-1C

Uncorrected

SPOT1/IRS-1C

Uncorrected



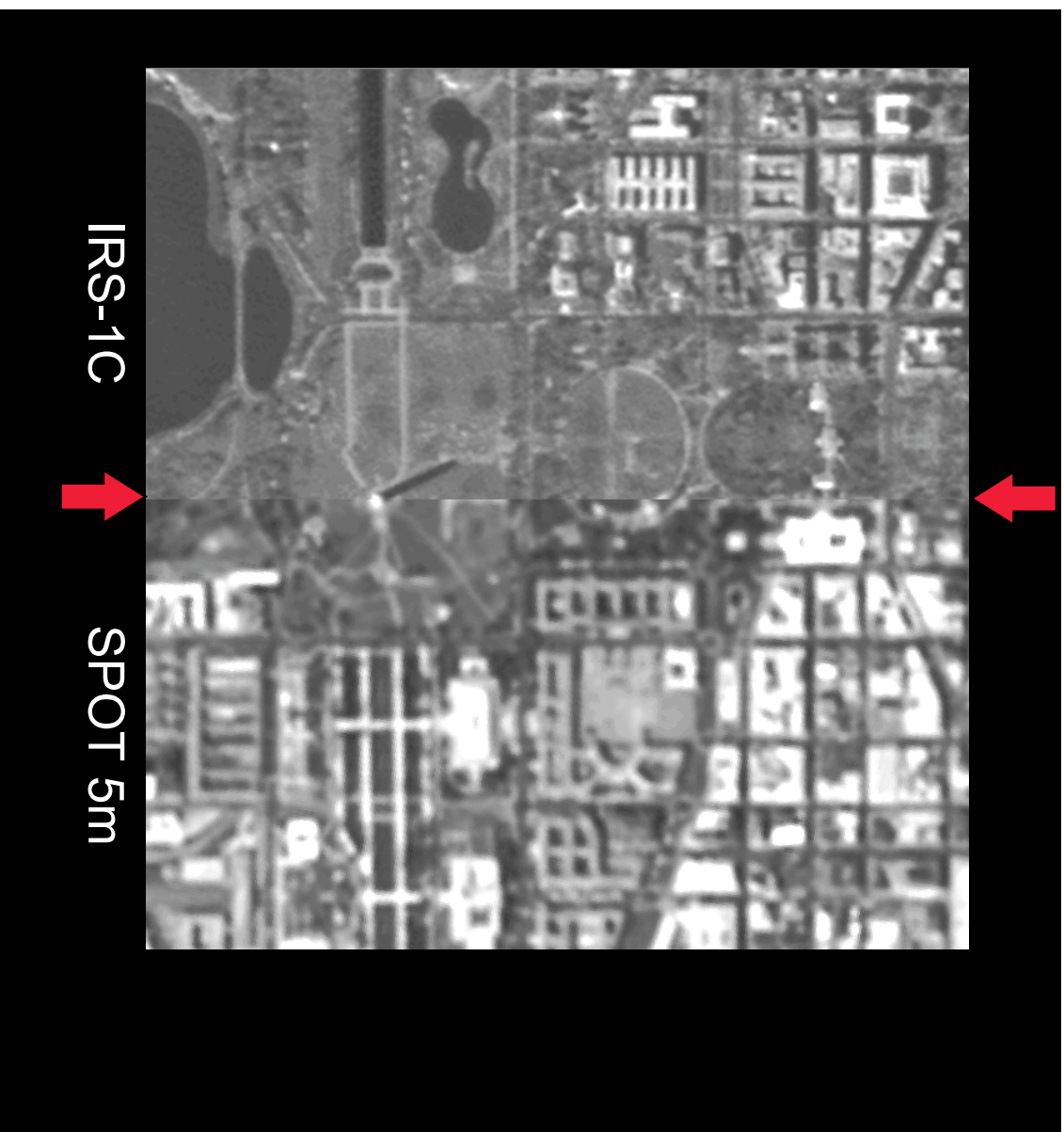
SPOT



IRS-1C

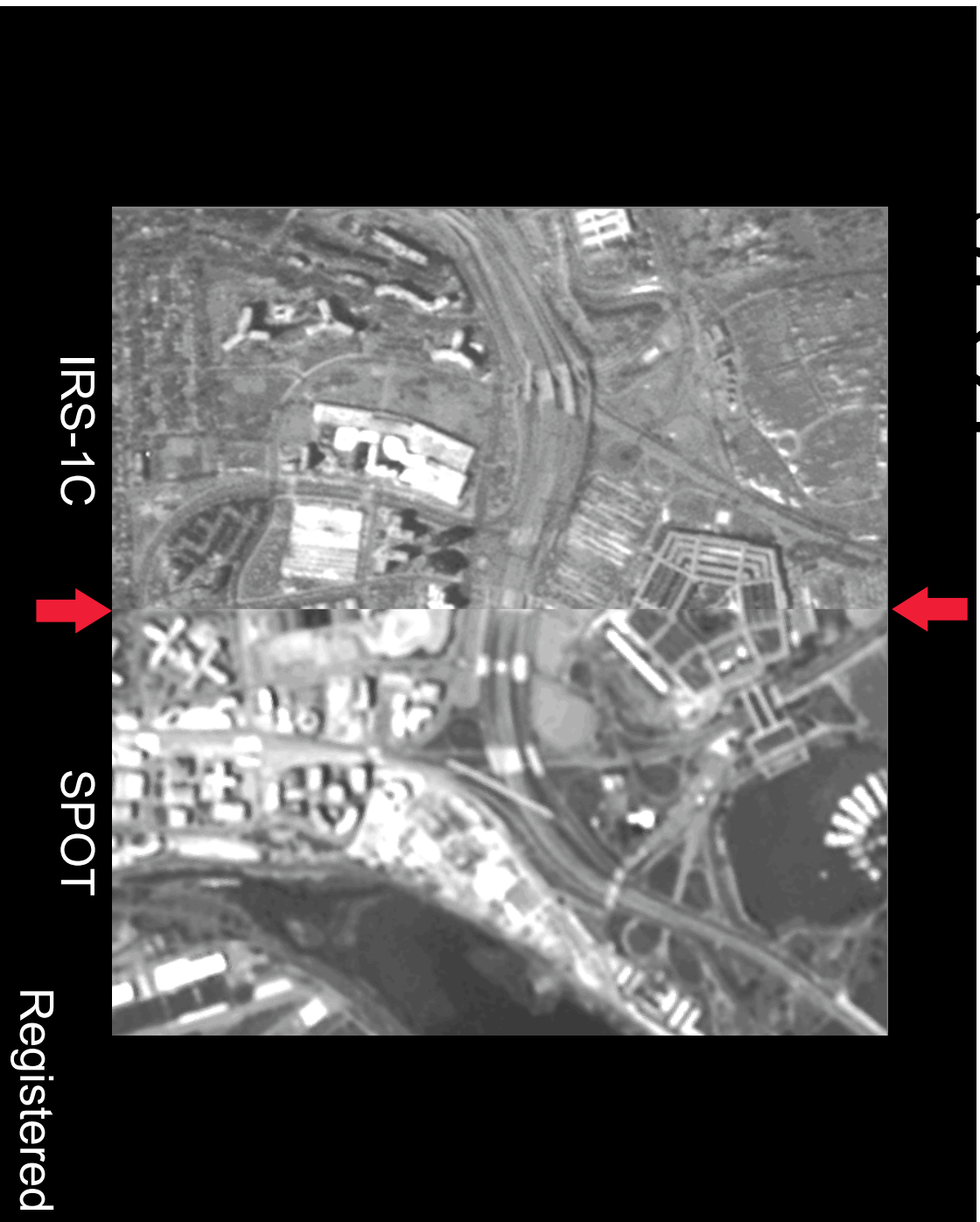
Uncorrected

IRS-1C/SPOT Registered



Registered IRS-1C to

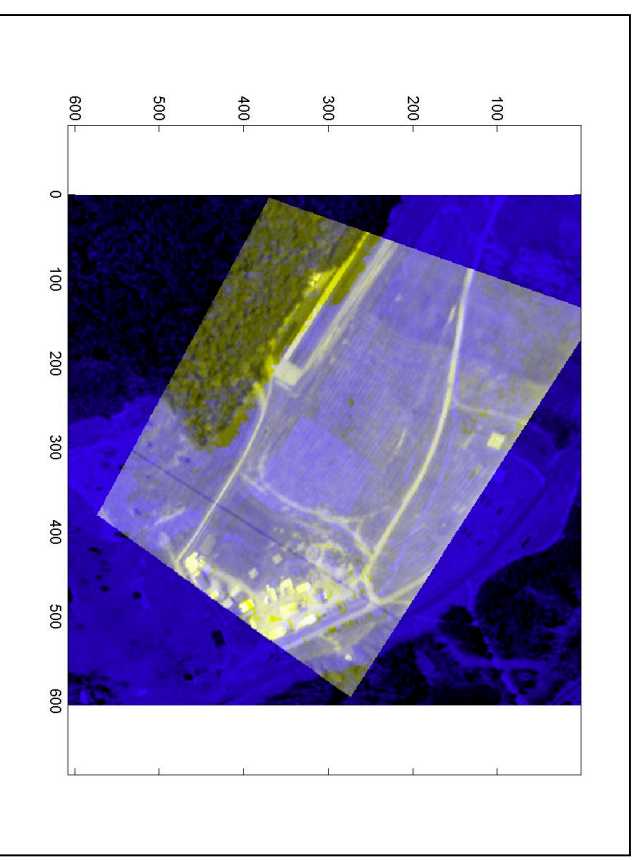
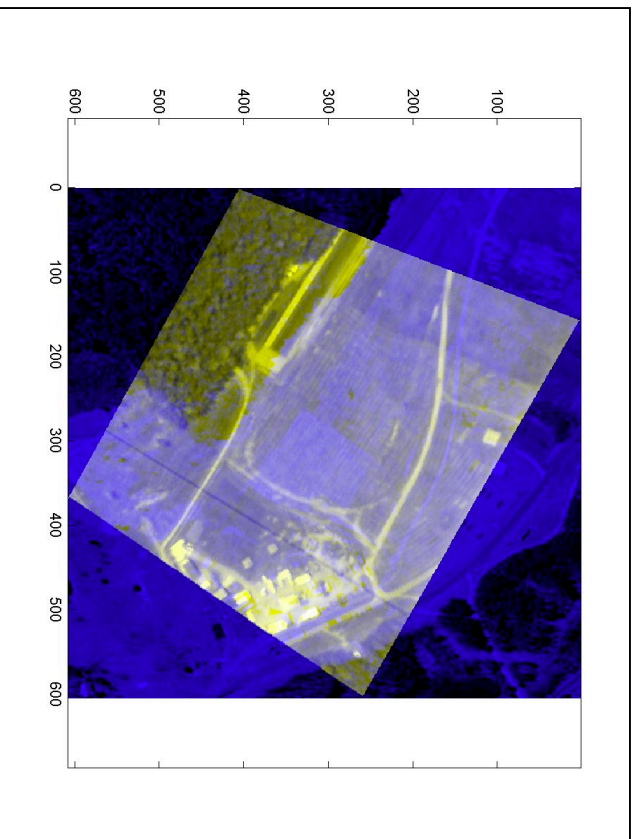
SPOT



GeoRegistration

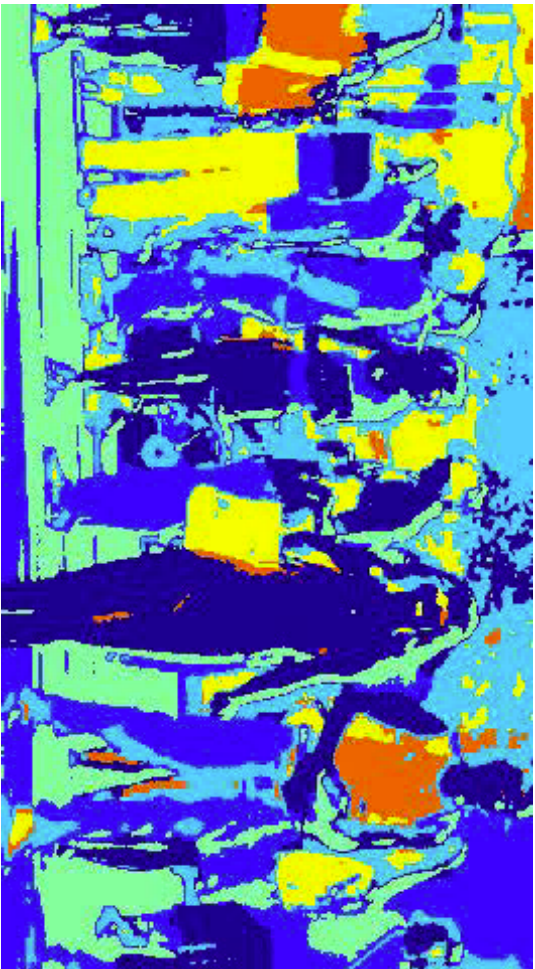
Results and Conclusions

Results superimposed with the reference image



Computer Vision
University of Central Florida

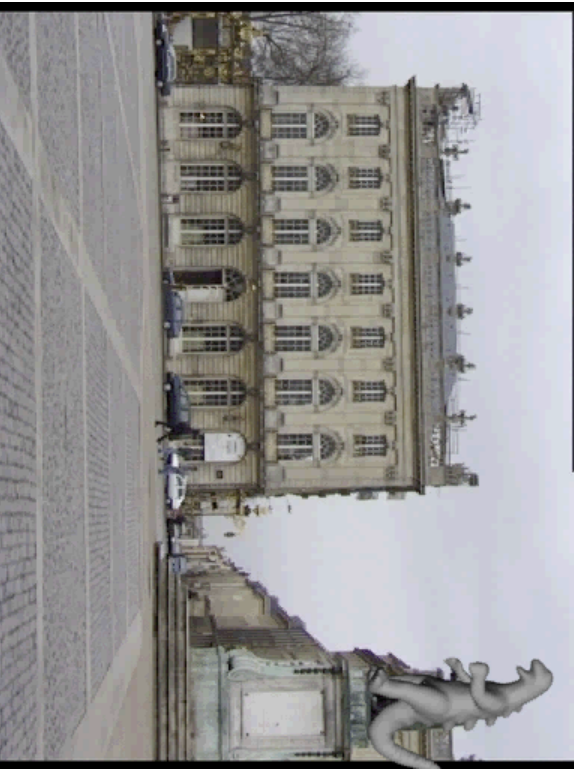
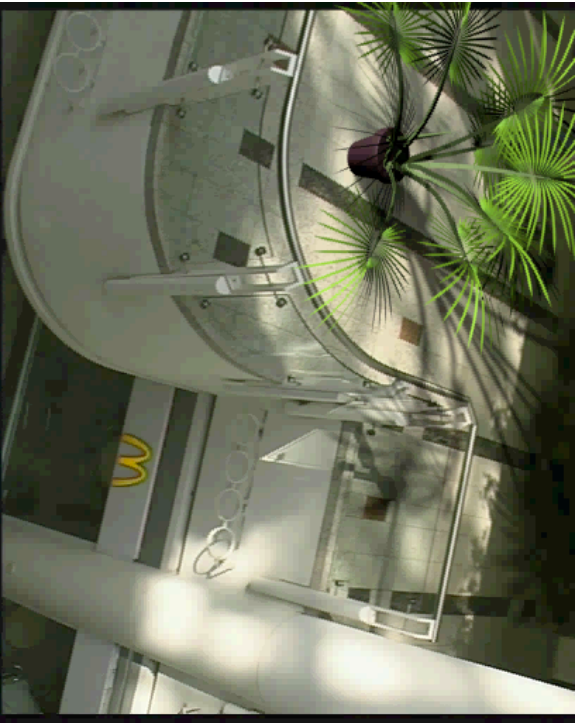
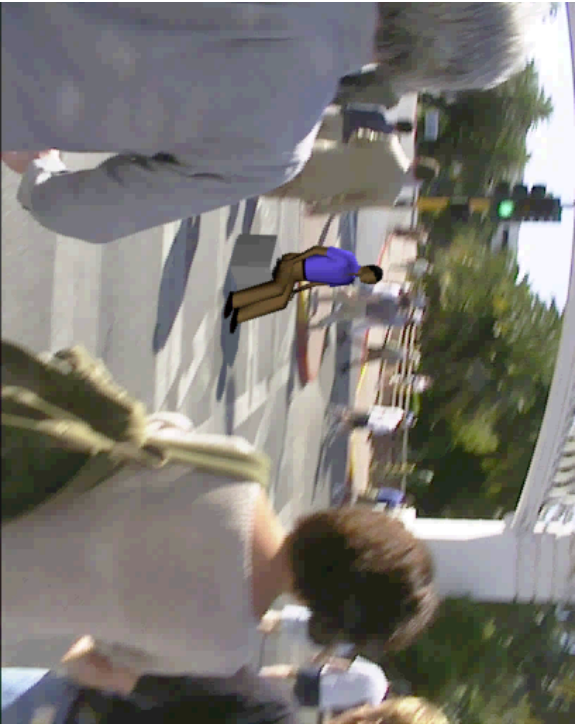
Video Segmentation





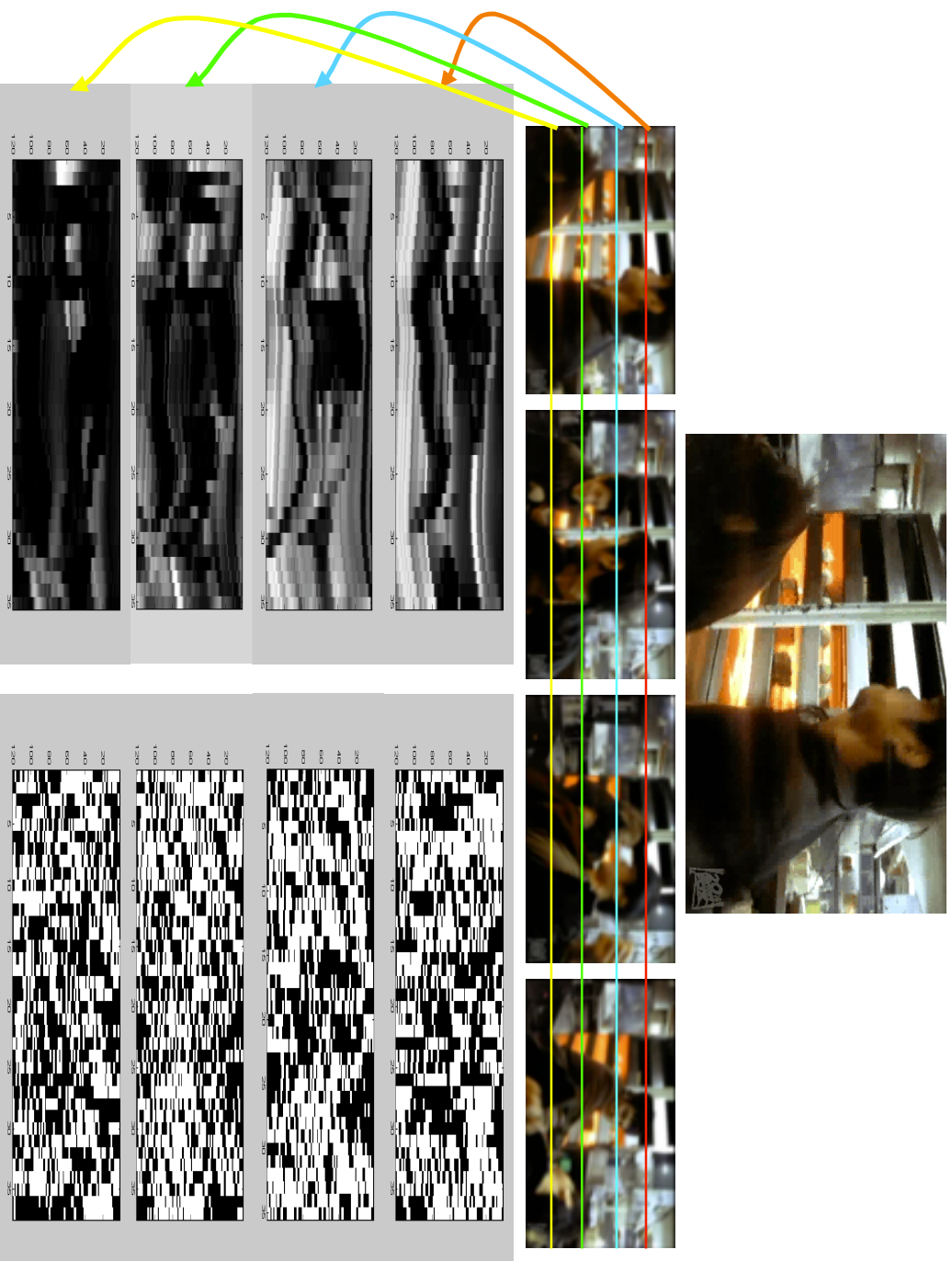


Augmented Reality



Understanding Hollywood Movies

Visual Disturbance



Explosion/fire Detection

