

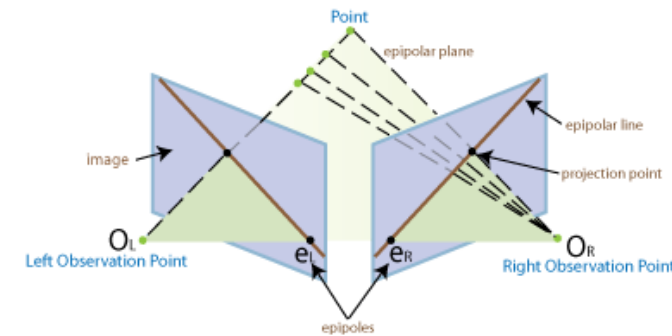
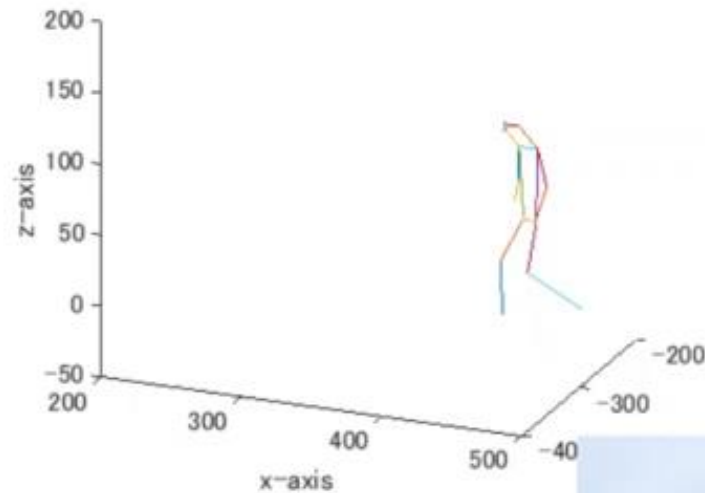
# Pose Estimation in 3D using stereo camera

MathWorks Japan  
Application Engineering division

# 3-dimensional pose estimation is possible using two cameras

## Required Toolbox

- Deep Learning Toolbox
- Image Processing Toolbox
- Computer Vision Toolbox
- Signal Processing Toolbox



## Good Points

- with two ordinary cameras.
- velocity and acceleration analysis is possible
- a variety of applications are possible with trajectory analysis.
  - Sports
  - Entertainment
  - Robotics ... etc.



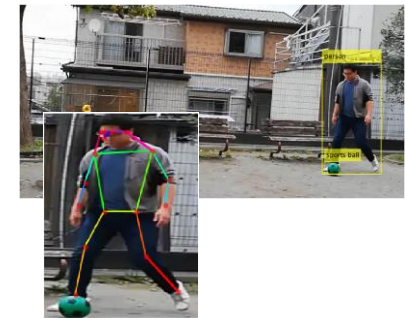
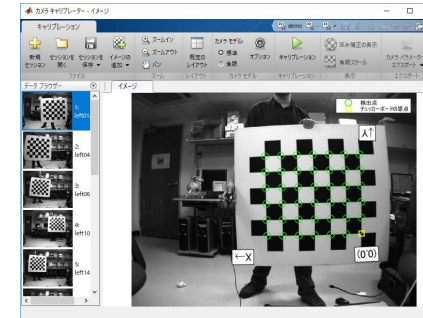
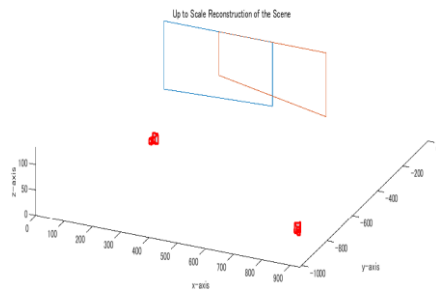
# Processing Flow

Camera Position

(preprocess)

Undistortion

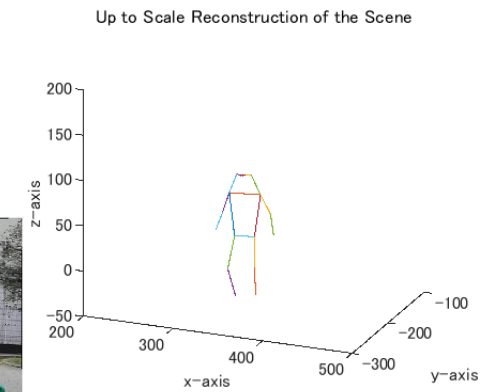
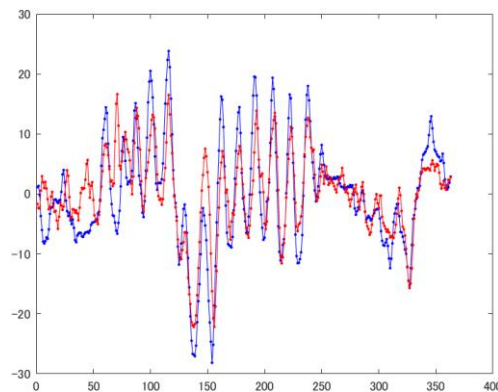
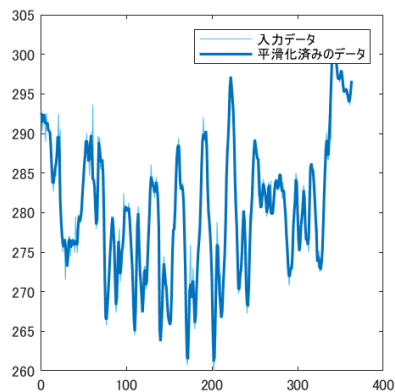
Pose estimation



Correction

Synchronization

3D Pose estimation

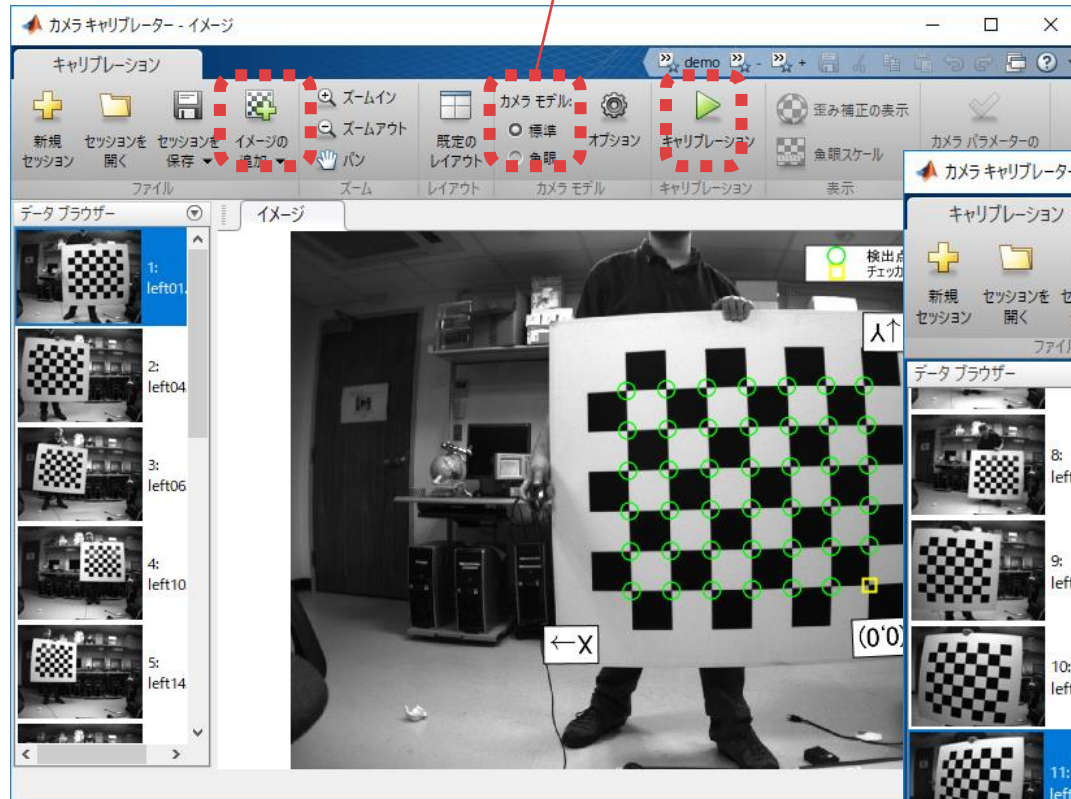




# Single Camera Calibrator App

Fisheye Lens Support

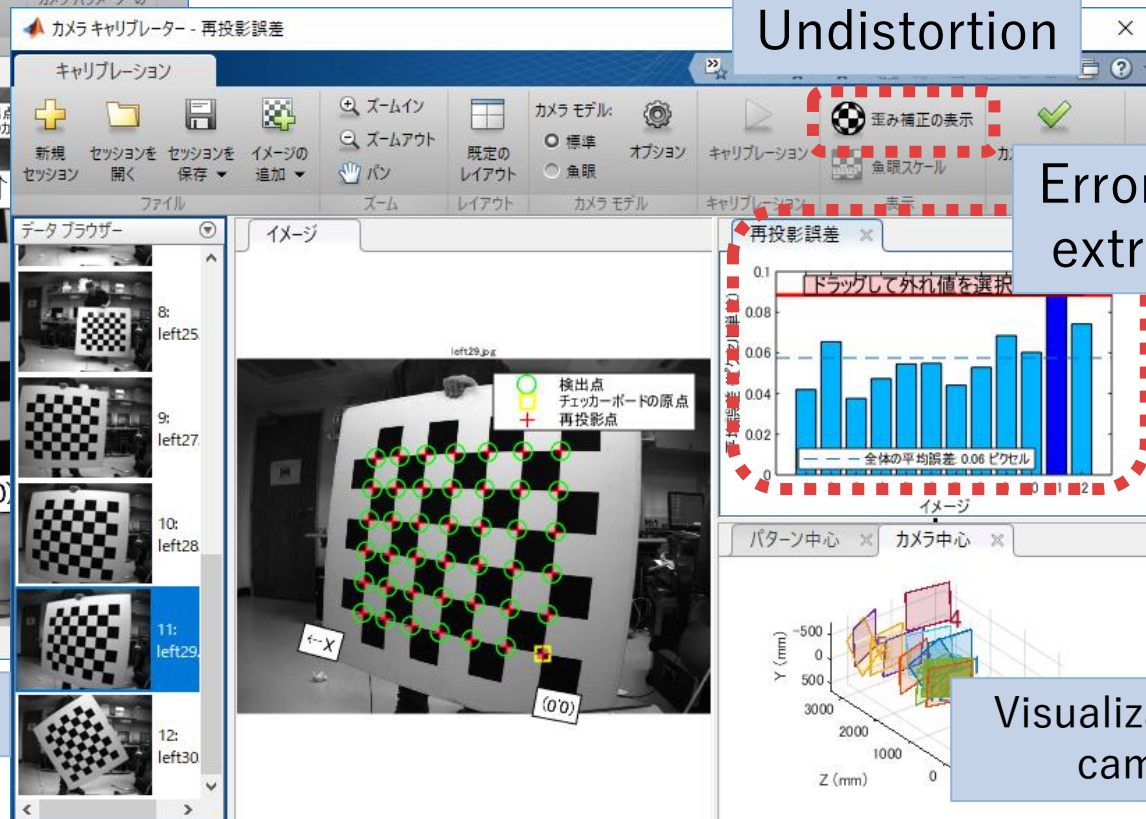
R2018a



Automatic Intersection Detection

R2015a

Faster processing speed



Undistortion

Error evaluation of extraction results

Visualization of Extrinsic camera params.

Calibration with sub-pixel accuracy  
lens distortion, intrinsic, and extrinsic camera parameter calculation

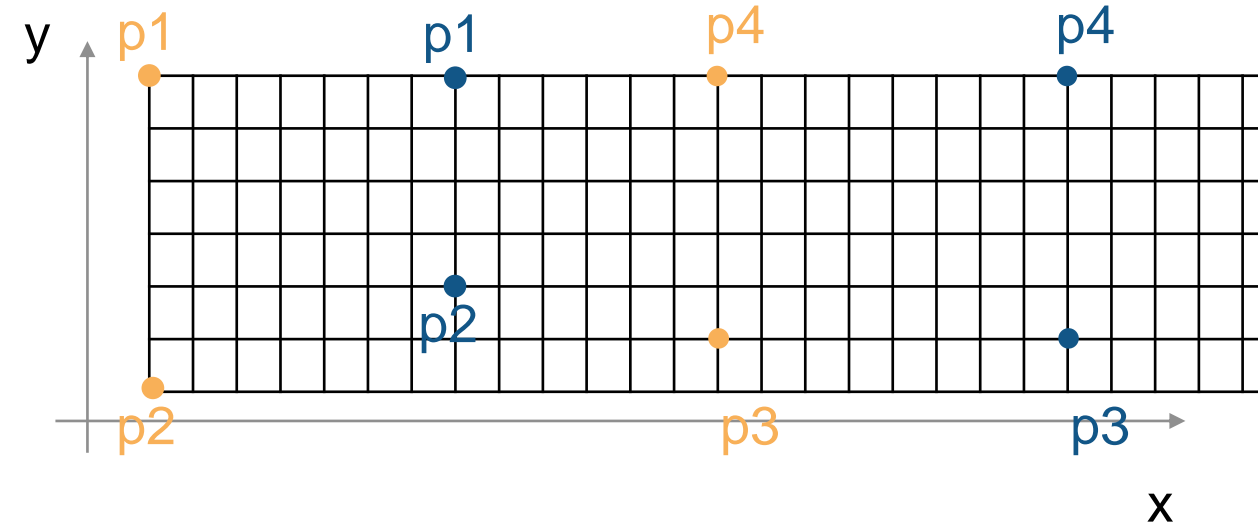
# Control points for camera position estimation



camera 1



camera 2



## Control Points

- used for transform from image to world
- corner or cross point are preferable.
- 4 points on co-plane in each scene
- identical world coordinate between scenes