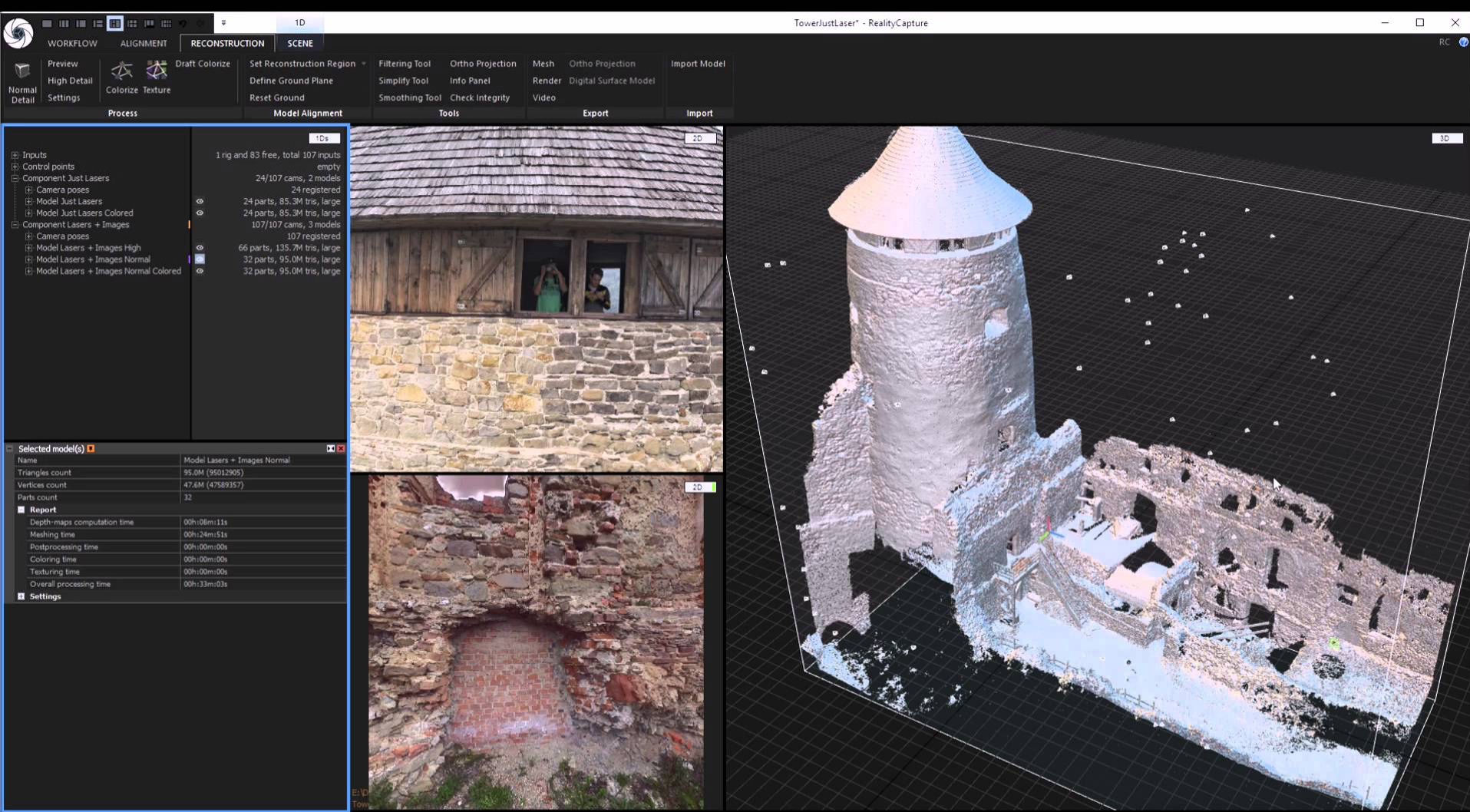# CMSC427
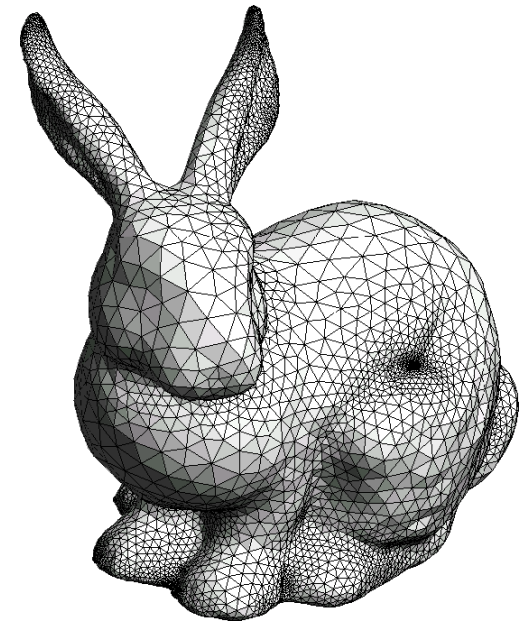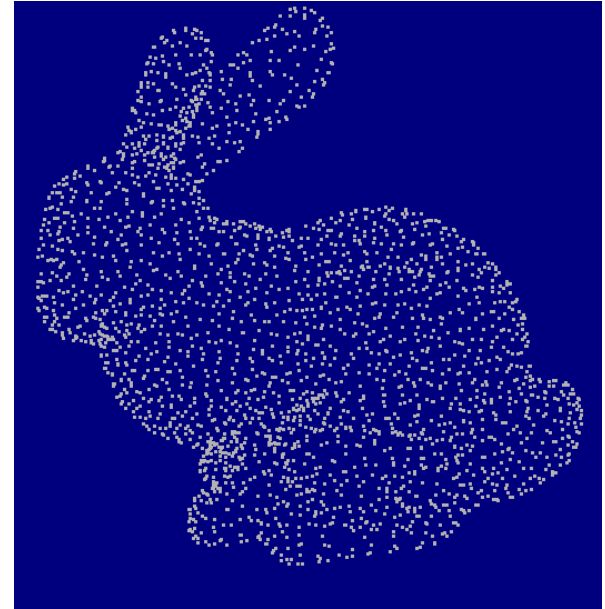# Model capture

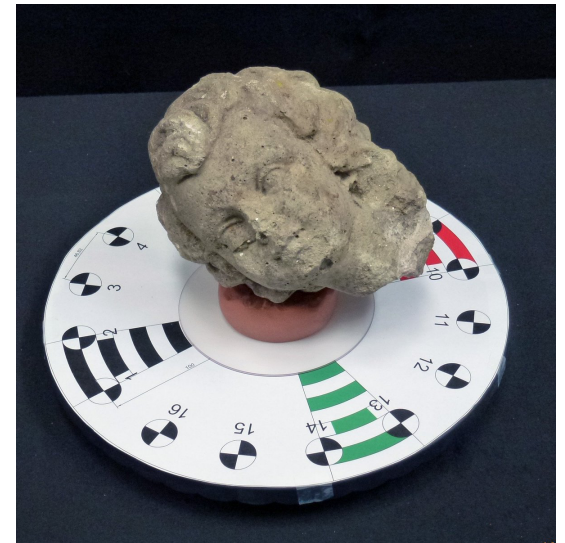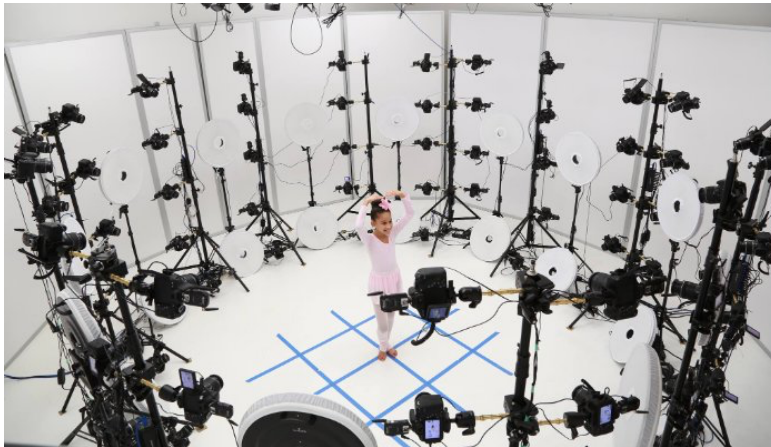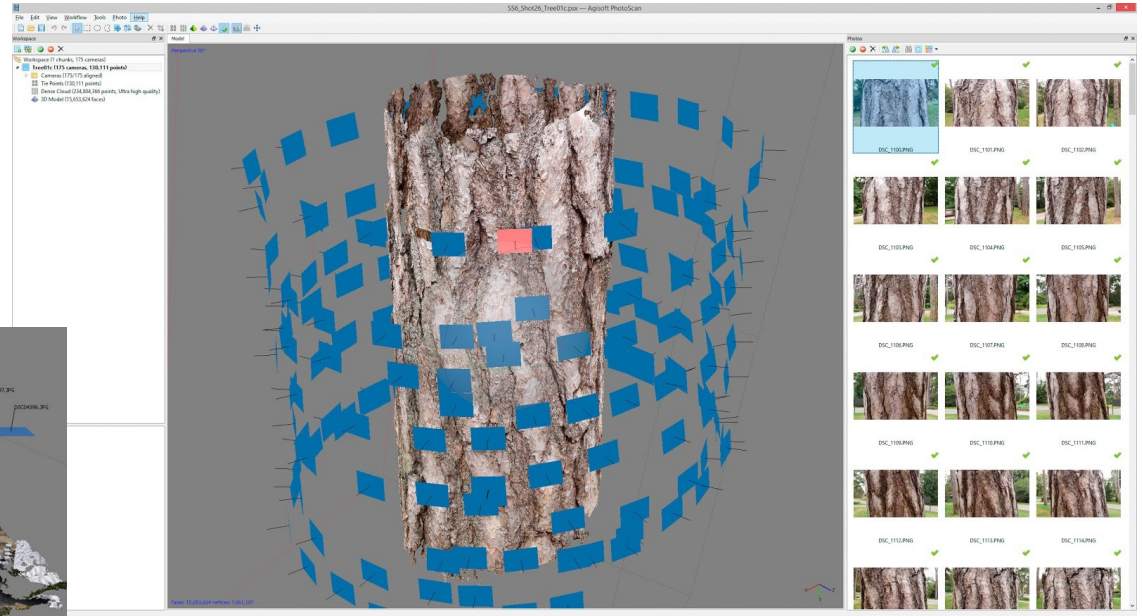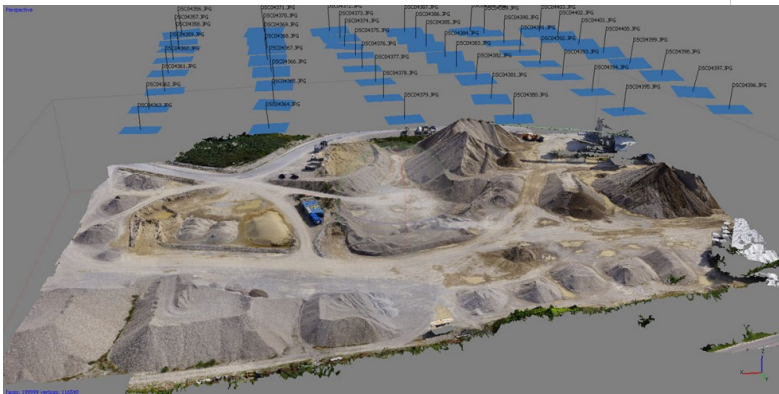# Creating 3D mesh from real world data

- Collect data
    - 2D images
    - 2 1/2 images
    - Point clouds
    - 1D scans
- Align and fuse data
- Create mesh from data

- Data to point cloud
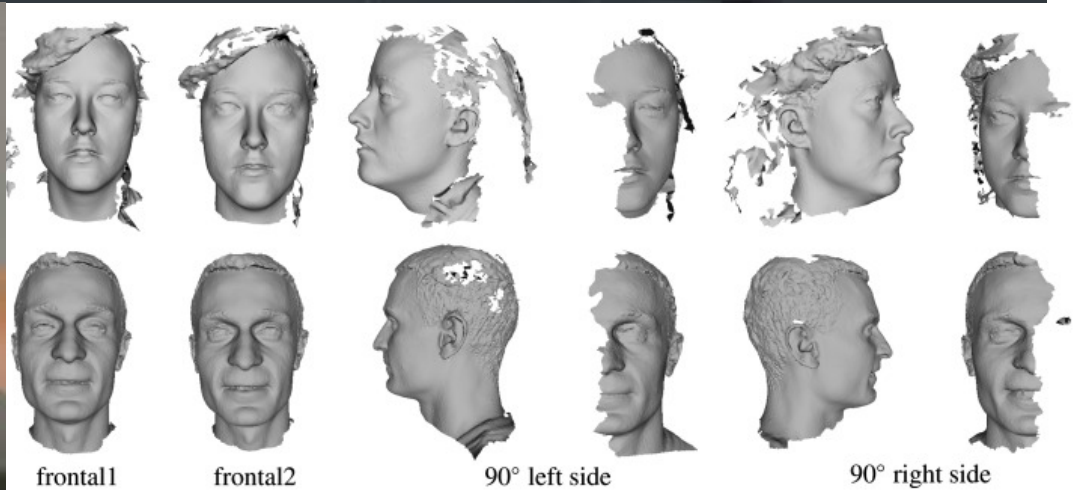- Point cloud to mesh

Collect data

- 2D images
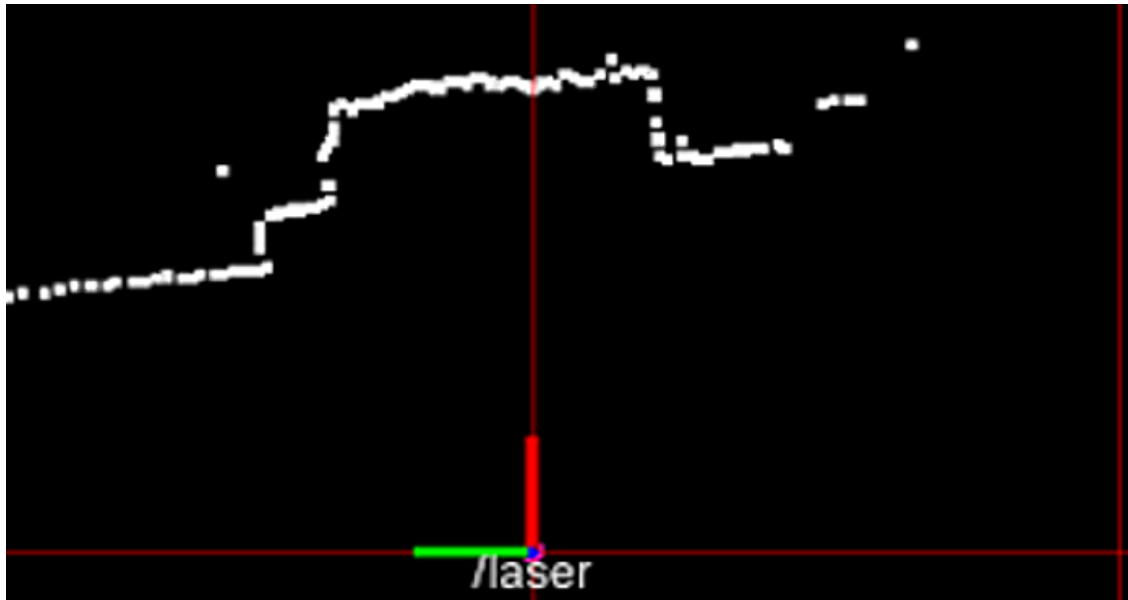 - Sequence or
  - simultaneously

2 ½ D scanner

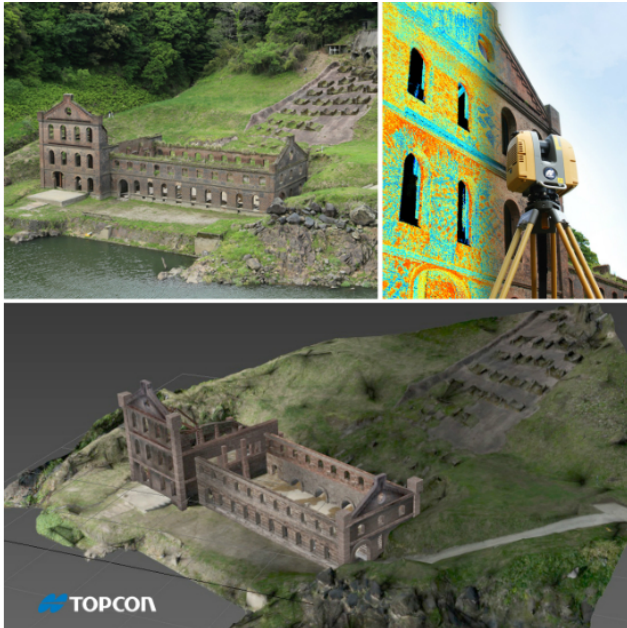- Eg, MS Kinect. Image plus depth data (2 ½ D)
- Structure.io

Raw Data Captured From Kinect | Smoothed using vertex averaging | Camera image applied to 3D data (planar Projection)

frontal1   frontal2   90° left side   90° right side

1-D scanners

- Eg, Eora3D.com
- Demo'd in class: Hokuyo URG-04LX

/laser

Point scanners

- Contact scanner
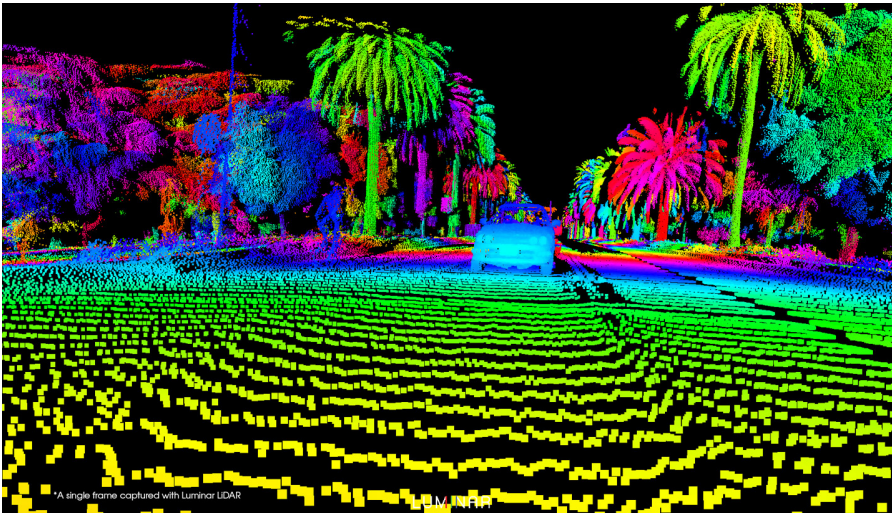
- Laser range scanner
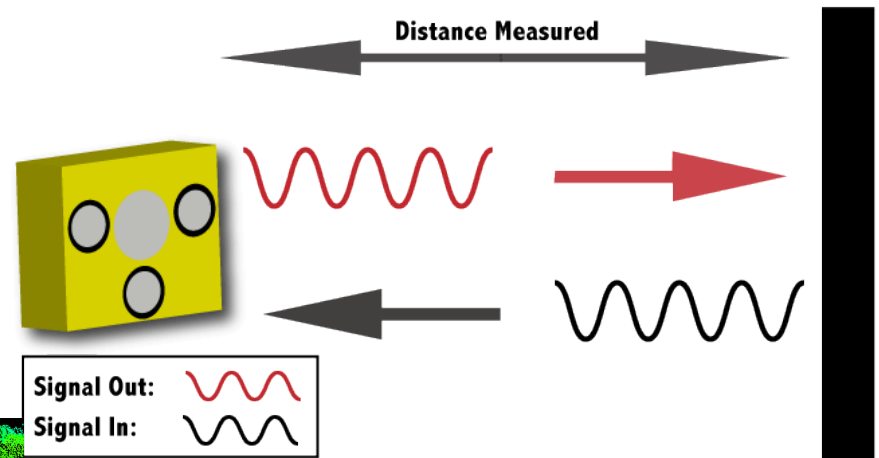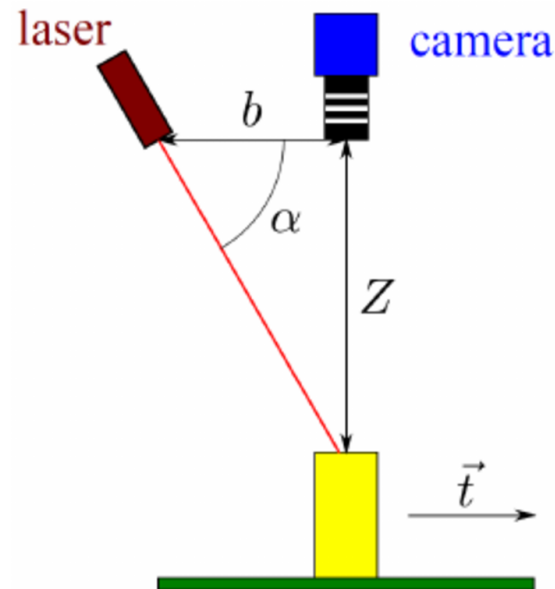 - Adjustable sequence of points

- Time of flight
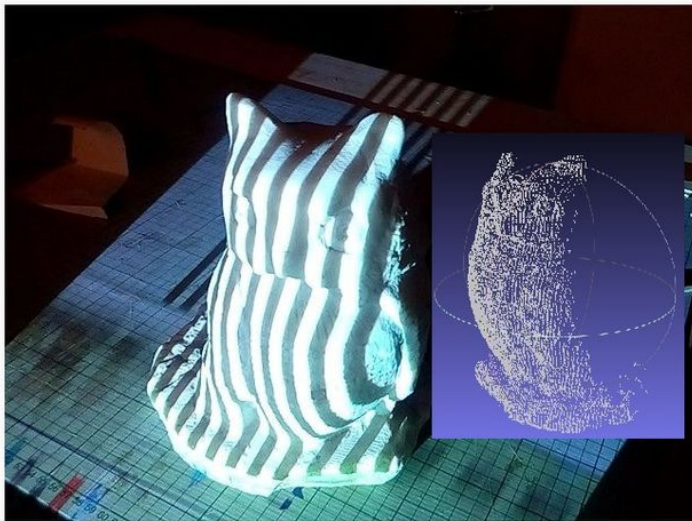 - LIDAR – Light Detection and Ranging
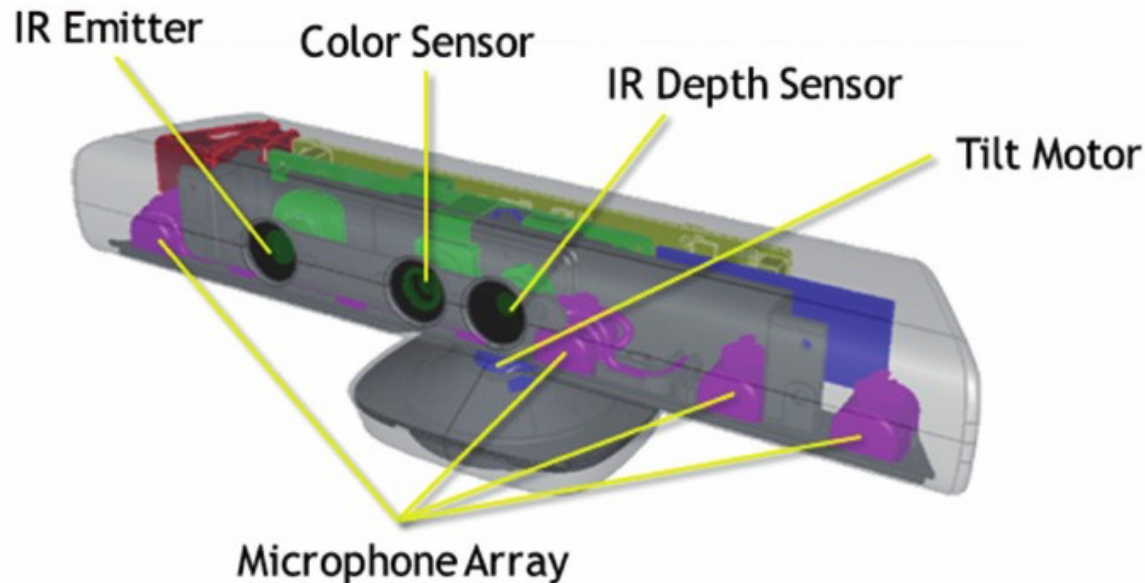

Time-of-Flight (ToF) Technology Using Light

Distance Measured

Signal Out:
Signal In:

*A single frame captured with Luminar LiDAR

- Triangulation
  - Camera to camera (stereo)
  - Laser to camera
  - Projector to camera

- Problem: matching
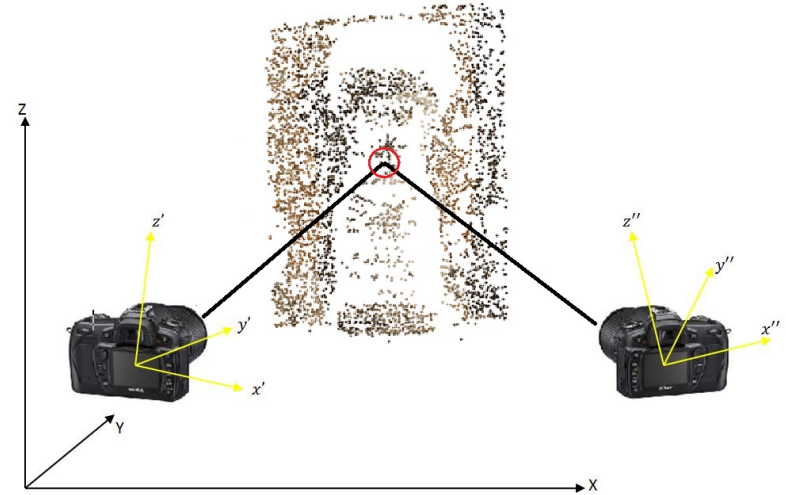
- Emitter projects known pattern

- Helps in matching

IR Emitter

Color Sensor

IR Depth Sensor

Tilt Motor

Microphone Array

- Match data between images
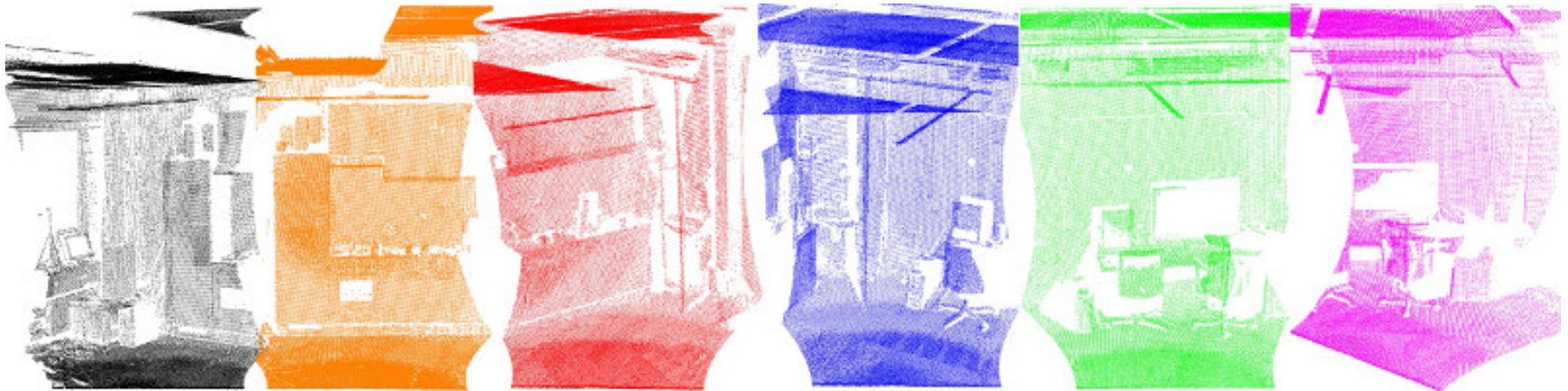
- Or point clouds

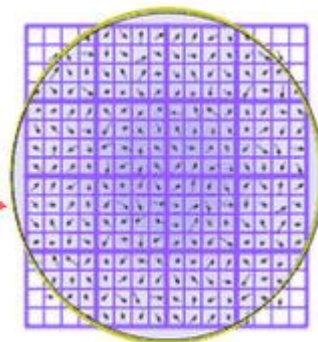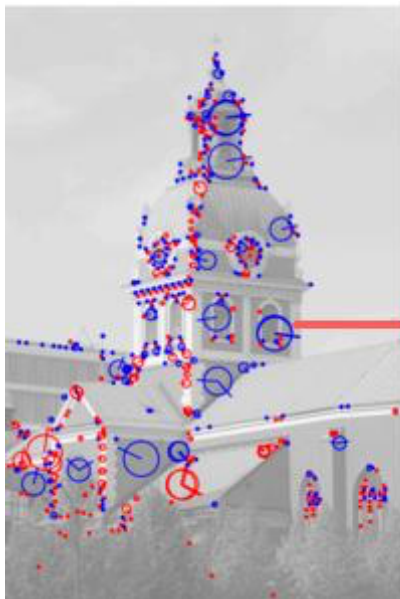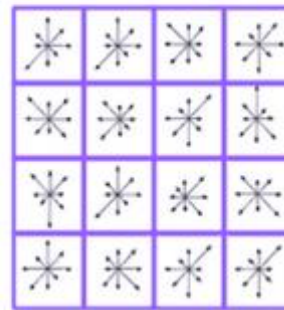- Find distinctive points in each image
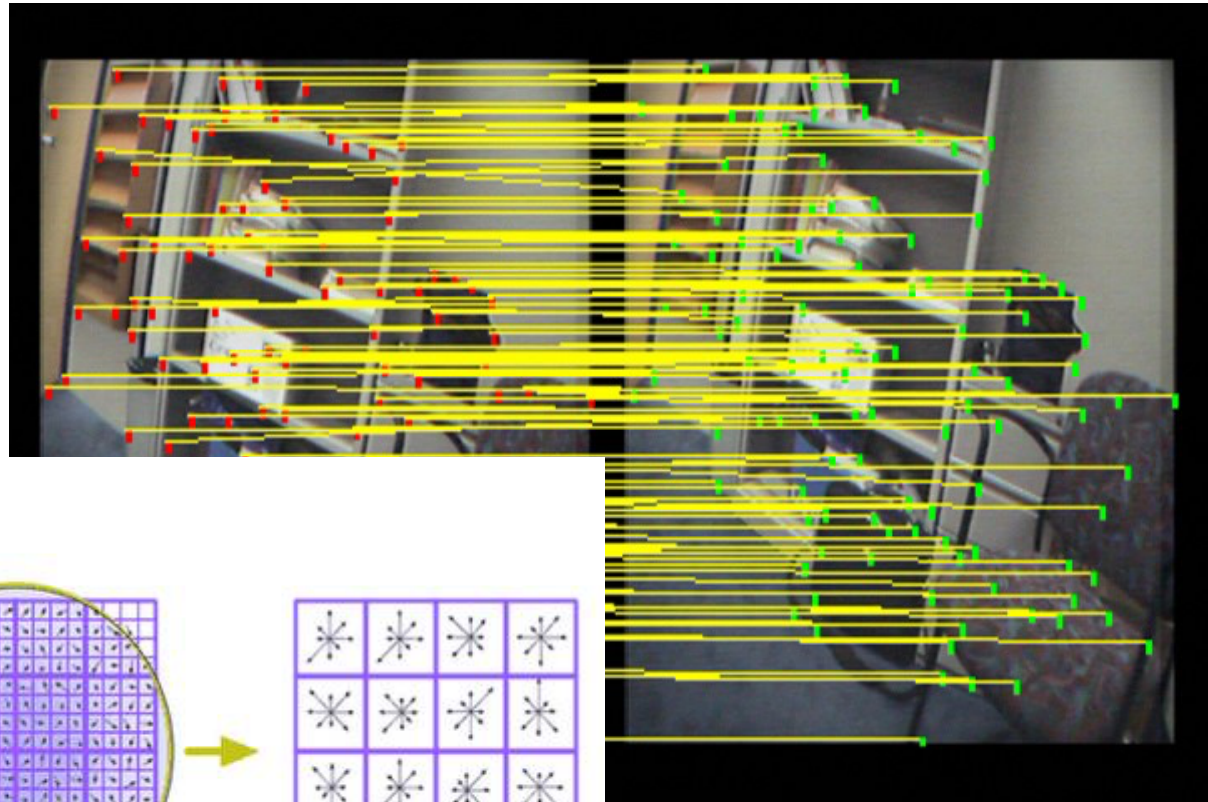
- Match based on local properties

Image gradients

Keypoint descriptor

(a)　　　　(b)　　　　(c)　　　　(d)

- One tool: Meshlab