

# 3D ROOM RECONSTRUCTION FROM IMAGE SET

An interactive matlab application that generates a 3D Scene from a set of pictures

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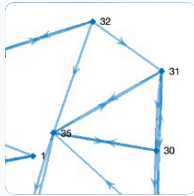
## PIPELINE & ALGORITHMS

Image View Set



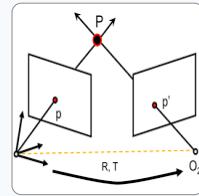
### Feature Extraction & Matching

SURF Features



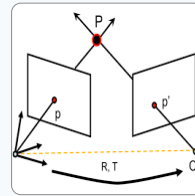
### Best Matches

Link most similar  
Images together



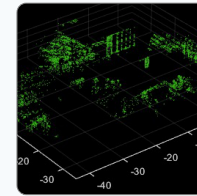
### Relative Position Estimation

RANSAC  
-> Filtering Matches

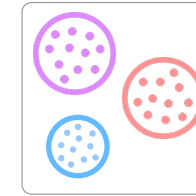


### Longest Sorted Path Computation

DFS  
Determination of  
Reference Frame

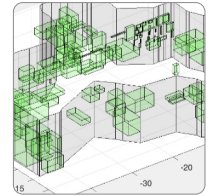


### Triangulation & Bundle Adjustment



### Point filtering & Clustering

Z- Score  
K Means

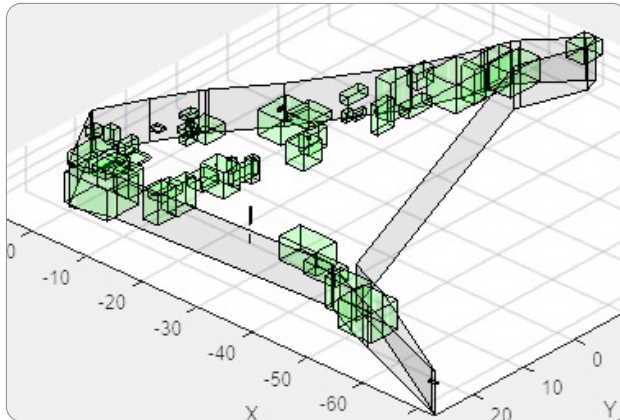


### 3D Scene Construction

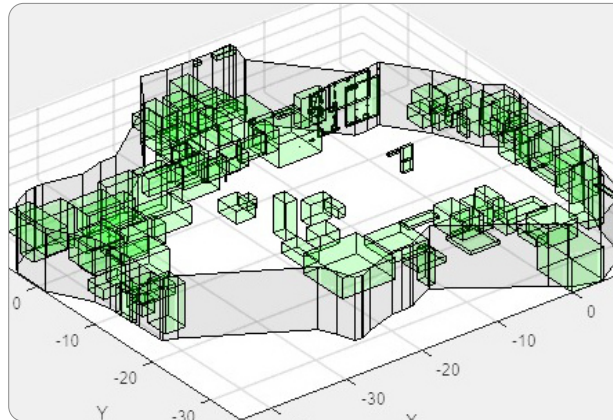
Bounding Box

## RESULTS

### Old Computer



### Delivery Area



## PROBLEMS

### 3D Point reconstruction

- Not robust for low connectivity of the reference image
- Long computational time because of high res images
- Many parameters to hardcode
- Order of images not clear
  - > Ordering required
  - > Match every image with every image
  - > Long computation time

### Visualization

- Removal of noise in point cloud
- Measuring of box size difficult to implement

References: [https://www.researchgate.net/publication/301197096\\_Structure-from-Motion\\_Revisited/link/5ae07a03aca272daf8c7e1b/download](https://www.researchgate.net/publication/301197096_Structure-from-Motion_Revisited/link/5ae07a03aca272daf8c7e1b/download) | <https://www.cvlibs.net/publications/Schoeps2017CVPR.pdf>

CV Challenge - Group 28 | Ömer Akar, Michael Baumgärtner, Jakub Dvorak, Menelaos Fotiadis, Max Gittel, Tuna Gürbüz