

Semiautomatic generation of semantic building models from image series

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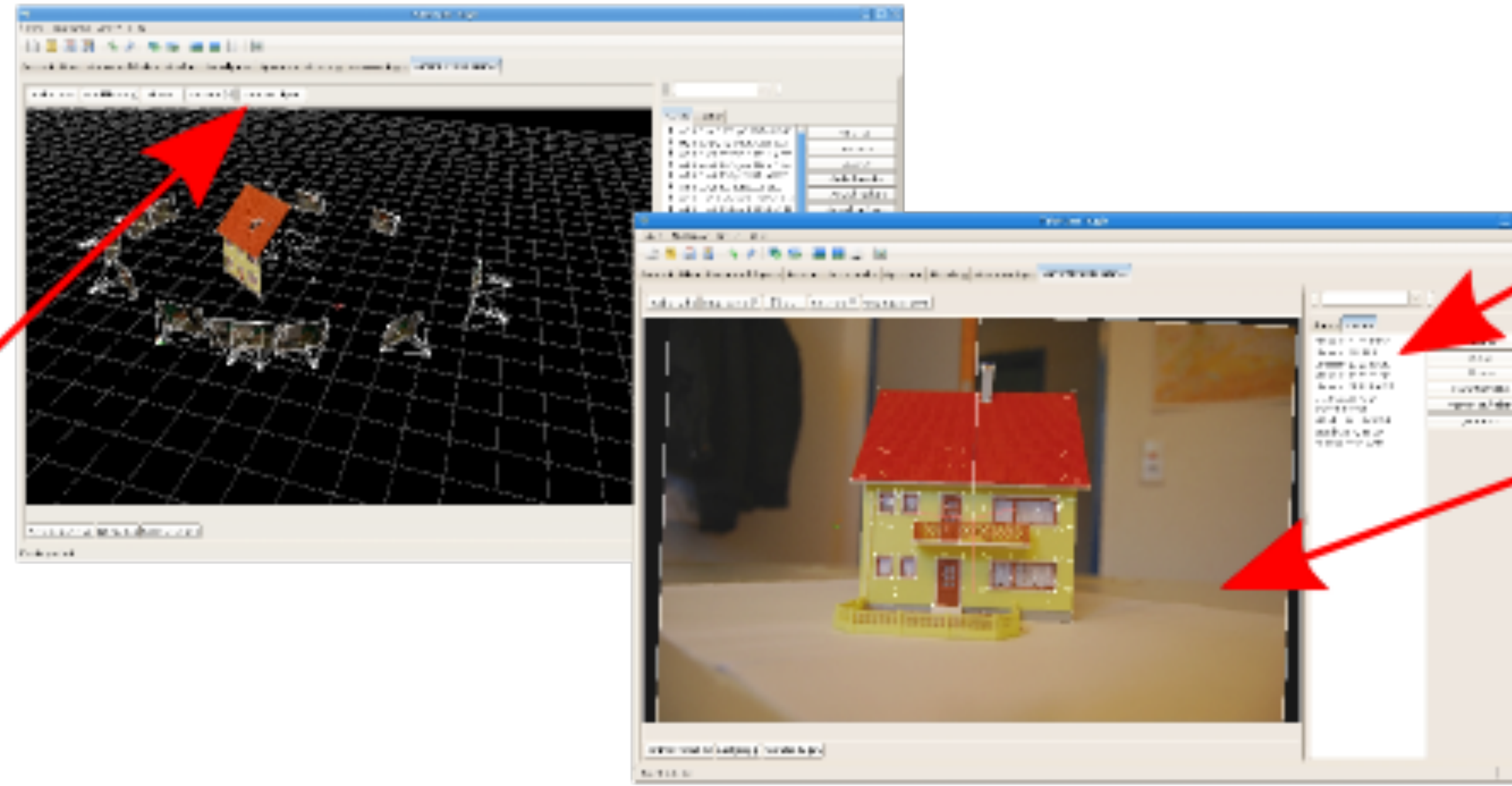
founded by: **DFG**



plugin for the photostitching tool Hugin (<http://hugin.sourceforge.net>)

average point-to-point error is less than 1.3%

City Geography Markup Language (CityGML) Export
(www.citygml.org)



semiautomatic approach
time saving model generation

model containing semantic, geometry and texture

fly to camera position
time saving model annotation

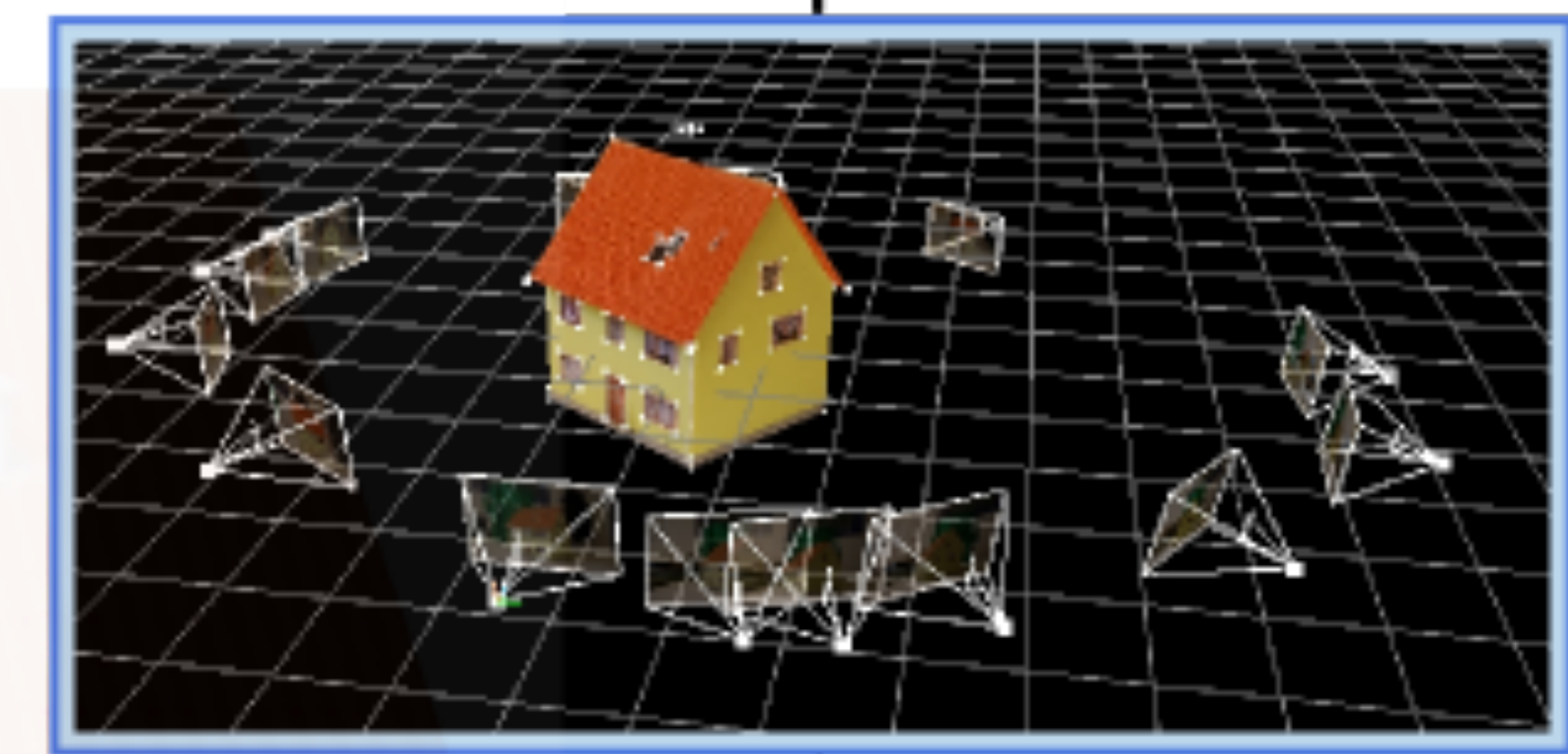
generation of 3D interior views possible

image acquisition and undistortion with intrinsic camera parameter:
(focal length, pixel size on the sensor chip, skew parameter, position of the principal point in the image plane and the radial distortion coefficients) [1]

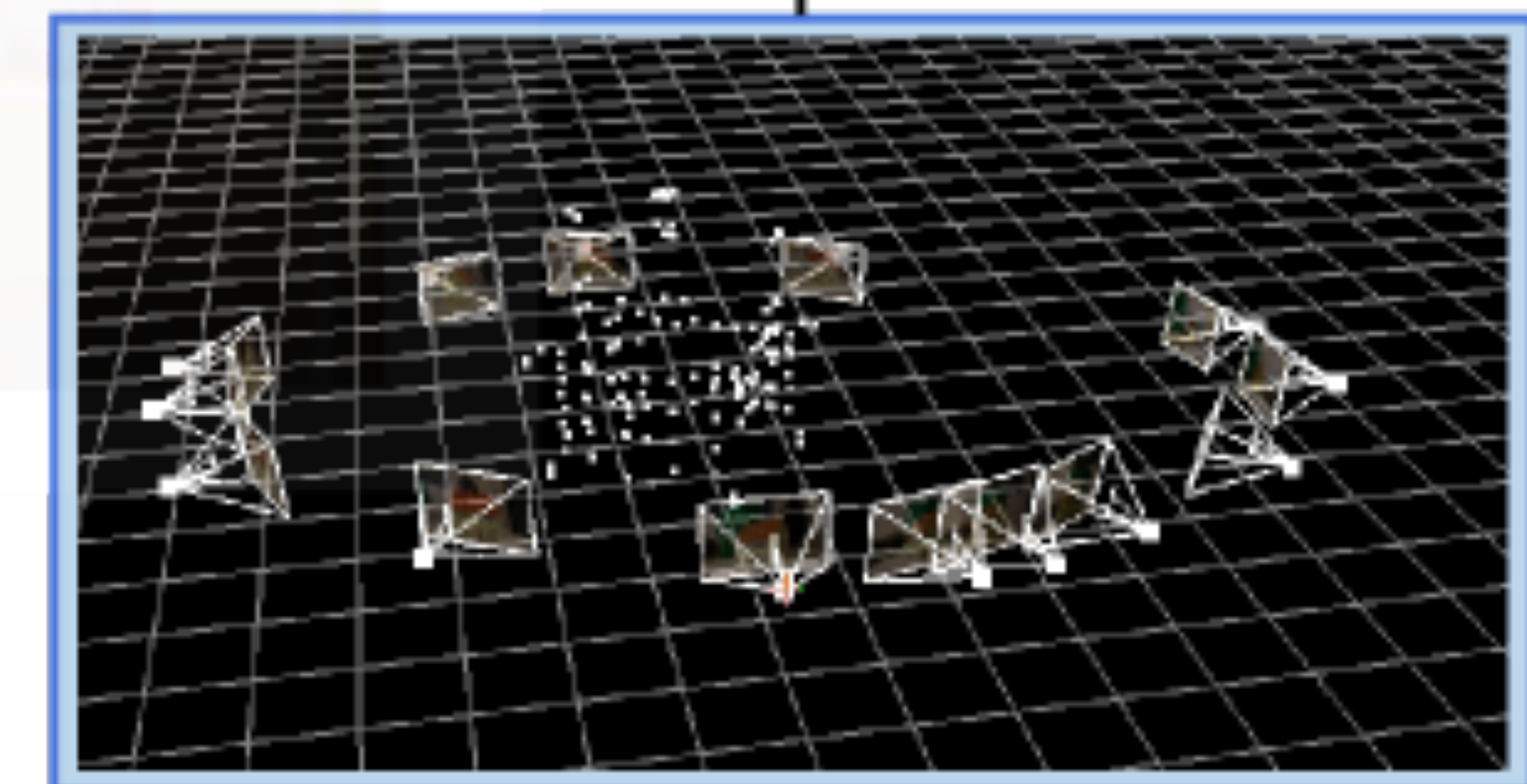


selection of semantic meaningful corner points
(important for the geometry of the building)
Hugin build-in function finds automatically the corresponding point to a selected point and achieves subpixel accuracy

SemanticModeler3D (SeMo)

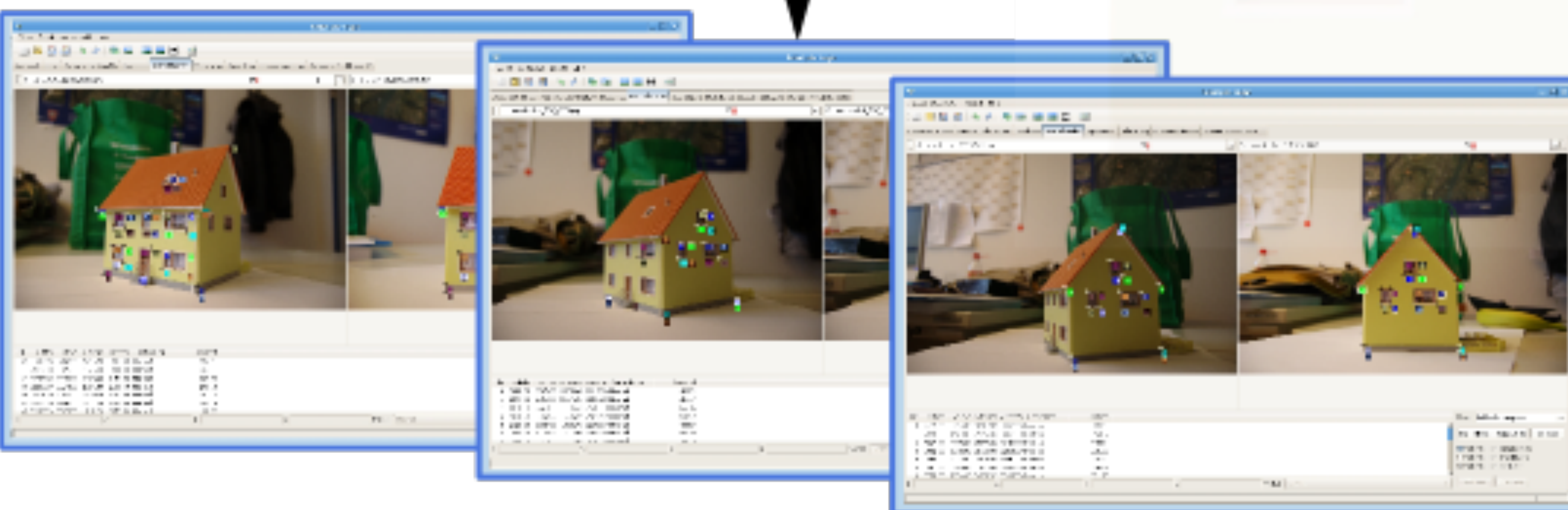


grouping of points to polygons and assign a label to the group:
(ground, facade, roof, door, window)



recovering of the 3D structure and camera poses:

- eight point algorithm [2]
- Fiore algorithm [3]
- triangulation [2]
- bundle adjustment [4]



References:

[1] Zhang, Z., "A flexible new technique for camera calibration," IEEE Transactions on Pattern Analysis and Machine Intelligence 22(11), 1330-1334 (2000).
 [2] Hartley, R. I. and Zisserman, A., [Multiple View Geometry in Computer Vision], Cambridge University Press, Cambridge, 2 ed. (2003).
 [3] Fiore, P. D., "Efficient linear solution of exterior orientation," Pattern Analysis and Machine Intelligence, IEEE Transactions on 23(2), 140-148 (2001).
 [4] Lourakis, M. and Argyros, A., "Sba: A software package for generic sparse bundle adjustment," ACM Trans. Math. Software 36(1), 1-30 (2009).