

# Smart Space Subdivision of Polyhedral Models for Indoor Navigation (SIMs3D)

Abdoulaye A. Diakité

IndoorLab

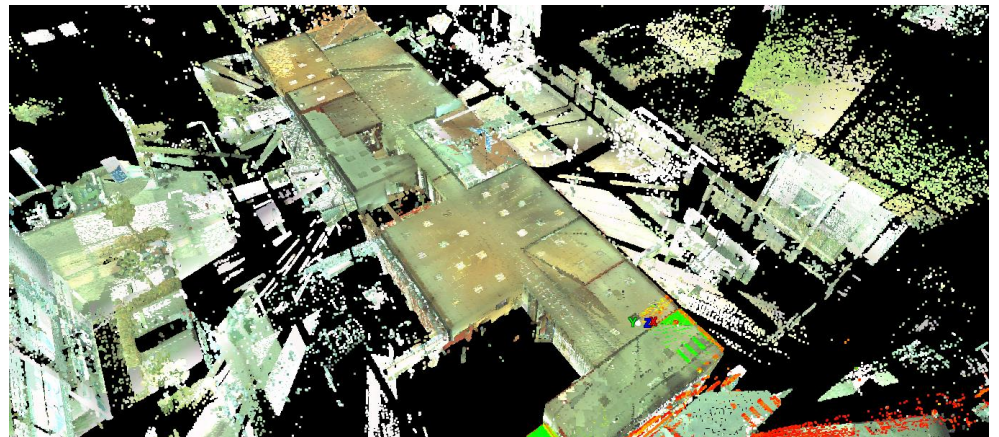
01-03-2016

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# Completed Works

- Data acquisition
  - Scanning of fire brigade and Maassilo buildings with Leica.

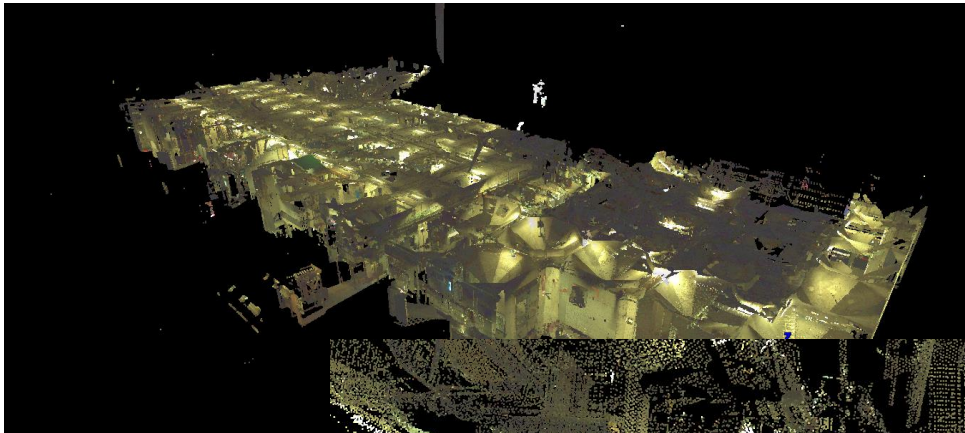


Source: [SIMs3D.net](https://SIMs3D.net)

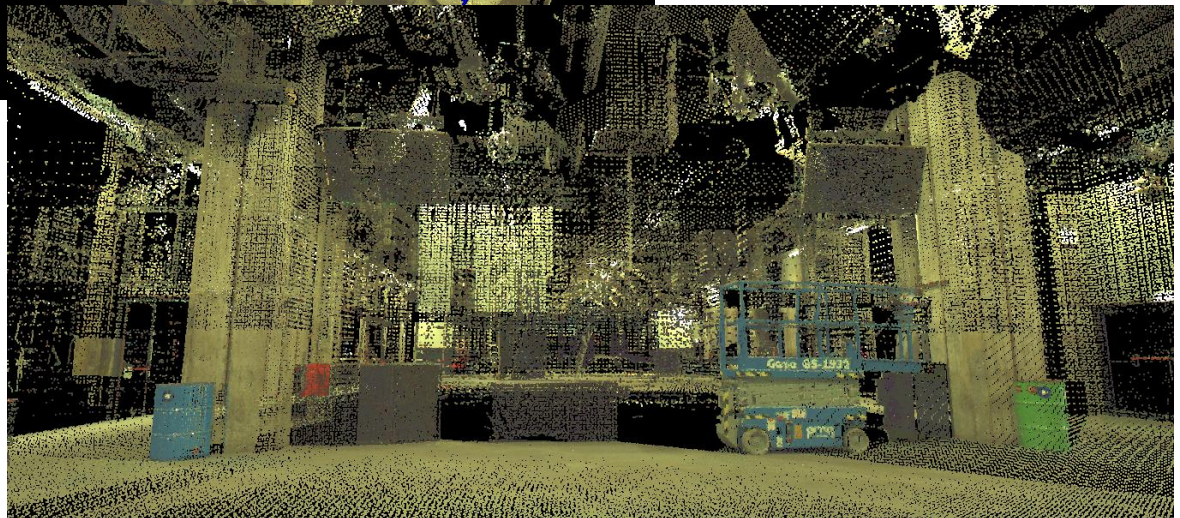


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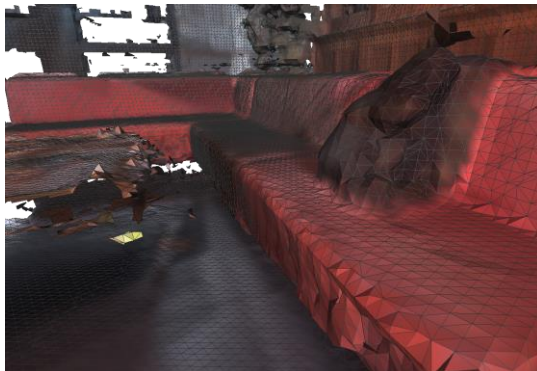
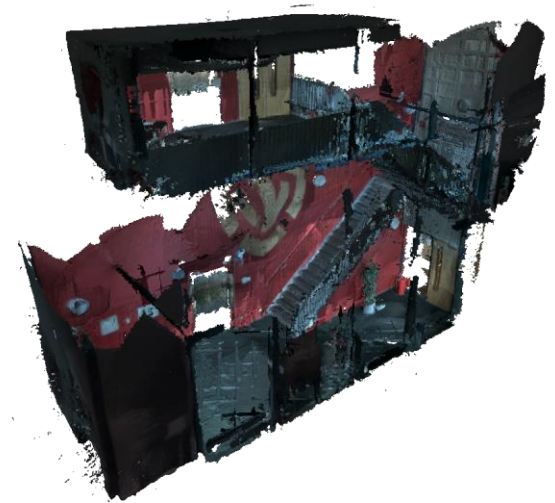


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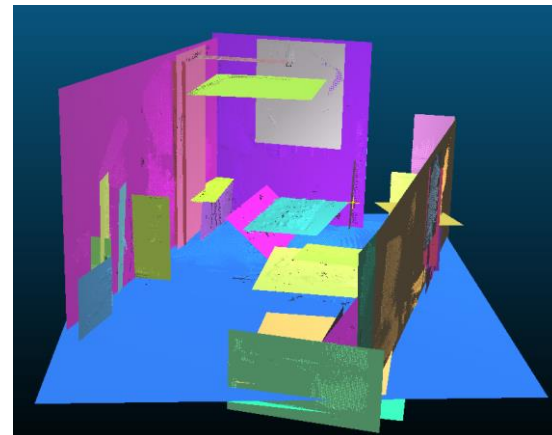
# Completed Works

- Google Tango
  - Investigation of the tablet for indoor scanning usage.
  - Tested on different types of scenes.



# Completed Works

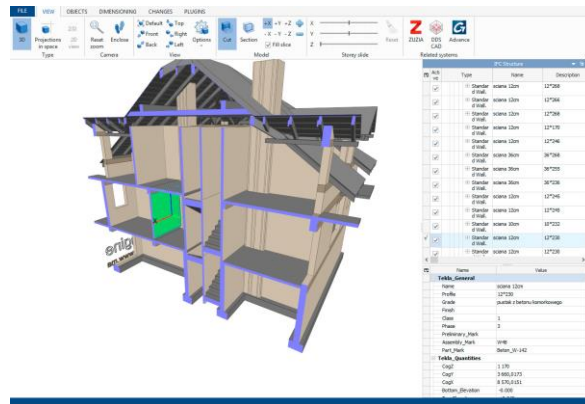
- Google Tango
  - Study of performance and quality
  - Accepted article at the 13<sup>th</sup> ISPRS Congress (to be published in July 2016).



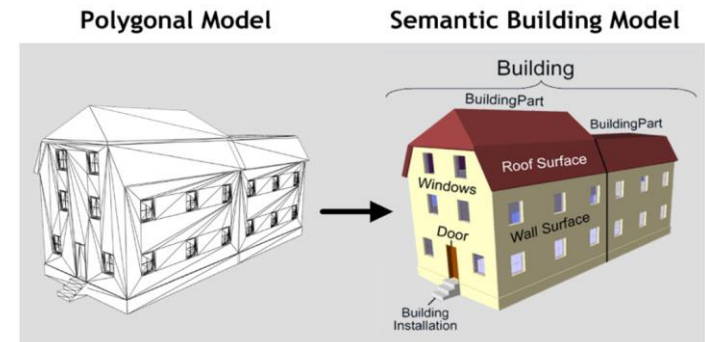


# Ongoing Researches

- Investigation of different representations
  - Octree
  - Voxel
  - Vector models (Polyhedral, IFC, CityGML LoD4)

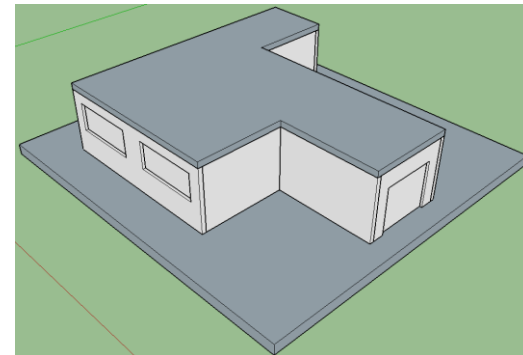


Source: [BimVision](#)



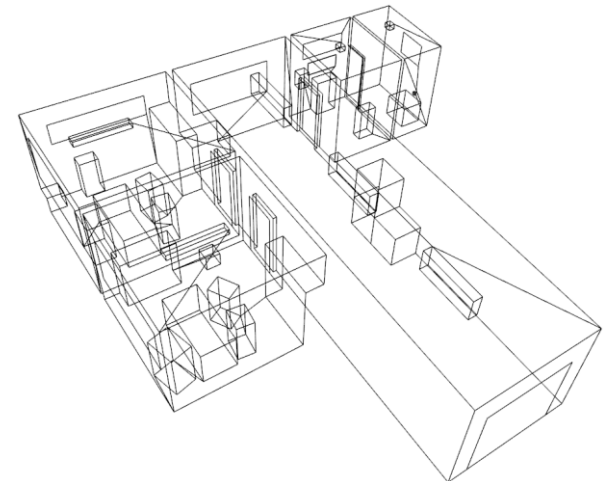
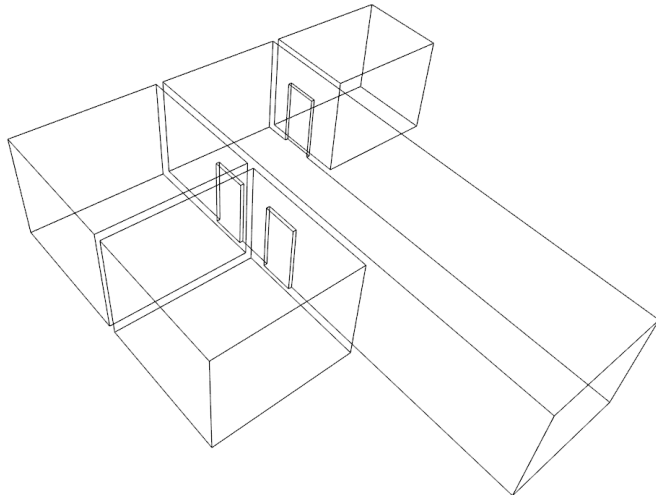
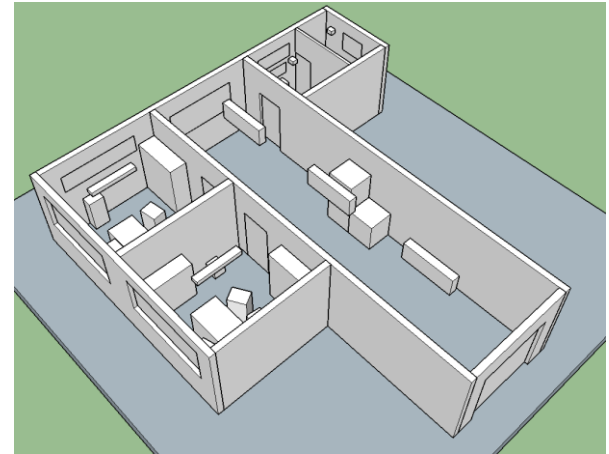
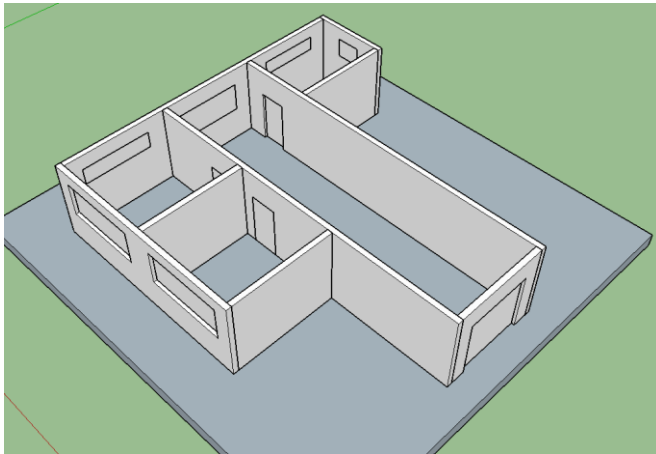
Source: Nagel et al. 2009

Production of test models



# Ongoing Researches

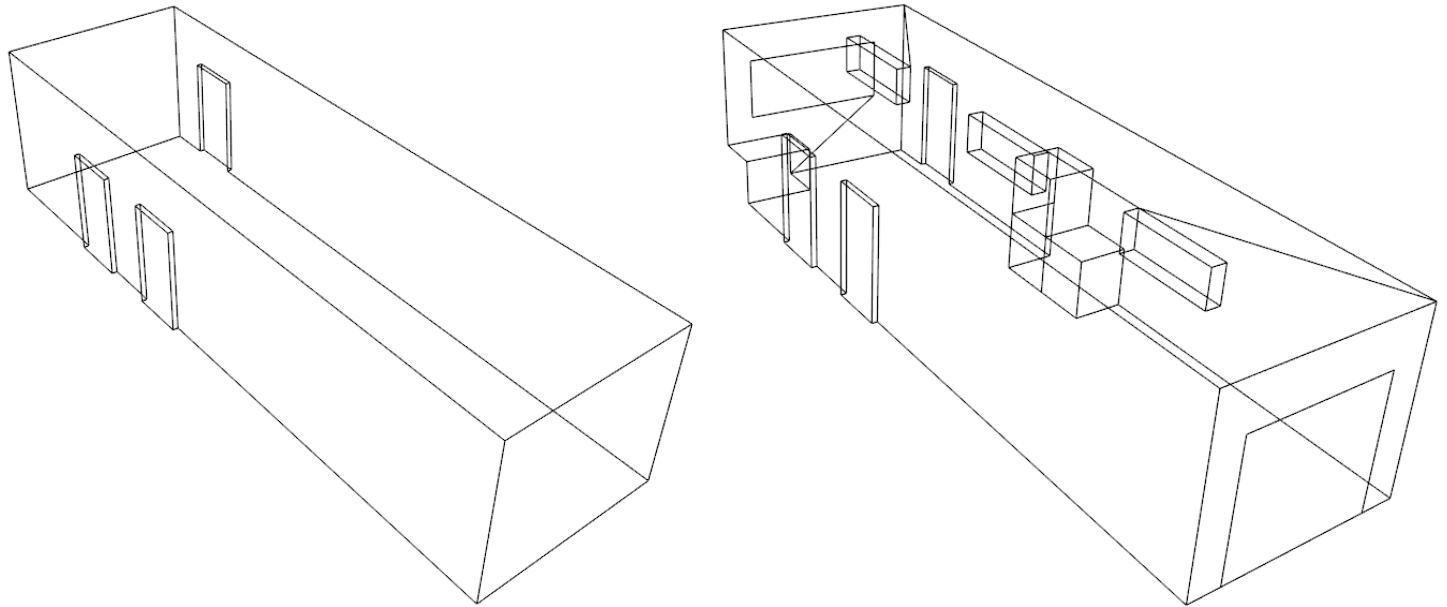
- Extraction of free space from vector models





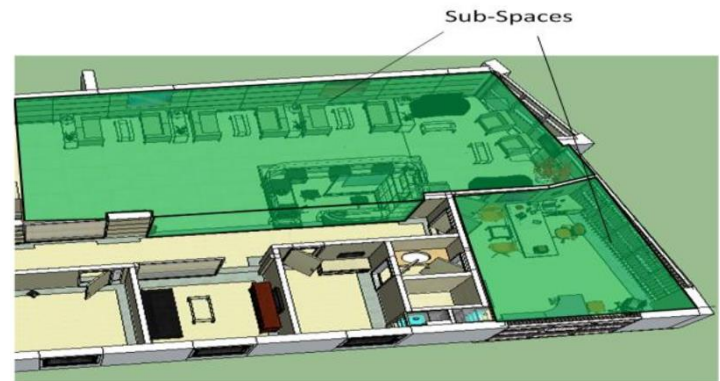
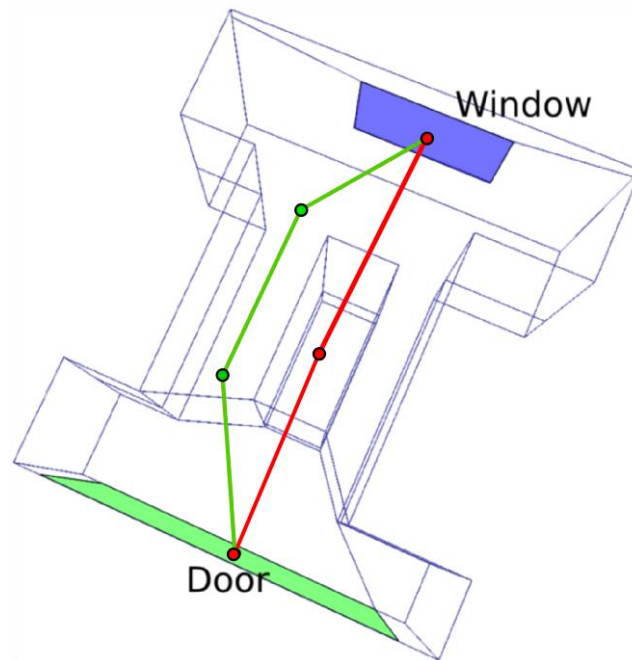
# Ongoing Researches

- Investigation of different representations
  - What to do with such volumes?
  - How to make them suitable for indoor path generation?



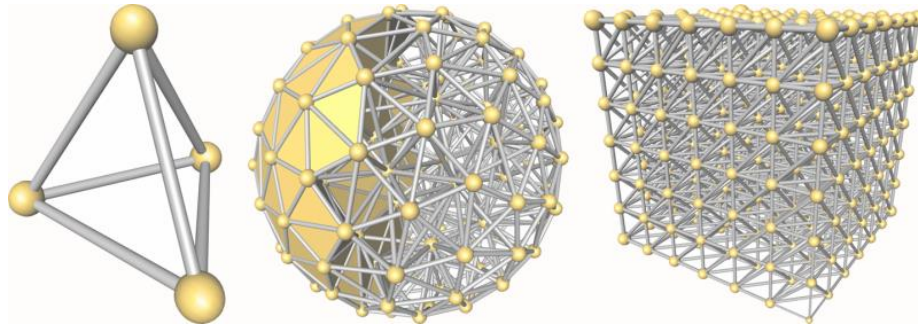
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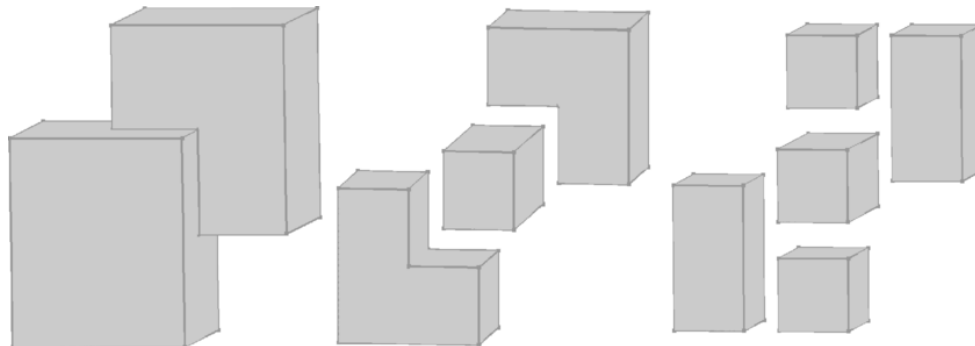
# Ongoing Researches

- Study of possible subdivision approaches
  - Tetrahedralization



- Convex decomposition

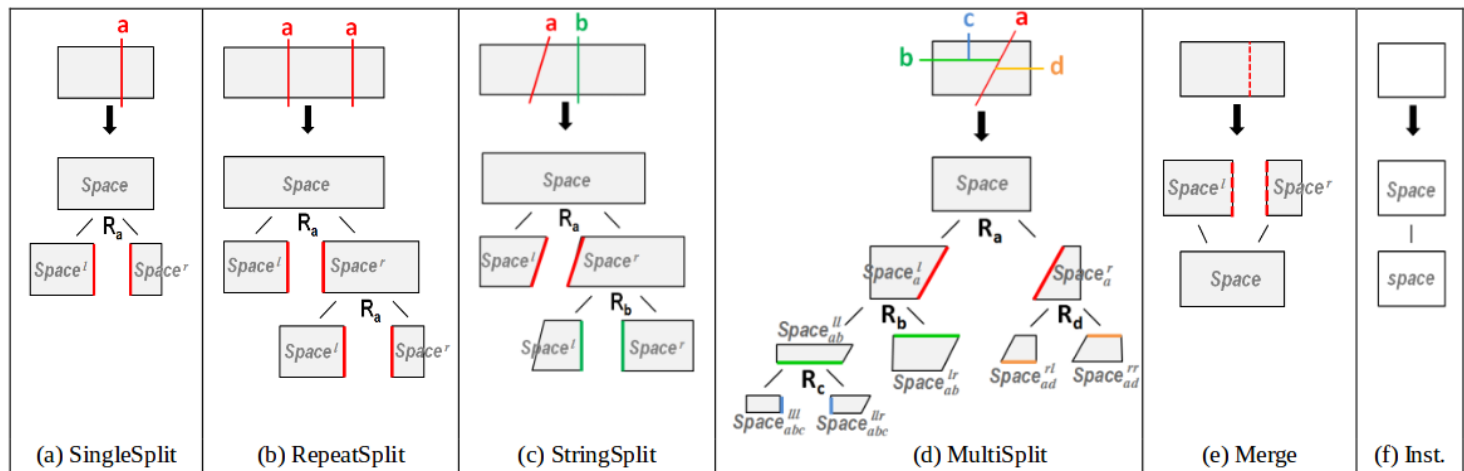
Images source: [CGAL](http://CGAL.org)



# Future Plans...

Years	2015	2016				2017		
Year quarter	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Data acquisition + Tango investigation								
Extraction of free spaces (simple/complex)								
Investigation of subdivision approaches								
Development of grammar approach								
Application on standards (IFC, CityGML)								
Publications								

- Grammar based subdivision
  - Set of rules/operations to generate spaces





# References

- Becker, S., Peter, M., Fritsch, D., Philipp, D., Baier, P., & Dibak, C. (2013). Combined grammar for the modeling of building interiors. Proceedings of the ISPRS Acquisition and Modelling of Indoor and Enclosed Environments.
- Nagel, C., Stadler, A., & Kolbe, T. H. (2009). Conceptual requirements for the automatic reconstruction of building information models from uninterpreted 3D models. Proceedings of the International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences, 46-53.
- Zlatanova, S., Liu, L., & Sithole, G. (2013, November). A conceptual framework of space subdivision for indoor navigation. In Proceedings of the Fifth ACM SIGSPATIAL International Workshop on Indoor Spatial Awareness (pp. 37-41). ACM.