SIMs3D: 3D indoor space subdivision for navigation

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Why subdividing the space?

• Occupation of indoor space is relative.
Why subdividing the space?

- To structure the accessible / non-accessible space of the building
- To perform dynamic and optimized 3D navigation
- To allow adaptive generation of navigation routes
How to subdivide the space?
Start from a furnished BIM model
(geometry + semantic + topology)
Simplify the geometry of the furniture using minimal bounding boxes
Extract the free space that correspond to the navigable space
Subdivide the free space depending on cases/constraints/subjects
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Space Subdivision Approaches

- Voxels
- Octree
- Combinatorial Maps
How to use the free space?

- Use topology + semantic to generate indoor navigation path
Framework for space subdivision

- **Space, Subspace, Partition**

- **Agent**: client in certain navigation
- **Activity**: task and navigation behavior performed by an agent.
- **Resource**: things that an agent can use in a sub-space or take from a sub-space.
- **Modifier**: define what event impacts which agents/resources/activities and on which aspects.

Agents, Spatial Units, the result of Subdivision Cell, from Decomposition Modifier (on Elevator) Activity Agents
THANK YOU!

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