SAGC-A68: "a **S**pace **A**ccess **G**raph dataset for the **C**lassification of spaces and space elements in **A**partment buildings"

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Url: https://github.com/A2Amir/SAGC-A68

Description: "The analysis of building models for usable area, building safety, and energy efficiency requires accurate classification data of spaces and space elements. To reduce input model preparation effort and errors, automated classification of spaces and space elements is desirable. Although existing space function classifiers use space adjacency or connectivity graphs as input, the application of Graph Deep Learning (GDL) to space layout element classification has not been extensively researched due to the lack of suitable datasets. To bridge this gap, we introduce a dataset named SAGC-A68, which comprises access graphs automatically generated from 68 digital 3D models of space layouts of apartment buildings designed or built between 1952 and 2019 in 13 countries. Each access graph contains nodes representing spaces and space elements and edges representing the connection between them. Nodes are uniquely identified and characterized by 16 features including "Position X", "Position Y", "Position Z", "Width", "Height", "Depth", "Area", "Volume", "Is_internal", "Door_opening_quantity", "Window_quantity", "Max_door_width"," Encloses_ws", "Is_contained_in_ws", "bounding_box", and "Label" (28 identified lables are shown in bold type in Table 1). Edges are identified by a unique ID and characterized by three features, including "Z_angle", "Delta_z", and "Length". In total, the dataset comprises 4871 nodes and 4566 edges, including disconnected nodes representing shafts. It is suitable for developing GDL models for space element and space function classification in Building information modeling (BIM) authoring systems. "

Table 1: Space and space element class hierarchies and instance counts in the SAGC-A668 dataset.

Space function classes		Space element classes	
Name	Count	Name	Count
Space		SpaceElement	
ResidentialSpace		SpaceEnclosingElement	
CommunalSpace		**Opening**	140
DiningRoom	3	Door	
FamilyRoom	6	**InternalDoor**	1428
LivingRoom	275	**UnitDoor**	291
PrivateSpace		**SideEntranceDoor**	84
Bedroom	495	**ElevatorDoor**	492
MasterBedroom	23	**BalconyDoor**	10
BoxRoom	2		
HomeOffice	8		
ServiceSpace			
Shaft	403		
StorageRoom	84		
WalkInCloset	2		
SanitarySpace			
Bathroom	274		
Toilet	145		
Kitchen	117		
LaundryRoom	57		
CirculationSpace			
VerticalCirculationSpace			
Elevator	86		
Stairway	70		
HorizontalCirculationSpace			
Entrance	67		
Hallway	12		
MainHallway	18		
InternalHallway	152		
External			
AccessBalcony	19		
Loggia	108		