



# DEVELOPMENT OF AN INDOOR SPACE SEMANTIC MODEL AND ITS IMPLEMENTATION AS AN INDOORGML EXTENSION

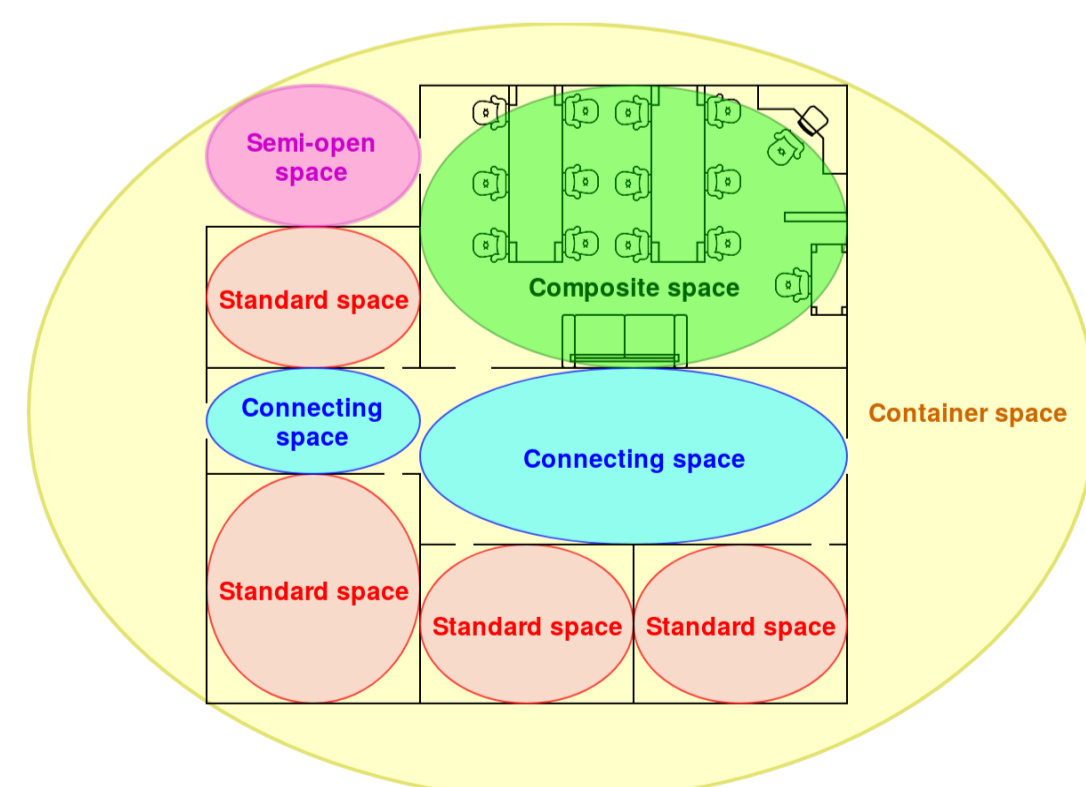
## OBJECTIVE AND MOTIVATION

- Capturing and handling of data for indoor spaces has increased over the years. While most of it is primarily driven by information of the physical representation of spaces, many applications look for semantic information as well.
- The traditional data sources, which range from architectural drawings to building floor plans provide only the geometric information of the spaces, hence the semantic information is missing.
- To bridge this gap, our work aims to propose a framework to understand the data in a better manner, accounting for both the geometric/syntactic and semantic information.

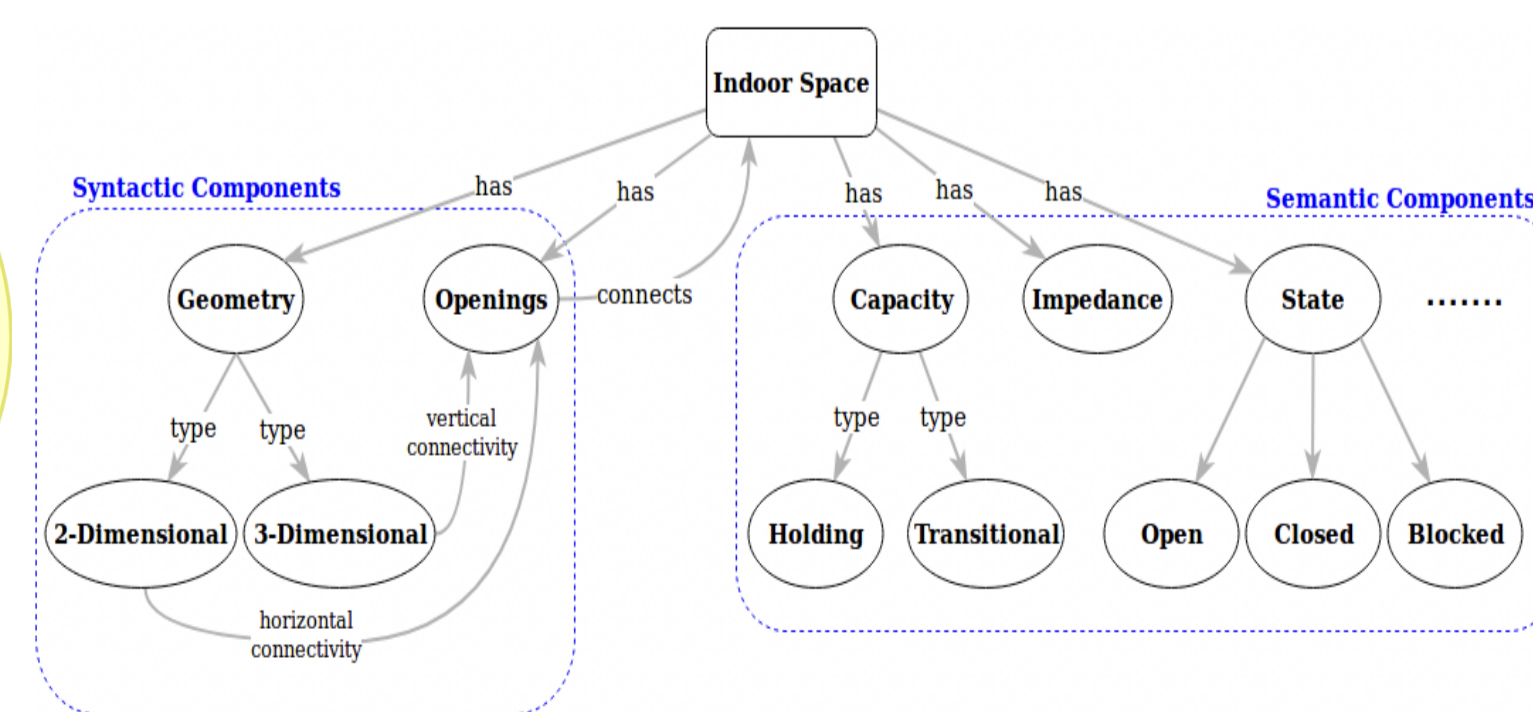
## METHODOLOGY

- **Space Classification and Ontology Development:** This research first proposes a classification of spaces to develop an ontology for the indoor space that accounts for both syntactic and semantic information.

The proposed ontological framework consists of two components – a syntactic component and a semantic component, with its associated features.

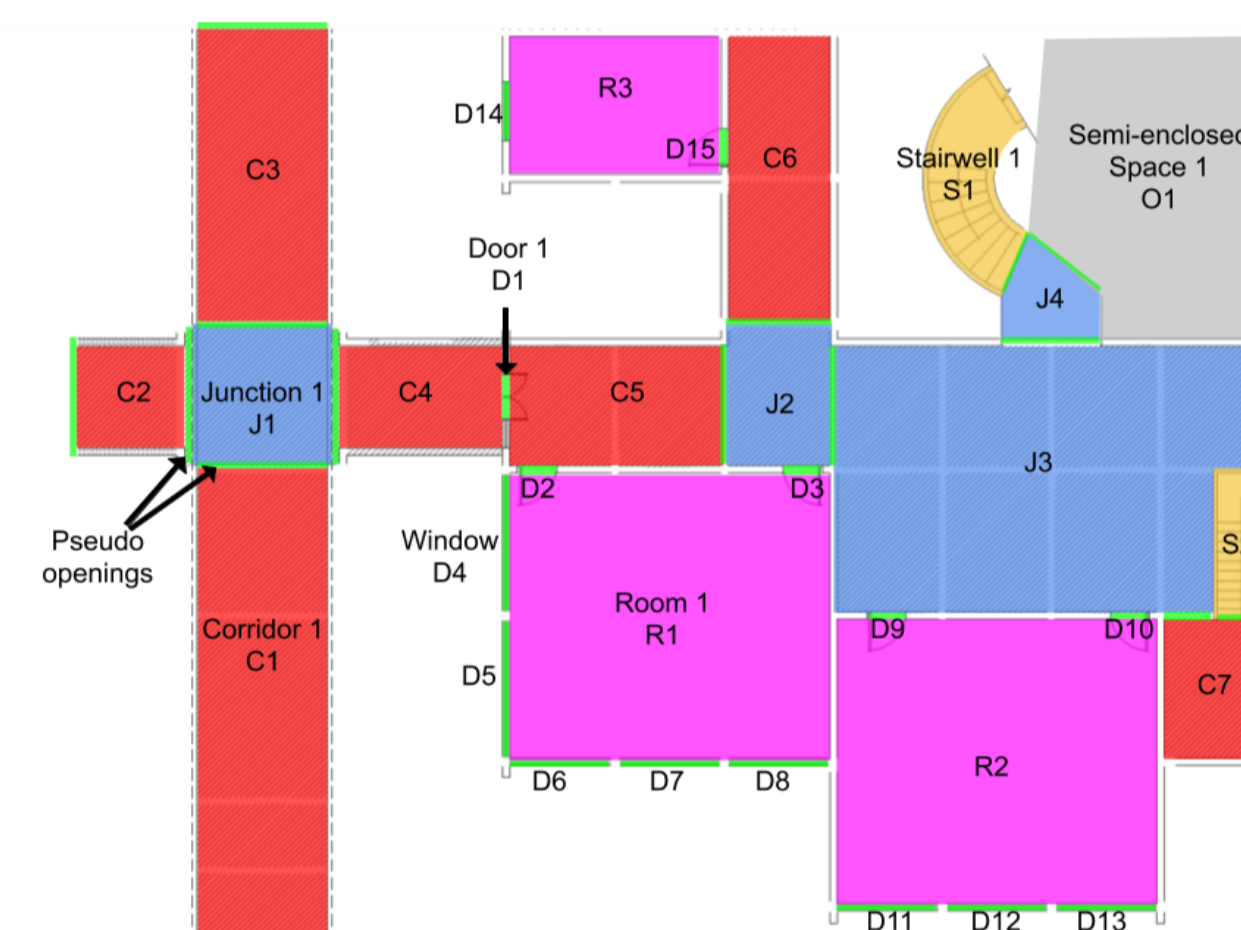


Classified categories of the indoor spaces.

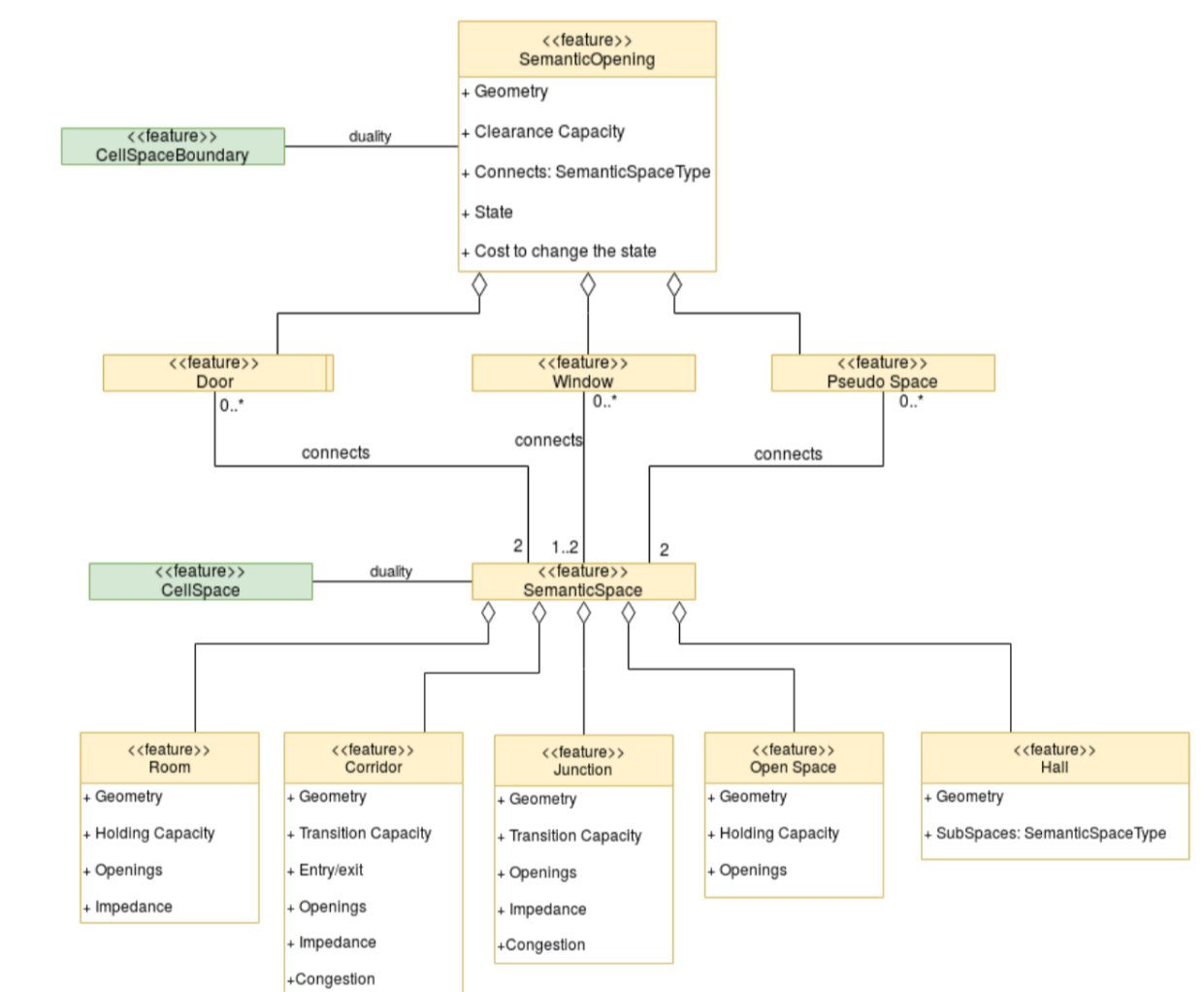


Properties associated with indoor spaces as defined in the ontological framework.

- **Indoor Space Semantic Model:** Based on the ontological framework, an indoor space semantic model is proposed which defines indoor spaces as a set of features belonging to classes like – Room, Corridor, Junction, Door/Windows.



The set of feature classes defined for the Semantic model.



UML diagram of the features for the IndoorGML extension (in yellow).

- **Semantic extension for IndoorGML Standard:** To show the utility of the conceptual space semantic model, an extension to IndoorGML standard is proposed. It implements the features of the semantic model by extending the existing core geometric model of IndoorGML and adds the capability to store and manage the semantic information also.

## CONCLUSION AND FUTURE WORK

- The proposed Indoor Space Semantic model with its implementation as an extension to IndoorGML standard can allow for both semantic and syntactic data to be collated in one model.
- Usability of the work in different application scenarios like indoor space analysis, evacuation simulation and facility management needs to be studied further.
- Also, the interaction of the indoor data in the proposed model with the external space would need to be explored.