Abstract:
Indoor navigation highly depends on context and requires flexible data structures to support the many use cases and configurations. For example, an indoor navigation system must cope with different localisation techniques, infrastructures, and capabilities of mobile devices. Also physical constraints from the built-up environment, different modes of navigation (like walking, driving, or flying), and thematic restrictions like security zones have to be considered. In this paper we propose a novel modelling framework for indoor navigation which considers the aspects of route planning for different modes of navigation on the one hand and of various localisation techniques on the other hand. It is based on a structured and multilayered space model in which every type of physical or logical aspect is mapped within its own space layer. It is shown how layers can be combined according to concrete navigation contexts to build an n-partite graph facilitating both route planning and localisation.

Stichworte:
3D Building Models; 3D Navigation; Cellular Space; Dual Space; Indoor Navigation; IndoorGML; N-partite Graph; Poincare Duality; Route Planning; Sensor Space; GISTop_Standardization; GISTop_