

Abstract

Common areas in residential high-rise buildings were functioned with the purpose of enhancing quality of life. While common areas are designed for the “internal” residents, the primary elements of concern are external factors such as external view, perception, orientation, privacy, etc. These factors show abandonment of internal user accessibility concern.

There exists an attempt to apply computer advancement to improve common area design and planning process by the automated layout design systems. These consist of computational tools for generating alternative designs through synthesis, analysis, and evaluation process iteratively to reach optimum goals in certain design objectives. However, the algorithms developed in the past appeared to be insufficiently concerned about interactive design factors, which possess the ability to allow design parameters modifications by users along with computer’s interactive evaluation.

This research focuses on the development of common area design and planning system for residential high-rise buildings by synthesizing, analyzing, and evaluating design alternatives iteratively in two processes; vertical circulation placement process and common area layout optimization process. The vertical circulation placement process was developed using depth distance and centrality analysis method, applied from space syntax theory. This multi-objective problem is converted into a single objective problem by weighted average method. An interactive guided system is also introduced in this process to indicate an estimated placement of common areas. The second process, a combination between enumeration power of procedural method as an automated design tool, and power to generate alternative possibilities of fuzzy logic-based system as an interactive design tool were developed to optimize common area layout.