

A Framework for Enhancing User Experience in Existing Exhibit Spaces Using Evolutionary Algorithms

A Thesis Submitted to the Faculty of Engineering
Ain Shams University in Fulfillment of the Requirement for
M. Sc. Degree in Architectural Engineering

Prepared by
Nourhan Mohamed Bassam ElHalawany

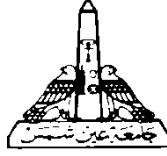
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I. STATEMENT

This dissertation is submitted to Ain Shams University, Faculty of Engineering for the degree of M. Sc. in Architectural Engineering.

The work included in this thesis was carried out by the author in the Department of Architecture, Faculty of Engineering, Ain Shams University, from 2013 to 2017.

No part of the thesis has been submitted for a degree or a qualification at any other University or Institution.

The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

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IV.ABSTRACT

Believing that the direct beneficiaries of any architectural space are the users and so designing and developing a new user-centric approach is mandatory.

This approach is applied by using manual tracking and observations to examine visitor parameters such as visitors' circulation, visiting styles, visibility patterns, active engagements and interaction with exhibits and spatial configuration developments.

This thesis aims at analysing the exhibition configuration and extracting the solid and valid parameters for both spatial and visitor's parameters which are (ill-defined) and transform them to (well-defined) inputs in the Evolutionary Algorithm component. Developing a method to solve the complexity of the spatial problem and getting the optimum result of the maximum visible area on the circulation curve and the percentage of the visible exhibits in order to be able to get a better probability of the enhancement.

It is a continuous changing process according to the changes in the configuration to bring eventually an understanding to both user and spatial components that can be driven into an algorithmic solving process as shown in the framework. It has been tested on a local exhibition space in Cairo(Picasso) which is an exhibition space which preview artworks in the heart of Cairo to make some enhancement modifications resulted from the evolutionary process to open other fields in solving the complexity of designing optimized functional spaces.

V.KEYWORDS:

User centric approach, Visitor behavior, Unobtrusive Observations, Exhibition Parameters, Visitor Studies, Evolutionary Algorithms, Socio-Spatial Parameters, Space Syntax.

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