

Synthetic Classicism: A Machine Learning Approach to the Recognition and Design of Circular Pavilions

Authors : Federico Garrido, Mostafa El Hayani, Ahmed Shams

Abstract : The exploration of the potential of artificial intelligence (AI) in architecture is still embryonic, however, its latent capacity to change design disciplines is significant. 'Synthetic Classicism' is a research project that questions the underlying aspects of classically organized architecture not just in aesthetic terms but also from a geometrical and morphological point of view, intending to generate new architectural information using historical examples as source material. The main aim of this paper is to explore the uses of artificial intelligence and machine learning algorithms in architectural design while creating a coherent narrative to be contained within a design process. The purpose is twofold: on one hand, to develop and train machine learning algorithms to produce architectural information of small pavilions and on the other, to synthesize new information from previous architectural drawings. These algorithms intend to 'interpret' graphical information from each pavilion and then generate new information from it. The procedure, once these algorithms are trained, is the following: parting from a line profile, a synthetic 'front view' of a pavilion is generated, then using it as a source material, an isometric view is created from it, and finally, a top view is produced. Thanks to GAN algorithms, it is also possible to generate Front and Isometric views without any graphical input as well. The final intention of the research is to produce isometric views out of historical information, such as the pavilions from Sebastiano Serlio, James Gibbs, or John Soane. The idea is to create and interpret new information not just in terms of historical reconstruction but also to explore AI as a novel tool in the narrative of a creative design process. This research also challenges the idea of the role of algorithmic design associated with efficiency or fitness while embracing the possibility of a creative collaboration between artificial intelligence and a human designer. Hence the double feature of this research, both analytical and creative, first by synthesizing images based on a given dataset and then by generating new architectural information from historical references. We find that the possibility of creatively understand and manipulate historic (and synthetic) information will be a key feature in future innovative design processes. Finally, the main question that we propose is whether an AI could be used not just to create an original and innovative group of simple buildings but also to explore the possibility of fostering a novel architectural sensibility grounded on the specificities on the architectural dataset, either historic, human-made or synthetic.

Keywords : architecture, central pavilions, classicism, machine learning

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