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Intelligent Design of Ecological Furniture in Risk Areas based on Artificial Simulation

The study is based on the characterization of different AI models applied in the public furniture design analyzing the conditions of risk, materiality, and integration of variables in two AI generative modeling algorithms. As risky since they contain flood-prone areas, low vegetation coverage, and underdevelopment of infrastructure; therefore, these characterizations are tested through artificial simulation. The experimental method is applied through laboratory tests of various material components and their structuring in 3D simulators to check their resistance and risk scenarios. The case study of one of the most risky and populated areas of the informal settlement area of the Northwest of Guayaquil, such as the Coop, is analyzed. Sergio Toral is the focal point for on-site testing. It is concluded that the generation of a planned scheme of ecological furniture with different materials responds more effectively to the territory and that through artificial simulation an advantage can be obtained in terms of execution time and results, thus demonstrating that artificial intelligence is an ideal tool. To generate furniture design proposals that are more diverse, innovative, and functional with the environment, but it generates a minimum level of error for specific designs in the experimental model_01 of 0.1% to 3% and a high level in the experimental model_02 with an increasing error from 20% to 70%. As a future line of research, it is proposed to generate a simulated system of all the new informal settlements in Guayaquil and establish focal points for the implementation of new ecological furniture.