Drawing Building Blocks in Existing Neighborhoods: An Automated Pilot Tool for an Initial Approach Using GIS and Python

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Abstract : Although designing building blocks is a procedure used by many planners around the world, there isn't an automated tool that will help planners and designers achieve their goals with lesser effort. The difficulty of the subject lies in the repeating process of manually drawing lines, while not only it is mandatory to maintain the desirable offset but to also achieve a lesser impact to the existing building stock. In this paper, using Geographical Information Systems (GIS) and the Python programming language, an automated tool integrated into ArcGIS PRO, is being presented. Despite its simplistic enviroment and the lack of specialized building legislation due to the complex state of the field, a planner who is aware of such technical information can use the tool to draw an initial approach of the final building blocks in an area with pre-existing buildings in an attempt to organize the usually sprawling suburbs of a city or any continuously developing area. The tool uses ESRI's ArcPy library to handle the spatial data, while interactions with the user is made throught Tkinter. The main process consists of a modification of building edgescoordinates, using NumPy library, in an effort to draw the line of best fit, so the user can get the optimal results per block's side. Finally, after the tool runs successfully, a table of primary planning information is shown, such as the area of the building block and its coverage rate. Regardless of the primary stage of the tool's development, it is a solid base where potential planners with programming skills could invest, so they can make the tool adapt to their individual needs. An example of the entire procedure in a test area is provided, highlighting both the strengths and weaknesses of the final results.

Keywords : arcPy, GIS, python, building blocks

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