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CITYZOOM'S VISUAL DOMINANCE ANALYSIS: VISIBILITY IN URBAN ENVIRONMENT

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INTRODUCTION

CityZoom supports the visual impact analysis of new buildings on historical settings. The software, developed by the NTU-UFRGS, computes the relative dominance of different objects during a route travelled by an observer. In this paper, two visual impact methods, supported by CityZoom's Visual Dominance Model are used to investigate the visual interference of new buildings in historical preservation areas.

MATERIALS AND METHODS

CityZoom's Visual Dominance Model disaggregates the surfaces of 3D models into triangles capable of storing information about its geometry. The two different sub-models are: a) View Plane sub-model (left hand-side of Figure 1), where the viewfield of an observer is disaggregated into pixels. The triangles' "address" is identified and the Visual Dominance calculated as the quotient between the area of the View Plane and the area of the View Plane occupied by the analyzed building; b) Point Cloud sub-model (right hand-side of Figure 1), each of the façades' triangles receives the information of its visibility from a specific point of view. Test scenarios were defined whereby new buildings occupy the background of a historical building - a Methodist Church.

Figure 2 features a) existing views of the historical church, b) simulated viewpoints (P1, P2 and P3) for the View Plan sub-model from the same position, and c) bars indicating the percentage of the observer's field of vision occupied by each building. Figure 3 shows a) the application of the 2D Point Cloud sub-model b) the representation of the differential percentage of the targeted building's facades visualized from that point.

ANALYSIS AND RESULTS

In P1, the church occupies less area of the observer's field of vision than the simulated new buildings. In P2 and P3 the area occupied by the church is larger than the simulated new buildings, indicating the growing visual dominance of the historical church as the observer travels from P1 to P3.

The observation value of the church does not significantly change but the simulated buildings's observation value is significantly different to each scenario: the taller buildings (simulation 2 and 3) become visible from farther away and can be seen along a great length of the adjacent street axes to the historical church. On the other hand, the church is not significantly visible from long distances in the existing scenario.

CONCLUSION

The test scenario have shown that CityZoom's Dominance Model was able to numerically and graphically demonstrate that, although the new buildings are visually predominant from farther away, the church keeps its visual prominence in a very similar way that it performs in the existing setting.

FIGURE 1: CITYZOOM'S VISUAL DOMINANCE SUB-MODELS

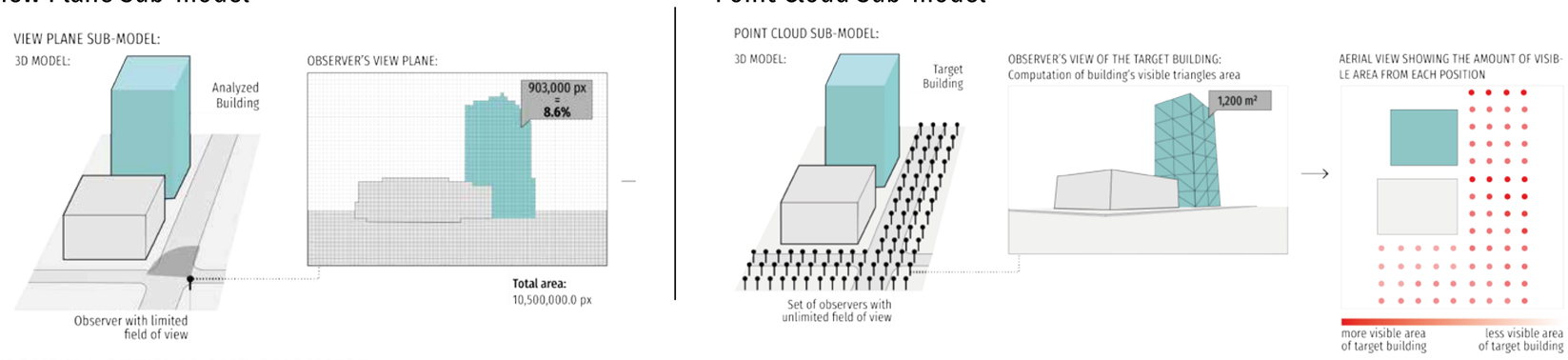


FIGURE 2: VIEW PLANE ANALYSIS

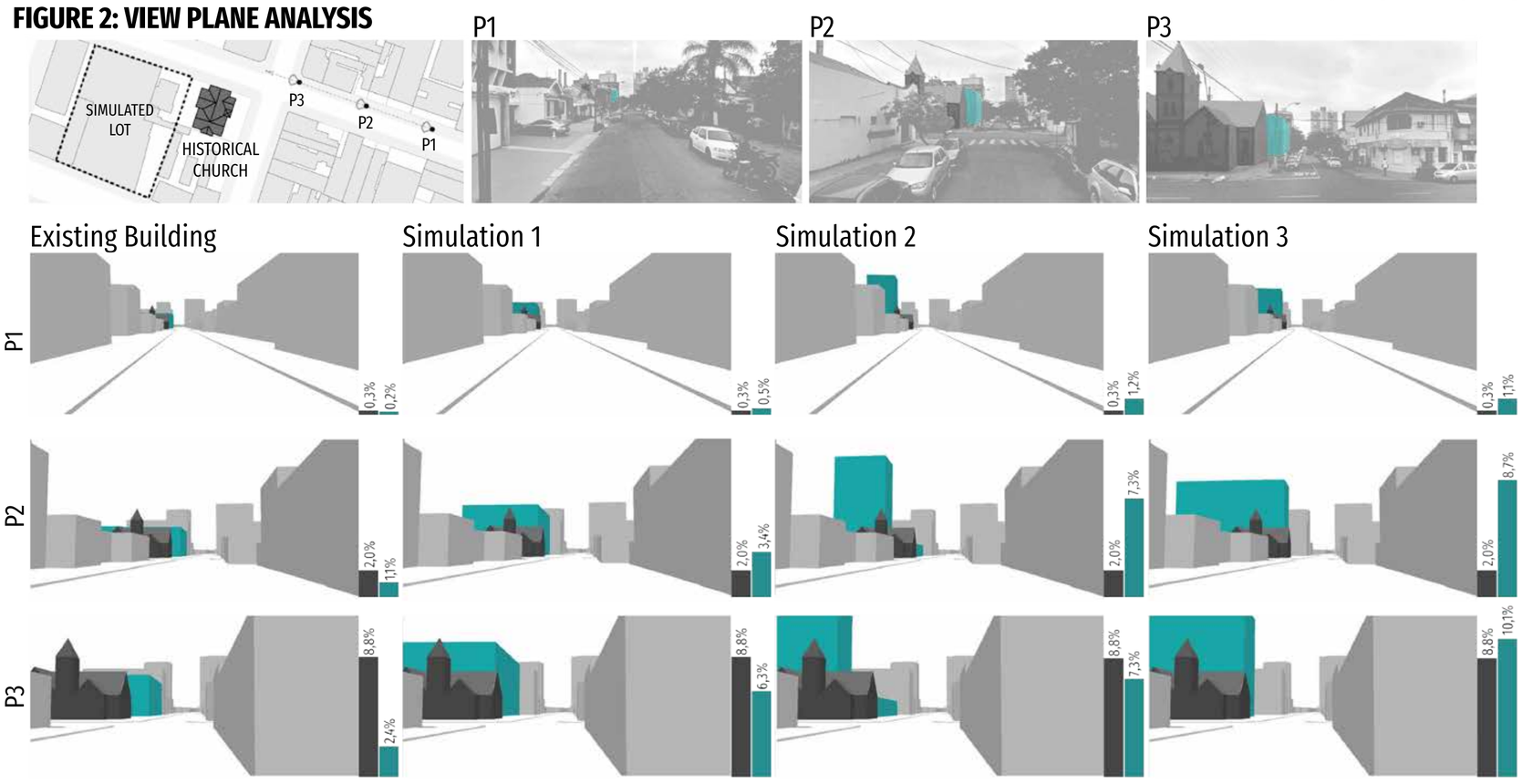
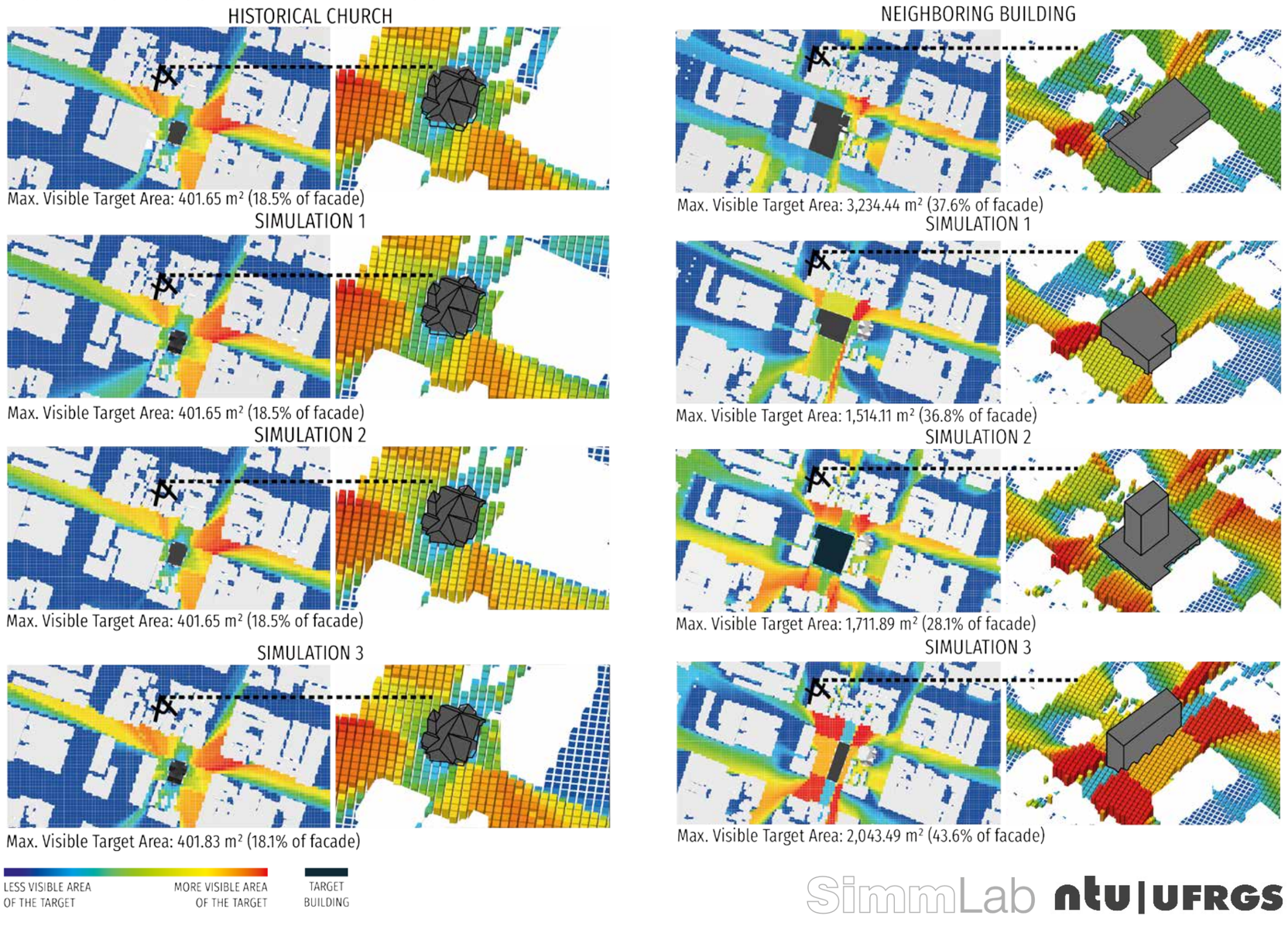


FIGURE 3: POINT CLOUD SUB-MODEL ANALYSIS



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