

Abstract

The possibilities generated by Digital Fabrication and Digital Visualization in architecture nowadays are huge. This research will explore deeper how they can be used in conjunction to create precise parametric models using non-traditional sources of inspiration and how those can prove equally reliable in terms of inspiring beautiful and useful examples of architecture, sculpture, furniture etc.

Chicago is known for being one of the best sport cities in the nation. Not only it houses teams of the great American Leagues: Chicago Bears in the NFL, Chicago Cubs and White Sox in MLB, Chicago Blackhawks in NHL, Chicago Fire in MLS, and Chicago Bulls in NBA; but it also offers a great variety of indoor and outdoor sports activities for Chicagoans. It is not uncommon to see people running, exercising, playing different sports, all across the city, any day any time. If we look closer in why Chicago stimulates this amount of activity, one of the answers can be: its Architecture.

Although the relation might not be so clear, the architecture and urban planning of the Windy City is arranged in a way that favors the practice of activities, specially the outdoors. Chicago is full of parks, green areas, broad avenues. If we analyze the main landmarks of the city, almost all of them are ideal to exercises: Navy Pier, Grant Park, Lake Michigan Shore, Museum Campus, the Riverwalk, among others.

In this sense, it is clear that there is a relation between the sports vocation of Chicago and its design. So in this research I will explore more this relation, but in a Digital Fabrication and Visualization standpoint.

The focus will be in the capture of movements during sports practices and how it can be used as inspiration – both conceptually and parametrically – to design development. The research will be divided in two main stages. Firstly, I will record different movements of different sports using techniques of Motion Capture to transfer the movements of the performer into the Digital Environment. The hardware used will be the Microsoft Kinect, a camera used primarily in Video Games consoles to allow the interaction between the player movements and the game being played.

Secondly, the data recorded with the Kinect will be transferred to two visualization software that work together, Rhino 3D and Grasshopper, that allow to manipulate the data input and create a proper architectural object. Based on the movement of the different sports captured, a point cloud will be generated in the computer, and with the use of Grasshopper, I will create a parametric bench for each sport that celebrates the individuality of its movement. Those benches are to be placed in different areas in the city in which the sports are more practiced.

Lastly, the 3D generated model will be digitally fabricated (in a smaller scale) taking into consideration the materiality and machine used. In view of the different tools and materials, their choice should be made observing the advantages and disadvantages of each in different situations.