

BIM-based Building Performance Monitor

Ramtin Attar, Ebenezer Hailemariam, Michael Glueck, Alex Tessier, James McCrae, Azam Khan
Autodesk Research
210 King Street East
Toronto, ON, Canada M5A 1J7
{firstname.lastname}@autodesk.com

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Abstract

This video presents a set of visualization techniques for displaying real-time building behavior and usage, for the purposes of energy minimization, in the context of a semantically-rich building information model. Ambient occlusion shading is used to visualize the 3D space of the building, over which other visualizations may be layered. Specifically, occupancy, power usage, heat sources, air flow, and temperature are presented, as well as aggregated data sets such as “activity”.

1. OVERVIEW

Real-time building performance monitors, that visualize information collected from sensors distributed throughout a building, typically show the raw data values as simple text labels on 2D floor plans. This video shows how the same data can be better visualized in 3D (see Figure 1) in the context of the specific zone configuration of the building under consideration (see Figure 2). For example, while the temperature in a room is a valuable piece of information, seeing the temperature visualized as surface shading in the room together with seeing physical features that may contribute to the current temperature value (the air conditioning vents, air flow pattern, the size of the windows, placement of radiators, etc.) will provide much more contextual information to the building operator looking at the data (see Figure 3).

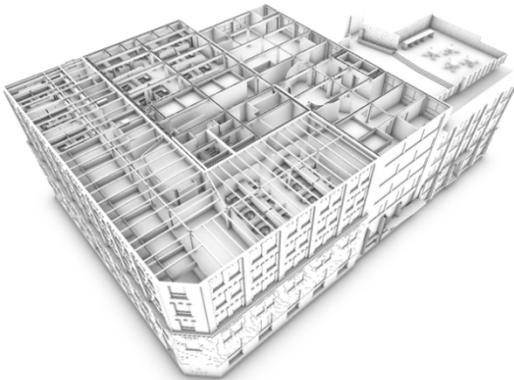


Figure 1. Real-time ambient occlusion base rendering of building surfaces.

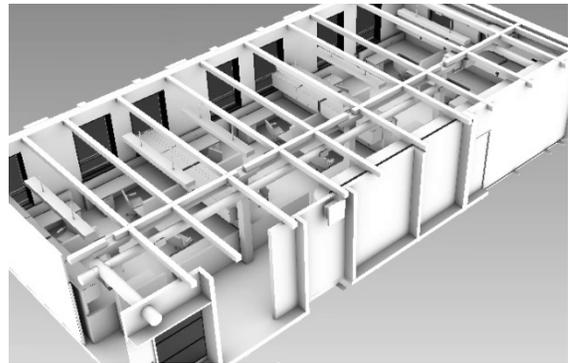


Figure 2. Specific zone on 5th floor of building, showing air handling units, windows, cubicle layouts, etc. obtained from the building information model.



Figure 3. Real-time visualization of occupancy (chair highlighting), heat source (computer glowing and red arrows), power usage (text label and meter), and aggregated “activity” status (peach shading of background).

References

Hailemariam, E., Glueck, M., Attar, R., Tessier, A., McCrae, J., Khan, A. 2010. Toward a Unified Representation System of Performance-Related Data. eSim 2010 Proceedings. (In press).