



## Towards digitally enhanced interaction with architectural representation

Brakke, Aaron<sup>1</sup>   Herrera, Oscar<sup>2</sup>   Leon, Hernando<sup>2</sup>

Keywords: architectural representation; drawing; augmented reality



**Abstract** Architects rely on traditional descriptive representational techniques, such as; plans, sections and elevations to communicate the design intentions of the architectural object. J.N.L. Durand's 1809 treatise *Précis des leçons d'architecture données à l'École royale polytechnique* solidified a methodology dependent on descriptive geometry. The presentation technique prescribed relied upon a set of drawings in which the arrangement of disparate parts alluded to the whole. This system, a reductive approach, lends itself well to the field of architectural construction in which scaled representations of the architectural object ought to be able to communicate in a clear and concise manner. However, it falls short when considering the communication of an architectural idea to an untrained eye.

Spatial concepts are more understandable through the employment of perspectival drawing which has been present in architectural representation since the Renaissance. Through meticulous development, Brunelleschi, Alberti, da Vinci, Durer, Filarete and others were able to techniques (and machines) of drawing that accurately depict rhythm and proportion of view (Perez-Gomez). The Renaissance man, vested in arts, science, and philosophy, personified *ego*. Building upon this legacy, Descartes was able to contribute through the clarity of man (thinking I) as subject and further develop a discourse on the topic of vision through *La Dioptrique*. Contemporary thought leads us to dismiss the dualism Descartes suggested and to understand the interdependent relationship between mind and body.

Drawing a line to connect these precedents and architectural representation in contemporary visual culture is a difficult task. A superficial observation might perceive congruence in the translation of the drawing typologies named above into a computerized environment. Proponents of digital tools reason that vantage has been gained by expediting processes. However this argument is sustained without a clear and critical analysis of computer enabled design processes which have begun to sever the human observer from the process (Crary). Continuing along this path will lead to detrimental conditions which are not clearly illustrated as the representation of the architectural object has been isolated from reality.

The research being conducted attempts to address this issue of disconnection and examines various possibilities of how architectural representation could reconnect the subject and object by encouraging an "aletheic gaze", a *phenomenological way of seeing* as understood by the Greeks which is a nature of knowing through the uncovering of beings (Heidegger). Our research is producing prototypes, which include; experimentation with AR, Kinect sensors and robotics and is testing amongst students and professors of architecture, IT and mechatronics. The preliminary results lead us to believe that technologies like Augmented Reality that allow for the seamless overlay of digital layers of information on physical reality which can help reveal the hidden. When approached from the right perspective, technology can be utilized in architectural visualization to bridge the gap between the *virtual* and the *real* and aid in a richer understanding of our environment.

1. HD+i : Digital Tools, Universidad Piloto, Bogota, Colombia y WHITEKNEE
2. Innovatic, Universidad Piloto, Bogota, Colombia



# Towards Digitally Enhanced Interaction with Architectural Representation

Brakke, Aaron Paul - Hd+i, Architecture, Universidad Piloto, Bogota, Colombia

Hererra Bedoya, Oscar - InnovaTIC, Ingenieria Sistemas, Universidad Piloto, Bogota, Colombia

Leon, Hernando Efrain - InnovaTIC, Ingenieria Mecatronica, Universidad Piloto, Bogota, Colombia



Architects rely on traditional descriptive representational techniques, such as; plans, sections and elevations to communicate the design intentions of the architectural object. J.N.L. Durand's 1809 treatise *Précis des leçons d'architecture* données à l'École royale polytechnique solidified a methodology dependent on descriptive geometry. The presentation technique prescribed relied upon a set of drawings in which the arrangement of disparate parts alluded to the whole. This system, a reductive approach, lends itself well to the field of architectural construction in which scaled representations of the architectural object ought to be able to communicate in a clear and concise manner. However, it falls short when considering the communication of an architectural idea to an untrained eye.



Spatial concepts are more understandable through the employment of perspectival drawing which has been present in architectural representation since the Renaissance. Through meticulous development, Brunelleschi, Alberti, da Vinci, Durer, Filarete and others were able to techniques (and machines) of drawing that accurately depict rhythm and proportion of view (Perez-Gomez). The Renaissance man, vested in arts, science, and philosophy, personified ego. Building upon this legacy, Descartes was able to contribute through the clarity of man (thinking I) as subject and further develop a discourse on the topic of vision through *La Dioptrique*. Contemporary thought leads us to dismiss the dualism Descartes suggested and to understand the interdependent relationship between mind and body.



The image at the top is one of the implementations of AR that has been realized within the research project. The middle image is an engraving by Albrecht Dürer called *Artist and Nude*. The render and image to the bottom right are images from the project of the authors.



The images above are part of an installation constructed as part of the research project. This installation involves holographic imaging, kinect sensors and a robotic machine for visualizing corporal gestures in 3D in real time.

Drawing a line to connect these precedents and architectural representation in contemporary visual culture is a difficult task. A superficial observation might perceive congruence in the translation of the drawing typologies named above into a computerized environment. Proponents of digital tools reason that vantage has been gained by expediting processes. However this argument is sustained without a clear and critical analysis of computer enabled design processes which have begun to sever the human observer from the process (Crary). Continuing along this path will lead to detrimental conditions which are not clearly illustrated as the representation of the architectural object has been isolated from reality.

The research being conducted attempts to address this issue of disconnection and examines various possibilities of how architectural representation could re-connect the subject and object by encouraging an "aletheic gaze", a phenomenological way of seeing as understood by the Greeks which is a nature of knowing through the uncovering of beings (Heidegger). Our research is producing prototypes, which include; experimentation with AR, Kinect sensors and robotics and is testing amongst students and professors of architecture, IT and mechatronics. The preliminary results lead us to believe that technologies like Augmented Reality that allow for the seamless overlay of digital layers of information on physical reality which can help reveal the hidden. When approached from the right perspective, technology can be utilized in architectural visualization to bridge the gap between the virtual and the real and aid in a richer understanding of our environment.