Aspects of Digital Mimesis in Design

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Abstract. The imitation process and the 3D digitizer deployed in conceptual design
Keywords. 3D digitizer, mimesis, imitation, and architectural design.

Imitation and design

The narrative potential of the digital media redefines the nature of design practice by making
the creative process more transparent. We can communicate design progress not only across
temporal and geographic borders, but also publish it and make it explicit at different stages of its
development for the benefit of distant collaborators and wider public. Furthermore, the reductive
conventions of the past are being augmented by new ones - often imported from previously remote
disciplines as architecture redefines its character.

Bioengineering and reverse engineering techniques are of growing interest today in many
areas of the advanced design. Until recently the process of rigorous recording, examination and
appropriation of organic forms and its incorporation into the critical design process has been
probed by very few. Le Corbusier towards end of his prolific life developed an exceptionally com-
plex architectural syntax derived often from the examination of diverse organic shapes. This,
often implicit process was deployed later in both his painterly and architectural labors.

In his final projects Le Corbusier imitated the organic assemblage of an objet à reaction poétique
next to the careful constructs based on object-types. The elements of the primitive, vernacu-
ar and organic replaced the initially platonic, machine aesthetic. “As in painting so in
Architecture, Le Corbusier invented or adopted a set of prototypical sign-like elements for use as a
vocabulary that was amenable to gradual modification and from which a great variety of state-
ments could be constructed” (Sekler, 1975). With growing interest, we revisit this largely unspoken
mimetic process of the greatest architect of the 20th century.

Digital Mimesis

While the interest in complex natural environments and landscapes is becoming an important
aspect of contemporary design culture, the role of the small-scale natural, organic models in architectural design is largely underestimated. With digital tools, the formal and functional lessons derived from an organic object found can be appropriated into once stably constructed design universe. The creative application of the 3D digitizer opens particular possibilities that enable us to register and incorporate into our design a universe of models of not only macro but also micro landscapes. Its potential is illustrated here with several student design etudes developed recently at The University of British Columbia School of Architecture. The guided process of digital reconstruction of complex organic objects was paralleled by the revelation its deeper formal structure. The shapes were fragmented, tested, modified and applied to simple, conceptual projects.

The design research begins with the isolation and clarification of a source object, followed by marking the model with an organized lattice of cross sectional and transverse sectional lines which are then recorded with a contact 3D digitizer and the data cloud is processed with Nurbs modeler. Among the software used in those case studies were: MAYA, FmZ and Rhino. Some of the resulting models were also reproduced with 3 axis CNC machine, related to the original and often reused in the following project. The theoretical implication of this digital imitation method for architectural design was also discussed. The broader employment of the laser digitizer is anticipated in the near future.

The 3D digitizing technology has been used for some time in the advanced engineering and developmental medical applications. We have seen it used in surgical planning, prosthetic design, and anthropometric measurements as well as in machine vision, rapid prototyping, scientific measurement and even in cataloging archeological artifacts. The reverse engineering was initially used in the creation of CAD legacy data from master parts. More recently 3D shape capture and analysis of complex organic forms is becoming essential part of biomimetic robotics.

Figure 3 The sensory feedback served as the basis of the control system for this robot’s design in order to achieve the adaptability of locomotion over very rough terrain typically found in the North American cockroach.

Figure 2 The guided design process involved the critical selection of the found object followed by its digital reconstruction, revealing and addressing its deeper formal structure at the same time. The cognitive process of imitation deployed in this class was not based on trivial or mechanical reproduction. The explicit imitation and dissemination of the results in the exact, prescribed the format that constituted the essential part of this course.
where multidisciplinary collaborations produced
design based on biological principals of formal
structure and control. The work of Delcomyn and
Nelson describing the design of a six-legged
robot based on the features the American cock-
roach makes for the interesting example extend-
ing notion of the “bio-mimetic” process. The robot
was designed with insect-like leg structure and
actuators that act as muscles. Both form and
functionality of this insect was instrumental in
advancing aspects of this design, based largely
on the critical process of reversed engineering
and imitation.

By using the 3D digitizer for form acquisition,
the cognitive process of architectural design can
be taken to new heights. Furthermore the biomor-
phic, nonrepresentational patterns resembling
natural organisms and supported by its deeper
understanding can be an interesting source and
model in the development of contemporary
designs.

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