Dossier Editorial:
Future trajectories of computation in design

Ethem GÜRER

Computation has become a widely embraced notion in architectural design. While designers traditionally rely on intuition and experience to deal with design problems, computational approaches aim to enhance that process by supporting abstraction, algorithmic and parametric thinking, collaborative design, form studies, complex modeling, automation, simulation and fabrication. In this regard, computational design not only alters the very nature of design activity (thinking and doing), from intuition to logic, as well as from product to process, but also offer powerful media for the communication of different disciplines, to the designer in the multidisciplinary world of the 21st century.

The dossier subject for A|Z ITU Journal of the Faculty of Architecture 15 (1) special issue is entitled *"Future Trajectories of Computation in Design"*, as parallel to the conference CAADFutures 2017 organized in Istanbul Technical University, Taşkışla. The main purpose of this special issue is to question and to discuss how the practice of design is reforming (and will reform) itself in response to these crucial changes. The dossier comprises eight articles, which introduce not only the state-of-the-art in the computational design field, but also recently developed computational tools, technologies, methods and implementations over specific case studies of different design context and scale. The three papers that were originally presented at the CAADFutures 2017 Conference in Istanbul went through a rigorous double-blind- refereeing process, and benefited from discussions during the conference. The remainder of the papers arrived through the conventional journal process upon invitation and underwent the same blind peer review by experts.

Departing from the fact that modern cities generate data in increasing speed, volume and variety which is more easily accessed and processed by the advance of technology, *Elif Ensari* and *Bilge Kobaş* present methods in order to collect and visually represent these data with the aim of supporting urban design decisions. The authors propose to use web scraping methods to gather a variety of publicly available data within the Kadıköy municipal boundaries of Istanbul, as well as a visual programming software to map and visualize this information. Urban conditions such as demographic and economic trends based on online real estate listings, spatial distribution and accessibility of public and commercial resources are discussed through the presented method and superposition of the resulting maps.

To comprehend the inner nature of complex traditional cities, *Pınar Çalışır Adem* and *Gülen Çağdaş* introduce Data Mining algorithms of Geographic Information System (GIS) technologies as a holistic data gathering and processing approach. The paper firstly discusses the risks of uncontrolled urbanization activities like top-down planning decisions and designer's personal motives over the local character of traditional cities. Through the case of Hatuniye Neighborhood in Amasya, the authors then present the logic of their interpretative method for dealing with traditional urban data, which is mainly based on topographical and morphological attributes, in three consecutive phases: formation, analyses and interpretation of data. Referring to the three phases of the established methodology, *Adem* and *Çağdaş* emphasize the importance of the use of computational models and approaches in collecting and interpreting local urban data to sustain the special character of traditional environments.

The article which is titled "A Model for Parameterization of Urban Regulations" by *Miray Baş Yıldırım* broadly focuses on the significance of multidisciplinary approaches and participatory processes in the urban regeneration processes. While the first section presents a brief summary of the parametric regulation modeling and design guides within the context of urban design problems, the following parts describe the generation of the model as

a parametric regulation modeling tool for design decision support. By using real-time regulations and standards as fundamental design data, the proposed model allows designers to generate and test various design scenarios. Accompanied with some technical limitations, the model differs from others by customization of local regulations for evaluating design alternatives. The transformation of textual regulations and standards into computational design rules is the main challenge of the study.

Ömer Halil Çavuşoğlu and *Gülen Çağdaş* discuss opportunities of Building Information Modeling (BIM) from an unfamiliar perspective that aims to integrate BIM tools into early design stages. With the use of different data gathering methods such as quantitative ones (questionnaire), qualitative ones (pure observation, participant observation, in-depth interviews and focus groups) and protocol analysis (retrospective analysis) through five case studies that were implemented with 25 unique participants, the article elaborates five crucial impacts for the BIM environment that contribute to the early design stages: design exploration, 3D modeling, parametric modeling, conceptual energy modeling and decision support system.

Similar to the previous article, *Şeymanur Yıldırım* draws attention to the increasing role of BIM in design, but this time from an algorithmic perspective and in an architectural project development context. The lack of healthy communication between different disciplines and actors, and the difficulty of managing big data in a design process are introduced as the major problems of BIM for architecture offices. Through a specific case study, the paper not only challenges these problems but also offers highlights for the companies that intend to implement algorithm aided approaches in BIM during project design, development, management and construction processes.

In order to shape both macro and micro geometries for acoustic performance, *Dagmar Reinhardt* introduces 6-axis robotic fabrication which is based on a range of mathematical equations that regulate physical properties of spatial surfaces and pattern details through the implementation of three robotic prototypes. By interfacing computational scripts, mathematical source codes, and structural analysis, this exhaustive research discusses the opportunity of producing a compelling and distinctive topography of multiple scales and dimensional geometries for shaping sound in the context of performance spaces and theatre acoustics.

From a broader point of view, *Güzden Varinlioğlu, Burkay Pasin and Hugh David Clarke* shed lights on the problem of integrating digital methods and tools into the architectural curriculum through a case study of a workshop entitled "Mission Mars 2024: A Biomimetic Structural Organism", as part of the studio course ARCH 202 in the spring semester of 2017 at Izmir University of Economics Department of Architecture. As demystified by the authors, the paper presents a critical approach to understanding the impact of digital tools and methods on the learning outcomes of the students, which are, discussed and demonstrated based on four studio outcomes.

Orkan Zeynel Güzelci and *Sinan Mert Şener* introduce the concept of entropy as an objective, precise and quantitative methodology for measuring various types of information embedded in the built environment or buildings. For this purpose, the authors investigate 24 municipality building projects which were designed for architectural project competition between 2015 and 2016 in Turkey, and which have received awards. In order to reveal objective similarities, 24 projects were re-evaluated by calculating five different entropy values. The study differs from the precedents by using multiple interrelated entropy values for the evaluation of a specific architectural typology. The presented algorithm is also claimed to be a model for making some predictions about the potential of project winning a prize in a competition.

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