Design by Data

Arzu Gönenç Sorguç (METU Design, Research and Innovation Center, Middle East Technical University)

Computation design is an overarching term which melts the boundaries of different disciplines resulting in paradigmatic change in design processes as well as our fabrication methods. As the computational models getting more advanced by incorporating multi-dimensional data, machine learning becomes an integral part of the design introducing the term data design as well. Hence today design is by data and computational models are becoming data models as well. In this context, METU Digital Design Studio is conducting several researches related with structure, fabrication, biomimetics and AI. This presentation is to be focused on examples of some of these studies regarding data as the core.

Computational design enables to obtain multi-dimensional complex models where all the models are generative parametric models either using algorithms or machine learning, even both. The well-accepted file to factory approach today has been on the way to be extended to include data design and cyber-physcial constructions as well. Complex big data is turned to be “capta” within the modeling environment. Design space is explored and designers can integrate optimization into formation processes.

In this regard, first what is data design in computational design processes is to be explained. In this discussion how the asymmetry of data in different domains, their scale differences and patterns effect the process and how they can be calibrated is to be outlined. A very novel performative wall example based on biomimetic research is to be explained in depth to show the modeling phases and the processes. This project is not only a form finding but it is a challenge for fabrication as well. Besides the design study is a collaborative study for which capta of design have been determined by different species in nature to achieve a wall to collect water. System and complexity have been part of the design process.

Then following researches are to be briefly referred as examples of how computational design in turned to be data-driven in general. Crack detection on buildings by using ML, constructing 3D models based on 2D drawings, truss design and optimization by ML, Computer Aided Fabrication CAF as a parameter in computational model and how they transforms the design and lastly a biomimetic study to find robotic construction paths are to be.