


Arbor

A cyborganic living system

Author: Maria Kuptsova

Supervisor: Prof. Claudia Pasquero

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ABSTRACT: A cyborganic sculpture “Arbor” is a high-resolution 3D printed system designed by both human and non-human forms of intelligence and receptive for the interaction between human and non-human. Developed within the framework of the doctoral research under the supervision of Prof. Claudia Pasquero, the installation demonstrates a machine-learning-based design technic that is contextualised in a new form of material and formal articulation with an aim to impart biological intelligence into inorganic objects and synthetic environments. The project outlines an approach for reading the intelligence of an organic timber structure by the means of machine learning algorithms, as well as rethinking the life cycle of wood, proposing a bio-artificial system which is alive in a cybernetic sense.

Microscopic pattern of a wood contains information about intelligent mechanisms and heterogeneous properties possessed by wood in its living state. The possibility to embed the

organisation principles of an organic material into a digital system would allow the design of a hybrid materiality which hosts biological intelligence within the digital structure. Style GAN variant of Generative Adversarial Networks is used in the research project as a method for extracting a material organisation principle from an existing database of timber structure in order to generate a larger data set of bio-digital patterns using style transfer. To study the internal and external morphology of timber material, the latent-vector of the GAN is translated into Z access of volumetric analysis and decoded into a high resolution point cloud. In this process basic geometrical data describing the anatomical properties of timber structure was extracted. Final volumetric model consists of a comparative analysis of three anatomical cuts of a timber structure. Fabrication technologies such as additive manufacturing allows for the development of adaptive fabrication methods informed by research in material behaviour. Wooden based filament is used as a 3d printing material, suggesting a new regenerative life cycle of matter from the wood in its living state to a recycled wooden material.

“Arbor” sculpture presents a form of cyborganic living system that challenges the processes of growth, decay and ontogenesis. It is a synthetic landscape driven by non-human biases, co-designed by human, technological and biological systems.

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