The AI Protheses

This exhibition consists of the robotic, AI prostheses created by Marco Donnarumma with a team of collaborators for his 7 Configurations cycle. 7 Configurations is a cycle of performances and installations that focuses on the conflicts surrounding the human body in the era of artificial intelligence (AI). Through combined research on movement, dramaturgy, sound and technological engineering, each of the works in the cycle combines human bodies, robotic hardware, machine learning software and microorganisms into a particular ‘configuration’.

The prostheses of the 7 Configurations (2016-2019) embody uncanny combinations of the machinic with the organic. They are useless prostheses, paradoxical objects designed for the body, but not to enhance it, rather to subtract functions from it: Amygdala is a skin-cutting robot with a steel metal knife; Rei is a facial prosthesis which blocks the wearer’s gaze with a mechanical arm; C and B are two robotic spines that function as additional limbs without a body.

Created from scratch by Donnarumma in collaboration with designer Ana Rajcevic and engineer Christian Schmidts, the prostheses are first hand sculpted, then modelled in 3D software, 3D-printed, assembled and refined again by hand. Some of them are enveloped by bacterial biofilm cultured by Margherita Pevere. All robots are

offsprings of an initial template that is anatomically modified according to the specific needs of each artwork and performance where they are used.

The prostheses have been created to act as performers with their own agency, that is, to interact with their human partners without being controlled externally. Donnarumma, in fact, did not program the machines to perform predetermined movements. Instead, he designed their sensorimotor system and programmed the way it “perceives” the world. This technique, that builds on the research of the Neurorobotics Research Laboratory (DE), endows the machines with basic artificial cognitive and sensorimotor skills.

This is possible thanks to an architecture of biomimetic neural networks and machine learning algorithms. Inspired by biological nervous systems, biomimetic networks are information processing algorithms that are able to self-generate movement and alter the machines’ behaviour in response to real-time, sensory data. In this way, the machines perceive their own bodies in space, as well as the bodies of other human performers, and improvise movements in response to external stimuli, such as touch, pressure, pull and torsion. As they move, the prostheses learn about their partners and environment, constantly adapting and reacting to their surrounding.

Themes

Human biology
Neural network

Trans-humanism