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Machine Lab

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Artist Paper

Chico MacMurtrie is a contemporary artist and founder of Amorphic Robot Works (ARW), a collective that creates robotic sculptures and installations. His work explores the intersection of technology, biology, and art, often using robotics to create sculptures that move and respond to their surroundings. His installations have been exhibited in museums and galleries around the world, including the Whitney Museum of American Art, the Museum of Modern Art in New York, and the Venice Biennale. Some of MacMurtrie's notable works include "Border Crossers," a series of robotic sculptures that explore the themes of migration and displacement, and "Tree Whisperers," which features tree-like sculptures that respond to human touch and movement. We will be exploring MacMurtrie's creative process, how he makes things, and what plan of action he takes, and then we will explore in detail how he made the robots for his work "Border Crossers".

Chico MacMurtrie's creative process involves a combination of conceptualization, experimentation, and collaboration. He often begins by exploring a particular theme or concept and then develops ideas and sketches for potential artworks. Afterward, with his team Amorphic Robot Works, they experiment with different materials and technologies to bring these ideas to life. This process involves prototyping, testing, and refining their designs until they achieve the desired result. Collaboration is also an essential part of MacMurtrie's creative process. He frequently works with scientists, engineers, and other artists to develop his projects. This interdisciplinary approach allows him to incorporate diverse perspectives

and expertise into his work, resulting in a more complex and multifaceted final product. Sounds really similar to how we do things in Interactive Media. Moreover, MacMurtrie's creative process also involves a deep appreciation for the natural world and an interest in the relationship between humans and technology. His works often explore the boundaries between the organic and the synthetic, and the ways in which technology can both enhance and complicate our lives.

Now knowing his creative process let's look at the process of how one of his famous works Border Crossers which are robotic sculpture designed to highlight the human cost of border politics and to create a sense of empathy for those who are forced to cross borders in search of a better life. First, MacMurtrie and his team at Amorphic Robot Works created detailed designs for the sculptures, including their physical form and the movements they would make. They then built the structures for the robots using a combination of materials such as plastic for the joint mechanisms and other structural elements. Stretchy breathable fabric covers the pneumatic actuators and gives the robots a more lifelike appearance. Pneumatic tubing for pneumatic actuators which are connected to a network of flexible plastic tubing that carries compressed air and lastly foam padding and other cushioning materials to protect the components and create a more realistic appearance.

Next for controlling the movement they install and test a variety of sensors that include proximity sensors to detect the presence of objects or people nearby, and pressure sensors to detect changes in pressure, such as when the robots are touching the ground or when someone is touching their "skin." The robots use pressure sensors to adjust their movements based on the amount of pressure they detect. Infrared sensors for detecting infrared radiation, which can be used to detect heat sources or to determine the distance to an object in this case to detect the presence of people or other objects in their area. Accelerometers are also used to detect changes in their orientation or position and to adjust their movements accordingly and

finally, gyroscopes detect changes in rotational motion that the robots use to maintain their balance and to adjust their movements as they rotate.

The final stage of the process involved programming the robots to move in a coordinated way. This required extensive testing and calibration to ensure that the robots would move smoothly and in sync with one another. So, for this, a Control system allows the sensors and motors to connect with the programming of the software making all the parts come together and make the robot work. I couldn't get much information on how the control system works but from guessing and from some light information found online the control system uses a complex series of microcontrollers that allow it to take inputs and respond to certain sensor data. Looking at the robot would have a series of motor drivers and power supply components connected to different parts of the robot to appropriately respond to sensor data. One of the interesting things the robot uses is pneumatic control valves. The robots are powered by a system of pneumatic actuators as mentioned earlier, which are controlled by a network of valves that regulate the flow of compressed air. The valves are typically controlled by solenoids which are activated by the microcontrollers.

After prototyping and various iterations, the robots were complete and they have been exhibited in various locations, including at the United States-Mexico border. The goal of the sculpture is to highlight human cost, and border politics and raise the issue of the trouble migrants go through when trying to cross the border to search for a better life.