

Robotic arm shaped like an elephant's trunk (w/ Video)

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Image credit: Festo.

(PhysOrg.com) -- A German automation company has come up with a new design for a flexible robotic arm, taking inspiration from the trunk of an elephant.

Festo, based in Denkendorf in Germany, worked with the Fraunhofer Institute for Manufacturing Engineering and Automation in Stuttgart to design the [robotic arm](#), known as the "Bionic Handling Assistant," as a project of Festo's Bionic Learning Network. The arm was designed specifically to be safe when interacting with humans, which the company believes will make it useful in locations such as medical centers, [manufacturing](#) plants, mechanical repair workshops, schools, and in the home.

The trunk-like arm is made of soft, compliant segments that were

created from a polyamide using 3D printing technology, and is driven by a pneumatic system of tiny air chambers lining the interior of the arm. The air chambers are arranged in two rows and are inflated sequentially to provide the required movements. The arm is arranged in three segments to provide S-curve dexterity, and because the air chambers in the segments can be inflated separately, sections of the arm can be made to bend in opposite directions. The gripper is moved by means of air chambers in a fourth segment of the arm, known as the hand axis.

The arm has numerous resistance sensors that detect collisions and limit its movements when it senses contact, and this should make it safe for human interaction.

The gripper at the end of the arm has a novel shape consisting of three fin-shaped fingers constructed from compartments that collapse when the fingers enclose an object, trapping it. The FinGripper design means very little force is required to grasp objects, again reducing any risk of injury. The FinGripper is already being tested on production lines, and three different sizes are being developed, to handle objects from a grapefruit size down to hazelnut size.

The Bionic Handling Assistant has been nominated for an award in the Deutscher Zukunftspreis (German Future Award). Previous robots designed by the Bionic Learning Network include other examples of biomimicry such as penguins, jellyfish, aquatic rays and flying fins.

More information: www.festo.com/cms/en_corp/9617.htm

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