3D-PRINTED ROBOTIC HAND EXOSKELETON

TECNOLOGÍA PATENTADA

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RESUMEN

The group of **Engineering Design and Technological Development (DIDET)** from the ArtefactosLAB laboratory of the University of Alicante has developed a robotic hand exoskeleton to transmit movement to the user who has little or no movement due to neurological and/or physiological disorders. This device is manufactured with flexible material, breathable and resistant to liquids through a 3D printer and under some parameters of economic, environmental and social sustainability. The group is looking for companies or institutions interested in continuing this work of social innovation by developing the device or in designing and manufacturing new ones.

VENTAJAS Y ASPECTOS INNOVADORES

The present invention presents great advantages:

- The exoskeleton is manufactured in flat, obtaining a minimum thickness to make it as less bulky and more ergonomic as possible for the user. This flat shape also gives it great resistance.
- Ergonomic design, due to the type of flexible material used, adapting easily to the shape of the hand and fingers of the user.
- It allows the user to use the product, even if he or she lacks muscle tone or mobility.
- It can be operated with any functional muscle involved in the movement.
- The exoskeleton can be easily connected and disconnected from the electrical part according to the type of use, thus facilitating cleaning and hygiene without damaging this part.
- Low-cost materials are used and are accessible to everyone, saving a complex manufacturing process, which considerably reduces the cost of the assembly.
- The material is resistant to liquids so it is washable.
- The material is breathable, which facilitates its prolonged use and avoids problems of skin infections and bad smell from the skin.
- Its high durability allows for efficient and continuous use by the user.

INNOVATIVE ASPECTS OF TECHNOLOGY

Both the design and the manufacturing process of the exoskeleton have been optimized so that it can be produced using a 3D printer which, together with the use of three-dimensional models, has become an alternative manufacturing process to the conventional one. Its application within assistive technologies opens up endless possibilities to improve the quality of life of people with functional diversity due mainly to four factors:

- Low cost of materials and necessary equipment.
- Speed in manufacturing.
- Freedom of design that allows to approach the personal needs. This means that from a generic model of the exoskeleton, it can be scaled to a specific size, starting with the measurements of the user's hand and without the need for a new design.
- Manufacturing in any part of the world, giving the user or the professional rehabilitator the possibility of self-manufacturing and personalizing their own device, which also means savings in logistics and distribution.

In addition, this 3D printing allows the exoskeleton to be modular, that is, each part is printed separately and allows its subsequent coupling with

the others, thus achieving greater adaptability to the user.

APLICACIONES DE LA OFERTA

Fundamentally, it is aimed at the sector of assistive technologies and improving the quality of life of people. 3D printing is a technique that can be applied to meet any need, in any field, that a person may have. It is especially useful for those people with functional diversity with very personal problems in fields such as medicine, education, work or mobility.

COLABORACIÓN BUSCADA

From ArtefactosLAB, DIDET group is looking for companies or institutions interested in supporting the development of the exoskeleton or in the design and manufacture of other new devices with social purposes.