Tactile sensor for robotic arm

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Invention

Tactile sensor emulates the human sense of touch in sensing and locating a pressure over a large surface, reproducing human mechanoreceptors activity. The current patent includes the sensor manufacturing process, a robotic arm coated by this sensor, and a method for its operation. Modern robots show increased mobility and flexibility compared to traditional robots; additionally they are equipped with sensors. However, the tactile sensors available are unable to cover large curved surfaces, and do not provide adequate sensitivity. The present device overcomes these limitations: it can cover any type of surface (even large curved surfaces), and it detects contact point and pressure when a force is applied.

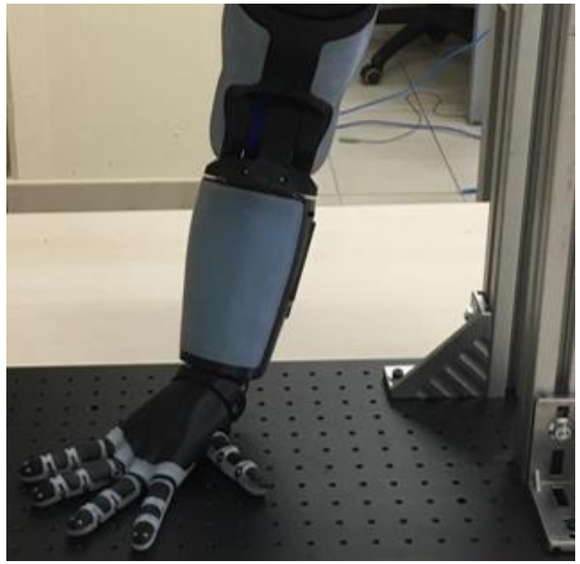
The tactile sensor consists of a silicone rubber coating with an optical fibre, which connects Fibre Bragg Grating (FBG) sensors following a continuous path.

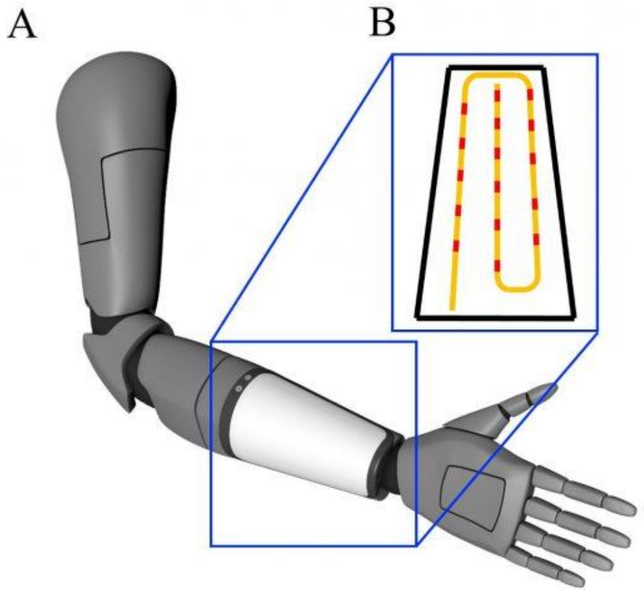
The coating, less than 10 mm thick, is subject to deformations when a force is applied. The stress generated is transferred to the FBG sensors, which in turns are translating this into optical signal, carried by the optical fibre. The use of FBG sensors facilitates the manufacturing process and at the same time ensures measurement repeatability and accuracy.

The technology, ready for pre-market certification, has been implemented on a robotic arm, fully designed by the research group, but it can be easily integrated on industrial robots with the aim to add sensorial capability.

Sapienza Università di Roma and Università Campus Bio-Medico di Roma are co-owners of the patent.

Drawings
& pictures





Industrial Applications

The tactile sensor, innovative for its lightness and adaptability to large curved surfaces, it can cover robotic prostheses and / or collaborative robotic arms, as an artificial skin. The system is flexible thanks to the use of a neural network methodology, and the use of a single optical fibre guarantees a high density of sensors, overcoming the wiring limitation.

Potential Evolutions

The invention has been implemented on a robotic arm, fully designed by the research group, but it can be easily integrated on industrial robots with the aim to add sensorial capability.

The technology is ready for the pre-market certification.

The research group is looking for industrial partners with interest to obtain the license of the current technology or industrial partnership in order to further develop the technology its technology readiness level.

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