Wearable active robot with sensor means for feedback control

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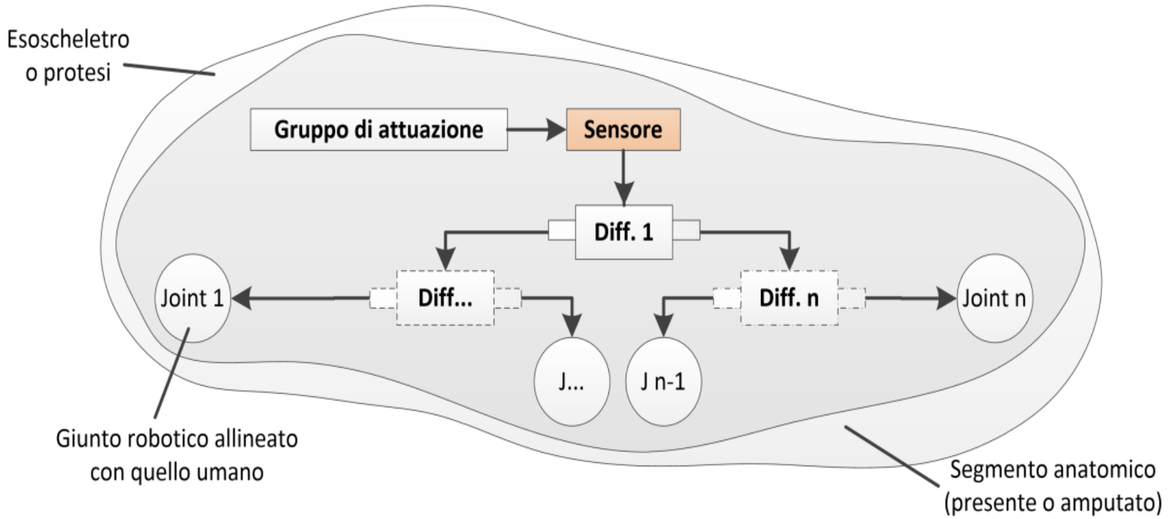
Invention

The new generations of exoskeletons are pushing more and more towards simple and functional solutions. There is a trade off between weight and footprint reduction and the ability to perform different tasks. The following invention is a torque transmission assembly for a wearable robot that allows a simplification of the mechanical transmission chain while maintaining, at the same time, a high functional reliability: in this way the weight is reduced while maintaining joint mobility.

The invention is characterized by torque sensors applied to a differential device used inside a wearable robot. In this way, in the event of external disturbance, such as a fall, a trip or a sudden action by the operator wearing the robot, the robot, thanks to the transmission unit and the dedicated control unit, perceives a difference between the absorbed torque and that delivered and reacts by correcting the torque delivered in order to compensate for the perceived deviation.

The invention can be integrated in a wearable active robot in which there are two articulated modules such as the joint between the pelvis and the hip, the knee, the ankle, the elbow, but also in which there are more than two modules, as in the case of a polyarticulate kinematics such as an exoskeleton for the spine.

Drawings & pictures



Industrial applicability

The device has undoubted advantages that favor industrial applications: it is a light and compact robot, minimally bulky. The transmission unit allows two or more articulated structures of the robot to be controlled simultaneously starting from a single motion output and can also be applied to non-wearable robots or other types of machines:

- Wearable robotics
- Rehabilitation
- Robotics
- Assistive robotics
- Prosthetics
- Orthosis

Possible developments

The research group is interested in obtaining industrial collaborations aimed at increasing the technological maturity of the present invention or industrial partners interested in taking the license of the technology object of this patent.

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