



PROSTHESIS Biomimetic ankle-foot prosthesis with extensive sensing capabilities

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TRL scale



What's needed for?

The object of the patent is an active bioinspired ankle and foot prosthesis aimed to improve the quality of life of its user by significantly reducing the gap between biological and artificial limb.

In fact, the design of this prosthetic device closely mimicks the most important structural elements and functional features of the biological counterpart, therefore reducing the onset of compensatory actions that typically occur in prosthetic device users. This leads to a device with improved terrain adaptation capability and energetic efficiency compared to modern commercial prostheses.

Moreover, the many sensors integrated in the design allow the knowledge in real-time of the state of the entire foot, unlocking huge potentials in terms of active control capability and feedbacks to the user.

Advantages

- Biomimetic design to reduce the onset of compensatory actions
- Superior terrain adaptation thanks to its biomimetic structure
- High energetic efficiency due to biological-like energy recycling mechanisms
- Usable both in «active» and in «passive» mode to extend autonomy indefinitely
- Extensive sensory system for control purposes and/or to give feedbacks to the users

Applications

- Prosthetic device for amputees
- Clinical tool to improve amputees walking strategy
- Research tool to perform parametric studies on gait biomechanics
- Use as instrumented foot to evaluate objectively footwear *in-vitro*