

# Power and Gait-assisting Footwears

Health & Wellness

Consumer Electronics

Energy Conservation/Generation/Management/Storage (Battery)

**A**



**IP Status**  
Patent filed

Technology Readiness Level (TRL) ?

4

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**B**

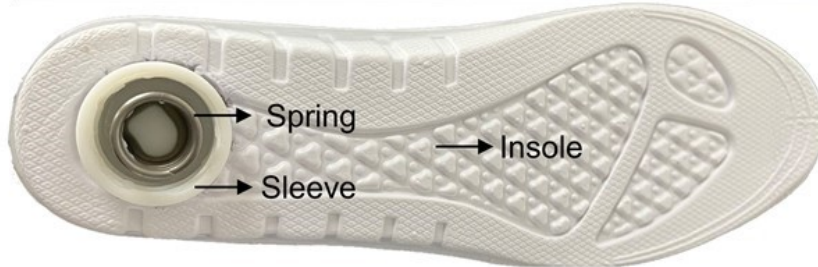


Figure 1. Photo of Gait-assisting Footwears

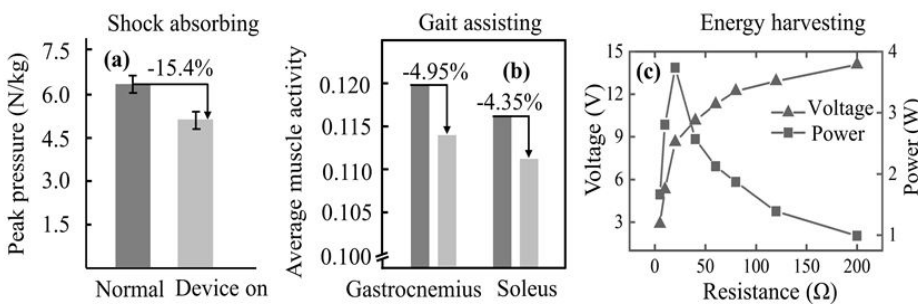


Figure 2. Outstanding performance of the gait-assisting footwears

## Opportunity

Due to the strong market demand for human augmented-locomotion devices, a lot of wearable exoskeletons have been developed. Recent advancements in energy harvesting and gait assisting devices have

Follow-on Funding

Build Value

Develop concept

Proof Concept

significantly improved the energy economy of human walking with passive and active mechanisms. For biomechanical energy harvesting, the major energy conversion methods include the electromagnetic effect, the triboelectric effect and the piezoelectric effect. For the gait assisting protocols, improving the energy economy of walking through reducing muscle force is the mainstream. The present disclosure sets forth walking assistance devices for improving the energy economy of human walking as well as harvesting the energy by naturally harnessing the collisional energy during the touchdown moment.

## Technology

The device is composed of five main components: one internal threaded sleeve, one gearbox, one spring, one three-phase generator, and one limit frame. The limit frame fixes the device in the shoes' heel. The gait assisting protocol is from wearing the device that operates in three modes: 1) absorb the shock force and protect the heel against the excessive load caused by the touchdown moment through a gait cycle; 2) assist the gastrocnemius and soleus generate force for the heel-up moment; 3) capture the impact energy during the touchdown period. The energy harvesting function is by electricity generated by the person walking using collisional force on the coiled spring. The AC power generated by the energy harvester is transmitted to the power management circuit and stored in an energy storage module (i.e., battery or supercapacitor).

## Advantages

- Compared to the existing devices, this invention offers a natural way of movement and the collisional force that is used is more predictable and consistent in way of energy harvesting. It has a small footprint and weight is light. It is cost effective and easier to manufacture.

## Applications

- Energy harvesting while walking to power other wearables and mobile devices like watches, phones etc.
- Provides gait assistance, saving energy while walking.

