

# Design of Knee Joint Support Suit with Fabric-type Artificial Muscles

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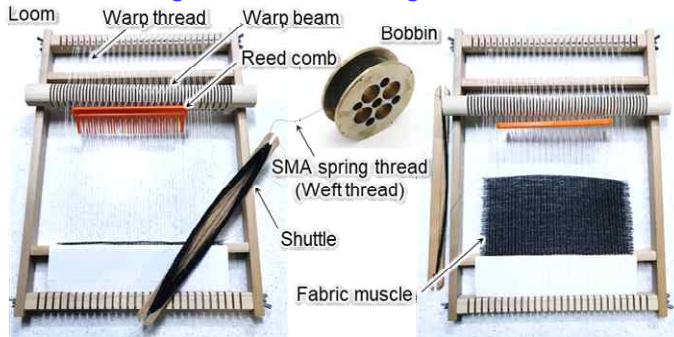
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## Introduction

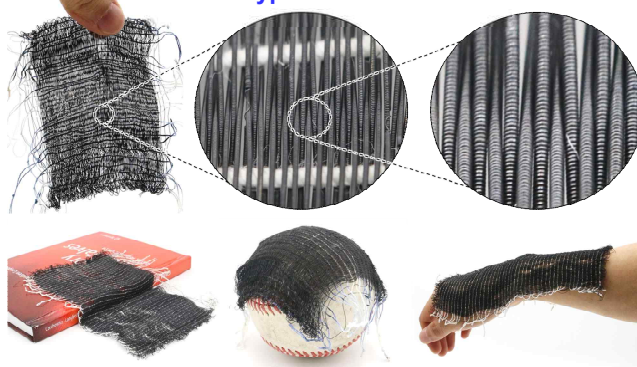
- As aging population rapidly increase and the number of elderly individuals living alone rises, there is a great deal of interest in the development of wearable robots that can assist in their mobility
- Elderly individuals are prone to frequent falls due to insufficient muscle strength in their knees
- To prevent this, wearable robots that can assist knee joint strength are necessary → They must be as lightweight as pants to ensure that elderly people can comfortably wear wearable robots in their daily lives
- In this study, we introduce a **knee joint support suit** applying **shape memory alloy-based fabric-type artificial muscles (fabric muscles)** that can generate a actuating force of 10 kgf with a light weight mass of 10 g

## Shape memory alloy spring-based fabric-type artificial muscle

### Weaving fabric muscle using a small loom



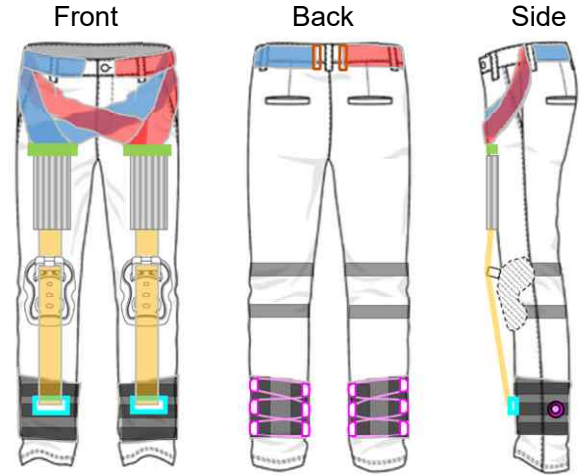
### Fabric-type artificial muscle



A fabric muscle weight of 10 g  
can lift a weight of 10 kg



## Design of knee joint support suit



## Configuration of the knee joint support suit



## Attaching the fabric muscle using a zipper



## Conclusion

- The developed knee joint assist suit has the advantage of being easy to put on and take off due to its structure similar to everyday clothing, and it is lightweight and comfortable to wear.
- We plan to improve its performance through the evaluation of the assist effect of the suit in the future.