# Proposal for Special Session at IEEE CASE 2022

**Goal:**

In the past decades, as the global aging level has intensified, the research of rehabilitation-assisted robots has become a vital way in solving problems such as the shortage of medical resources and insufficient medical care workers. Sensing, control, and evaluation are the most critical components in the rehabilitation-assisted robot. In recent years, relying on highly developed sensor technology, control law and machine learning methods, scholars have achieved breakthroughs in sensing, control and evaluation techniques of human assisted robots and applied them to actual clinical rehabilitation.

This special session focuses on current and emerging topics in sensing, control and evaluation of the human assisted robot. In particular, the following four topics are mostly welcomed:

1) Sensing integrated innovation: how to realize the high-precision, high-dimensional, high real-time and portable perception of kinematics and dynamics data of human assisted robot system through corresponding model prediction and data-driven methods.

2) Clinical evaluation mode: Combining the latest machine learning processing methods and the knowledge system of clinical experts to realize the clinical evaluation results.

3) Human-adapted control: Combined with the latest control laws, design a control method suitable for human assisted robots, which can achieve high real-time precise control and significantly reduce the risk of harming humans.

4) Individualized plan design: Through intelligent sensing, control, and evaluation technology, realize the rehabilitation strategy design suitable for different people in the whole cycle.

This special session is closely related to the topic "Sensor-fusion for intelligent automation systems" and "Smart and connected healthcare automation" of CASE 2022.

**Session Title:** [Sensing, control, and evaluation of human assistive robots]

**Organizers:**

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**Contributions:**

1. ***"Research on Humanoid End-effector Weak Link Upper-limb Training Rehabilitation Robot" by Bin Zhang/Tao Liu***
2. ***"Design, Control, and Verification of a Foot Arch Exoskeleton Based on Windlass-Spring Model" by Chenhao Liu/Long He***
3. ***"Attention Based Networks for Learning of Human Motion Intent Using Microneedle Array EMG Sensors" by Weibo Wang/Wei Dong***
4. ***"Gait quantification and diagnosis for movement disorders" by Xiangzhi Liu/ João P. Ferreira***
5. ***"Optimization of the Control Scheme for Human Extremity Exoskeleton by BP Neural Network Algorithm" by Xiaorong Guang***