2021 NSF CYBER-PHYSICAL SYSTEMS PRINCIPAL INVESTIGATORS' MEETING

CPS: Medium: Collaborative Research: User and Environment Interactive Planning and Control of Artificial Lower Limbs for Resilient Locomotion

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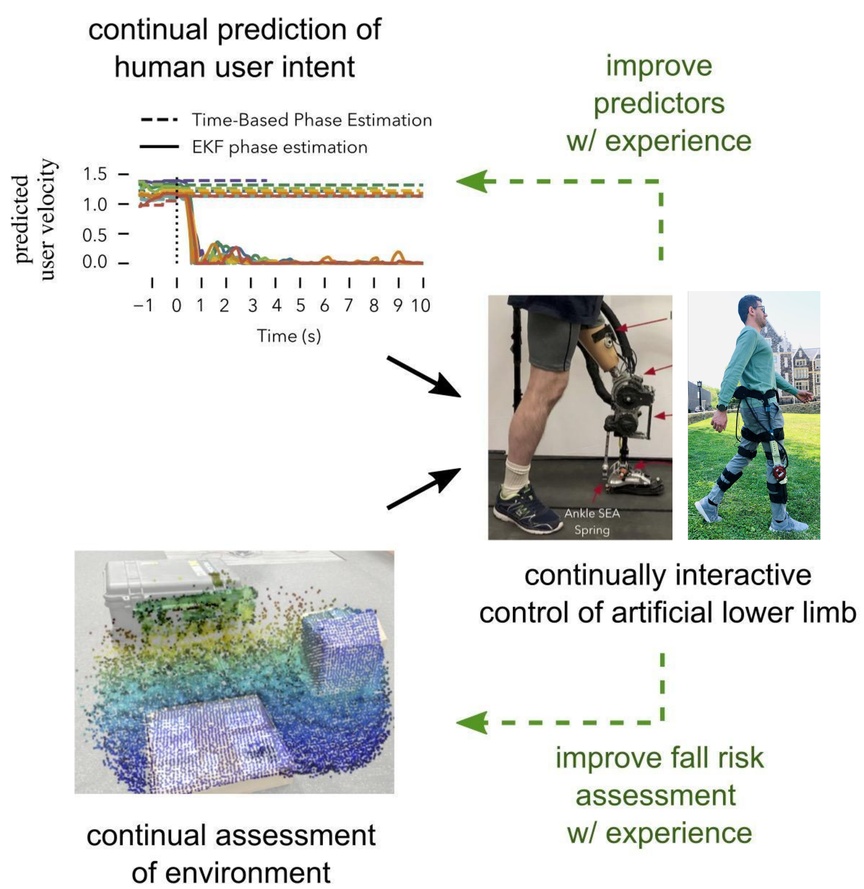
Challenge:

Powered leg prostheses and exoskeletons currently limited to predefined motions, which makes even normal gait difficult to master for their human users.

Solution:

Break away from predefined motions and shift control paradigm to cyber-physical approach:

Artificial limbs using rich sensory information to continually reason about and adapt their behavior to both the user and the environment with the goal of achieving stability, robustness, and versatility of legged mobility.



Scientific Impact:

Contributions to scientific foundation and related enabling technologies for addressing challenges of CPS core research in control, design, and human-in-the-loop systems.

Potential to change safety, resilience, and adaptability of healthcare CPS into a new, highly dynamic paradigm.

Broader Impact:

Intelligent artificial limbs with situational awareness and intervention could improve mobility of people who depend on artificial limbs for mobility and rehabilitation.

Application areas further include mobility aids for older adults and for the workforce in healthcare, manufacturing and logistics.

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