

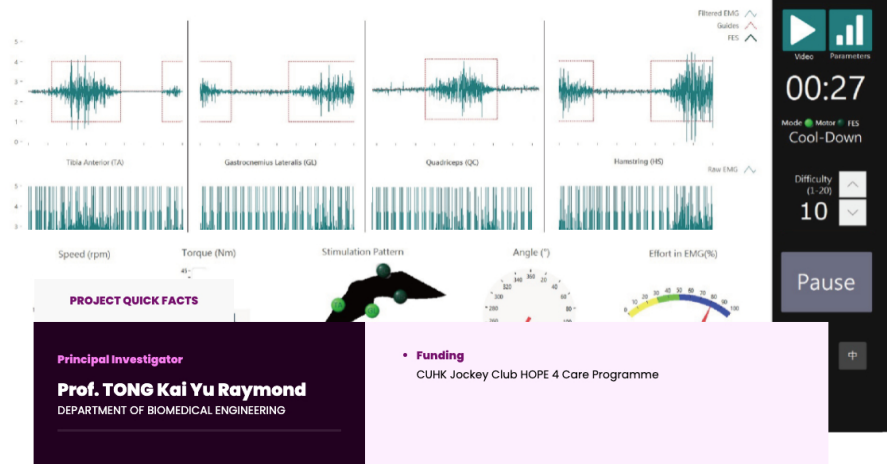


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Interactive Cycling System with Neuromuscular Electrical Stimulation for Lower Limb Rehabilitation

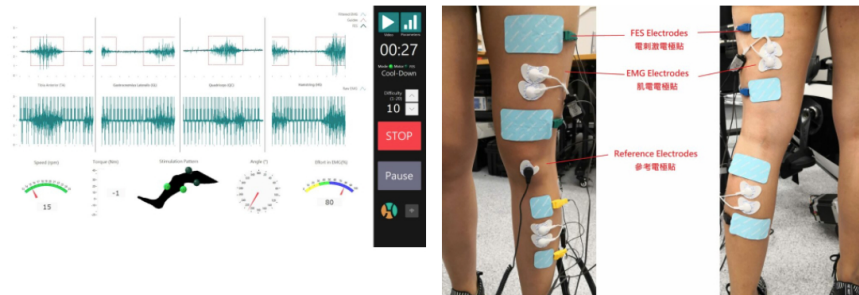
#Medicine #Healthcare #Rehabilitation



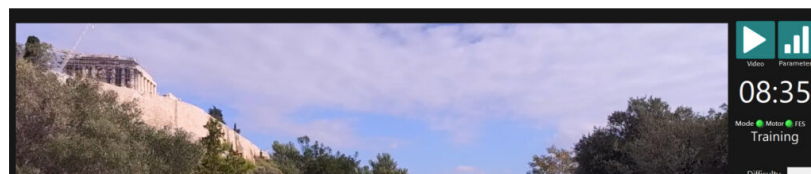
Our Neuro-Muscular Electrical Stimulation (NMES), motor-assisted cycling system is designed for persons recovering from stroke or other lower limb functional disabilities. Electromyographic (EMG) signals collected on the surfaces of four lower limb muscles (i.e. Quadriceps, Hamstring, Gastrocnemius, and Tibialis Anterior) are used to modulate the cycling speed and neuro-muscular electrical stimulation intensity through a closed-loop control system, in which the adjustment will be based on quality of the user's muscle contraction patterns. The system could facilitate motor and brain re-learning for the recovery of motor function.

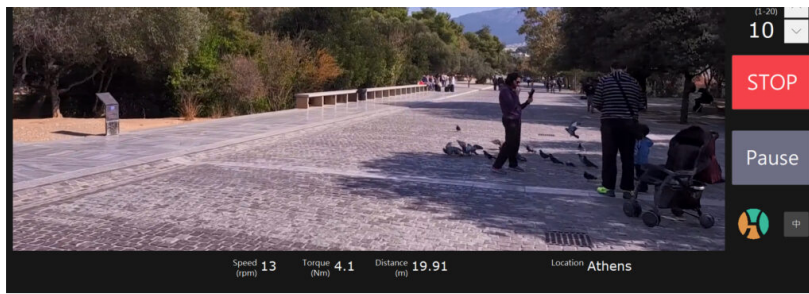
Uniqueness and Competitive Advantages:

- Real-time algorithms are used to determine whether the targeted lower limb muscles are activated by the user's voluntary intention at the correct cycling phase.
- Users with different muscle strengths and qualities can use our NMES cycling system, as EMG thresholds and maximum stimulation intensities are both individually adjusted.
- Therapists can choose any combination of the four lower limb muscles that requires active participation during the rehabilitative training.
- Smart filtering and data processing algorithms within our closed-loop control are used to remove stimulation artifacts and to improve surface EMG signal quality.
- More than 50 scenery videos from 29 different countries are provided, and the video speed can be modulated with the cycling speed to enhance user experience.
- Currently in use in 7 elderly/rehabilitation centres, and will be expanded to 14 in 2020



Electromyographic (EMG) signals collected on the surfaces of four lower limb muscles





50 scenery videos from 29 different countries are provided



Neuro-Muscular Electrical Stimulation (NMES) motor-assisted cycling system

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