Faculty of Engineering
Summer Research Program 2020-2021

Project Title: Take a Motion Snack with a Robot
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Objective
Develop, implement and test a robotic system that prompts users to take “motion snacks” (short periods of low-intensity physical activity) throughout the day. The developed system should interactively learn how to make such suggestions so as to increase the likelihood of the user’s taking part of these motion periods.

Project Details
Excessive sitting behaviour is a risk factor for many adverse health conditions. Coupled with an increase in the time we spend in environments and activities that limit or require little physical activity, as a population, we are currently at a higher risk of developing chronic health conditions such as cardiovascular diseases, musculoskeletal disorders, obesity, depression, and anxiety among others.

Recently, it has been reported that active rest bouts between prolonged sitting are beneficially associated with a decrease in risk indices such as waist circumference, body mass index, and triglyceride levels. However, despite the known benefits of an increase in physical activity throughout the day, many adults fail to meet the general guideline of no more than 30 min. of uninterrupted sitting.

Recent studies have shown promising results on how AI-based systems can help us to make and sustain lifestyle modifications such as a change in diet or an increase in the amount of light-to-moderate physical activity done during the day.

Inspired by these results, in this project, we wish to develop a first version of a robot companion/assistant that prompts users to take multiple active rest bouts or “motion snacks” throughout the day. To do so, we will employ adaptive and incremental learning methods to design an algorithm that will help the robot to decide when and how to propose a motion snack to the user so as to increase the likelihood of the user’s acceptance.

Prerequisites
Required skills:
   - Python; practical knowledge of reinforcement learning algorithms

Preferred skills:
   - ROS; Experience working with robots