E-Sports, Mobility, and Adaptive Sports

E-Sports

Summary
E-sports is rapidly becoming one of the most watched sports in the world and is particularly inclusive because people of all ability levels can compete on the same playing field. The goal of this stream of the Mount Sinai Health Hackathon would be to develop technologies that can enhance the ability of an adaptive eSports athlete to perform in a competitive environment against able-bodied opponents.

Background
Competitive video gaming, also known as eSports, is the fastest growing sport on the planet. In 2018, there were 258 million unique viewers globally, and that number is growing every day. In collaboration with partners such as Red Bull High Performance, the Brooklyn Nets and Logitech, the Abilities Research Center at Mount Sinai has become a leading authority in eSports science, working with some of the most prominent eSports athletes in the world. Unlike traditional sports, eSports is unique in that individuals with spinal cord injury can not only compete in eSports, but can compete on the same level as their able-bodied colleagues.

In the world of adaptive sports, there have traditionally been very few, if any, enjoyable options that are appropriate for tetraplegic individuals. The purpose of this project is to show individuals with high level spinal cord injury that there are indeed options that are relatively low-cost, highly social and enjoyable and competitive. In addition, members of the eSports community are notoriously passionate about attending eSports events and competitions (held at major stadiums such as Barclays) and streaming their gameplay online on Twitch (a social media network with hundreds of millions of contributors).

Key Examples
Using facial recognition technology such as the Apple facial tracking API to create independent control systems for gaming consoles that can give people with severe paralysis the ability to enact videogame actions with facial expressions

Using available speech recognition tools such as the IBM Watson speech recognition toolkit to develop a range of speech-operated commands to make the gaming experience more efficient for people with physical impairments.
Developing an AI-driven “adaptive eSports setup Wizard” that allows people with different impairments to input their specific impairment level (e.g. C5 spinal cord injury or right hemiplegia) and for the setup wizard to suggest an optimal adaptive console setup for the person to maximize their gaming capabilities.

**Mobility and Adaptive Sports**

*Summary*

There is currently a largely unmet potential for AI-driven technology to improve mobility and participation in many recreational activities for people living with paralysis or other loss of motor function. The purpose of this track will be to use AI to enhance participation in a variety of daily and recreational activities for this large population.

*Background*

The Christopher and Dana Reeve Foundation estimate that 1 in 50 Americans live with some form of paralysis that interferes with their ability to engage in many different activities. For these millions of Americans there is great potential for AI to enhance existing mobility solutions, opportunity to engage in adaptive recreational activities and overall quality of life. Adaptive sports have a massive impact on the lives of people with disabilities by decreasing social isolation, while encouraging physical activity and physical fitness in a population of people who may not have been aware of the full extent of exercise options that were available to them. However, full participation in adaptive sports can be challenging for many participants because customizations are often needed to personalize equipment to specific impairments between users. This can become expensive, making many adaptive sports and mobility solutions inaccessible. Advances in AI technology has created the potential to significantly reduce the cost of developing and deploying many customized mobility and adaptive sports technologies.

*Key Examples*

Speech operated systems such as Alexa have recently been recognized as powerful tools for improving in home accessibility and mobility. However, many people recovering from stroke, spinal cord injury and traumatic brain injury suffer from slurred speech (dysarthria) that can make their voice commands difficult to understand. To date, no solutions exist that allow people with dysarthria to reliably use voice recognition technology. Using available speech recognition tools such as IBM Watson, we propose an AI-driven training program that will allow people with dysarthria to use tools such as Alexa.