

SEMINAR REPORT

ABSTRACT

CUSTOM PERFORMANCE PATHS FOR OLDER ADULTS : ROBOT EXERCISE FOR OLDER ADULTS

Physical activities have tremendous benefit to older adults. A report from the World Health Organization has mentioned that lack of physical activity contributed to around 3.2 million premature deaths annually worldwide. Research also shows that regular exercise helps the older adults by improving their physical fitness, immune system, sleep and stress levels, not to mention the countless health problems it reduces such as diabetes, cardiovascular disease, dementia, obesity, joint pains, etc. The research reported in this paper is introducing a Socially Assistive Robot (SAR) that will engage, coach, assess and motivate the older adults in physical exercises that are recommended by the National Health Services (NHS) in the UK. With the rise in the population of older adults, which is expected to triple by 2050, this SAR will aim to improve the quality of life for a significant proportion of the population. To assess the proposed robot exercise trainer, user's observational evaluation with 17 participants is conducted. Participants are generally happy with the proposed platform as a mean of encouraging them to do regular exercise correctly.

There are needs for exercise training instructors. Having a human instructor for each elderly person is not feasible due to the increase in the population of older adults. A possible solution for this limitation is to have a Socially Assistive Robot (SAR) that engages older adults in the needed physical activity and also coaches and motivates them while providing performance assessment. A formal definition is provided in.

The aim of the research reported in this paper is to investigate the most effective and safest physical activity (with affordable cost) for elderly people, and implement an assistive robot that will engage older adults in the proposed exercises in both sitting and standing positions. This will be achieved by asking participants to mimic the robot, by assessing their performance and providing both visual and

audio feedback with facial expressions, motivational words and praise depending on the user's performance. Effectiveness of the new system is evaluated by running a test with users and collecting feedback.

Advantages of using robots for fitness for older adults:

1. Improved Motivation: Older adults may find it easier to stay motivated to exercise with the help of a robot.
2. Increased Safety: Robots can help reduce the risk of falls or other accidents, making exercise safer for older adults.
3. Personalized Workouts: Robots can provide customized and adaptive workouts, tailored to the individual's fitness level, abilities, and goals.
4. Convenient and Accessible: Robots can make exercise more convenient, as they can be used in the comfort of one's home, without the need for transportation or a gym membership.
5. Enhanced Monitoring: Robots can monitor and track progress, providing real-time feedback, and helping to avoid injury.
6. Reduced Loneliness: Robots can provide social interaction, reducing feelings of loneliness, and promoting engagement and well-being.

Disadvantages of using robots for fitness for older adults:

1. Cost: Robots used for fitness can be expensive, making them difficult for older adults with limited financial resources to afford.
2. Complexity: Older adults may find it difficult to operate and use complex robotics equipment, leading to frustration and decreased motivation to engage in physical activity.

3. Inflexibility: Robots may not be able to adapt to an individual's changing fitness needs or accommodate physical limitations, such as limited mobility or joint pain.
4. Isolation: Robots can lack the social aspect of exercising with a partner or in a group setting, which can be important for older adults.
5. Safety concerns: Older adults may be at a higher risk for injury when using robots due to their limited physical abilities, lack of stability, or difficulty in adjusting settings.
6. Limited accessibility: Robots may not be widely available, especially in rural or remote areas, which can make it difficult for older adults to access them.