Shanee Honig:

Intuitive ways to instruct a social assistive robot: a study of natural interaction with elderly people
Shanee Honig, Vardit Sarne-Fleischmann, Yael Edan and Tal Oron-Gilad
Presented at: Robots for Assisted Living Workshop, 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems, Madrid, Spain

Robots designed to support elderly people need to be able to recognize user intentions and operate accordingly. However, little is known about the intuitiveness of commands used to help older adults control a social assistive robot's movement. We examined which voice commands and/or hand gestures elderly people select to guide the motions of a robot. Twelve elders aged 69-78 participated in this 2-part study. The first part of the experiment implicitly elicited user commands in a simulated grocery store environment. In the second part, participants were explicitly asked to guide the robot to perform different navigational commands. The data was analyzed to consider age-related differences relative to previous experiments with younger adults, and differences between implicitly and explicitly selected communication forms. Results indicated that elderly people vary more in how they choose to instruct the robot than younger individuals. Implicitly used communication means were significantly different than explicitly selected ones, suggesting that elderly people may be unable to predict the hand gestures and voice commands that they are likely to use with a robot. Emerging patterns in how elderly participants guide a mobile social assistive robot could act as a baseline for future development of a natural, user-friendly aural and gesture vocabulary that is suitable for older users.

A User-Needs based Approach for Designing Human-Robot Interactions
Shanee Honig, Tal Oron-Gilad, Vardit Fleischmann-Serna, Samuel Olatunji and Yael Edan
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To guide the design of safe and comfortable human-robot interactions, a user-needs layered design framework is proposed. The framework, based on the Hedonomic Pyramid, provides a systematic way to incorporate social considerations in the design of robots. While we have shown that this framework is highly relevant to the design of a robot's person-following behavior, here we argue that it is also relevant to other aspects of human-robot interaction. The usefulness of the framework to the design of a robotic assistant is exemplified through a case study.

Polina Kurtser:

The Use of Dynamic Sensing Strategies to Improve Detection for a Pepper Harvesting Robot
Polina Kurtser, Yael Edan

This paper presents a dynamic sensing algorithm for a harvesting robot to improve detection that is currently limited in performance. The algorithm decides if an additional viewpoint is needed and recommends its location based on the predicted profitability of such an action. The suggestion of a possible additional viewpoint is based on image analysis for fruit and occlusion level detection, prediction of the expected number of additional targets sensed from that viewpoint, and final decision if choosing the additional viewpoint is beneficial. Applying the algorithm on 96 greenhouse images of 30 sweet peppers resulted in up to 19% improved detection. The harvesting utility cost function decreased by up to 10% compared to the conventional single viewpoint strategy. This research was held as part of the Horizon 2020 project SWEEPER.

Lili Sror:

Low-cost virtual reality system with passive arm support for stroke rehabilitation
Lili Sror, Shelly Levy- Tzedek, Mindy F. Levin and Sigal Berman, Senior Member, IEEE

Stroke is a leading cause of long-term sensorimotor deficits in upper limb function. Yet, current upper limb interventions have limited effectiveness. Multiple efforts have been initiated for augmenting intervention with advanced technology, yet high system costs limit access to the technology. Planar movements constitute an important sub- set of motions that need to be retrained following stroke. The current paper describes the development of a low cost, virtual reality system with a supporting passive manipulator, suitable for training arm movement in the horizontal plane. To increase tracking accuracy, the system integrates two 3D cameras: a Kinect and a Leap Motion. A camera reference-frame calibration algorithm is presented.

Vesna Poprcova:

Event: International PhD Conference on Safe and Social Robotics (SSR-2018) 29-30 September 2018 Madrid, Spain

Title: Body motion properties as indicators of depression in elderly

Abstract: Depression is a common mood disorder that is rapidly affecting lives of elderly worldwide. The detection of depression, however, is an issue because the common methods are subjective and depend of patient self-reports. Automated recognition may, therefore, be beneficial. This paper examines the possibility of using body motion properties as potential indicators of depression in elderly, and proposes an experimental method to assess the validity of such measures.

Samuel Olatunji:

User preferences for socially acceptable person-following robots: environmental influence case studies
Olatunji Samuel, Fleischmann-Serna Vardit, Honig S. Shanee, Zaichyk Hanan, Tamara Markovich, Oron-Gilad Tal, Edan Yael

Person-following is an important aspect in many service robotic applications whilst supporting a person in performing daily tasks. Few studies have actively worked towards making person-following behaviour usable, pleasurable or personal. As such, user studies are essential for promoting the interaction design, and increase user satisfaction and acceptance. A specific experimental setup for studying of socially acceptable person-following preferences and algorithmic design is presented here. In six user studies (171 participants in total) following-related factors were examined, of those, two related to environmental influence are specified here. Objective and subjective measurement of the quality of the interaction and user satisfaction were taken. Results and implications are discussed

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Increasing the Understanding between a Dining Table Robot Assistant and the User
Samuel Olatunji, Tal Oron-Gilad, Yael Edan

This study is a preparatory stage of a larger study intended to increase the understanding between a dining table robot assistant and the user. The users are expected to be older adults who need assistance in their daily lives but the study begins with investigating the level of understanding with younger adults with the intention of comparing the interaction with older adults in further studies. The aim of the experiment is to identify the most appropriate mode of communication from the robot which will convey the state of the interaction between the user and the non-humanoid robot. The results of the present study reveal that voice feedback from the robot aids better understanding of the state of interaction compared to visual feedback in the absence of background noise while the visual feedback aids better understanding in the presence of noise. Even though most of the users had an opaque understanding of the interaction with the robot while using the voice feedback mode, the results point to the possibility of obtaining better understanding if both feedback modes are combined, to highlight the advantage of each modality, and the content of the information provided is improved. The study is the initial step towards a design framework for improving the understanding between a socially assistive robot (such as a table setting robot) and the user.

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