Subjective Experience of Interacting with a Social Robot at a Danish Airport

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Introduction This paper investigates the subjective experience of interacting with a social robot at Aalborg Airport (AAL) by conducting an ecological field study and a scaling test. The purpose of the field study was to develop scales based on Danish travellers' own words and observational data. The scale test had the purpose of using and testing the scales developed from the field study. The idea behind the scales is that the scales will help robot designers to design their robot for different use cases and target groups. The paper consist of two parts, one for each of the to tests.

Methods and Proposals In both test the travellers were recruited by a remote controlled robot from Double Robotics, Inc., which had an iPad with an interface asking if it may help the travellers with wayfinding at AAL. When the subjects had chosen the desired location they were kindly asked to follow the robot. In the first test the robot led them to a semi-structured interview about their experience with the robot. The behaviour of the subjects was observed throughout the interaction with the robot and the interview. In the second test the physical parameters height, distance to subject, and angle of approach were altered throughout the study in order to be able to test the scales. When subjects started following the robot they were stopped and asked to evaluate the robot and the interaction with it on the 24 scales develop from the previous study.

Results - Elicitation of Parameters The observations and the 30 subjects' statements were interpreted and coded using an affinity diagram. 567 affinity notes were sorted by a bottom-up procedure into ten categories which roughly revolved around appearance, trust, behaviour, approach, problems with touch screen, avoidance of interaction, personal interest, positivity towards the robot, usability for people, and tech-experience. Variables were formulated as scale questions and labels for the scales for each of the ten categories. A Visual Analogue Scale (VAS) with closed endpoints was used for the scale presentation. In total 24 scales were developed, 11 scales were unipolar and 13 were bipolar. On the bipolar scales a midpoint was added on two of the midpoint the label "fine" were added.

Results - Scale Testing In total 43 subject participated and answered the scales. The results of the scale testing showed varied use of the 24 different scales. The scale responses were analysed with Principal Component Analysis (PCA) with groupings relating to the robots height, distance from subject, and direction of approach. Within the group *height* four pairs of positive correlation and five negative correlations were found. Within the group *distance* there were also found four pairs of positive correlation were found and six negative correlations were found. Within the group *direction* three pairs of positive correlation and five negative correlations were found.

Discussion The results presented in this study probably needs further validation given that they were collected on a small sample size. The affinity diagram was based on observational data from 30 people and their statements and the principal component analysis were based on 43 subjects. Even though correlation is found it might be useful to test the reliability of the scale items. Overall the subjects who participated were very fond of technology which might have biased their scale responses. Further, the mid label "fine " should be reconsidered due to the small variation in the scale responses. Perhaps the label "fine" is to broad and does not represent a fitting mid-point.

References

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