Experiential and Contextual Factors of Social Robots as Public Servants

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ABSTRACT

Social robots have the potential to augment public services and reduce staff's workload by taking on simple and repetitive tasks, while maintaining the valuable social interaction experience. Contexts with a continuous flow of new customers and short interactions place high demands on the robot's capability to create a positive experience and adapt to the range of potential users. Our current research focuses on three contexts in which a social robot Pepper is trialed as a public servant: working in the customer service at municipal service points of a medium-sized city, assisting newly arrived university students, and guiding seminar participants. This paper outlines our approach in investigating user expectations, experiences, and influential contextual factors in the deployment of social robots in public services.

Author Keywords

Social robots; public services; customer service; user experience; contextual factors; interaction design.

INTRODUCTION

Service automation can ideally increase customer satisfaction by providing a fast, flexible service experience [1,2]. Social robots form a new generation of service channels that can complement and even partially replace existing in-person and electronic channels [3]. While perceived ease of use and usefulness of technologies are key factors in the acceptance of self-service technologies [4], the experience of social presence and interaction will continue to be important in terms of satisfaction with the service [5]. Hence, designing suitable personality, identity and behavior for the robot, fitting the context it will work in, is crucial for development of social robots that will provide practical benefits in real-world settings [6].

User experience (UX) with a social robot is created by the interplay of expectations, interaction with the robot, and

contextual factors [7]. For instance, the customer's orientation may be towards a communal or an exchange relationship, which influences the emphasis the robot should put on conveying warmth or competence [5]. Initial frameworks for analyzing and designing user experience with social robots in public services have been created [5,6], but more work is needed to develop and evaluate experience goals for social robots in the role of public servants in various task, social, physical, temporal, technical, cultural, and business contexts [7].

In this position paper, we outline our ongoing research on the experiential and contextual factors of social robots in three public service contexts and target groups: customers at a city service point, newly arrived international students at a university, and participants of a seminar.

METHODS AND CONTEXT

In our studies, we are using SoftBank Robotics' Pepper robot[1] to augment customer service in public settings (Figure 1). Pepper is a 1.2m tall humanoid robot with wheels for moving around, ability to speak and understand multiple languages, arms for gesturing and eyes with LEDs for expressing emotional reactions, and a tablet on its chest for content delivery and another interaction modality.

In each study, we follow a common methodology in the design and evaluation process. We start the study with a contextual inquiry phase involving observations, interviews and surveys (e.g. Robot Attitudes Scale [8]) at the target context. Using a participatory approach, we iteratively develop the applications for Pepper in collaboration with relevant stakeholders and target group representatives, and pilot test the functionality before embarking on the study in an authentic real-world setting.

In our field trials, we observe various contextual factors and people's attitudes and interaction with the robot. Our focus is especially on the expressions of positive and negative user experiences. We obtain interviews from participants afterwards. We also log users' interactions with Pepper and Pepper's interpretations of what it hears (via speech recognition engine) for a deeper analysis of users' behavior and challenges in interaction design. In addition, we interview staff members to collect information about their views towards a new robotic co-worker.

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[1] https://www.softbankrobotics.com/emea/en/robots/pepper

Figure 1: The robot platform and study settings. Pepper robot (left), Frenckell service point (center), Pepper offering assistance to passers-by at Tampere University of Technology (right).

THREE STUDY CONTEXTS

Context 1: City customer service point

The Frenckell service point is located at the center of Tampere, a medium-sized city in Finland. Frenckell provides a variety of services, such as public transport, housing related issues, permits, event information, parking control, and urban planning. Pepper's primary tasks will be welcoming, guidance, and edutainment for customers. We aim to carry out 2-3 field trials during the year to study the impact of customers' and staff's temporal and task context.

Context 2: University

At Tampere University of Technology, around 1,700 foreign nationals pursue studies or work at the university. Newly arrived international students often face challenges: finding places, understanding the university practices, making friends. Pepper's task will be to provide help and assistance for new students to make this adjustment period easier. We are currently carrying out interviews with international students from different cultures, and aim to conduct field trials at the beginning of the new semester.

Context 3: Seminars

Seminars are frequently arranged on the university campus, attracting national and international participants. We collaborate with the national Virpa-D project to study how to design a social robot to give participants of a seminar a seamless, positive experience. This study also examines the optimal design of public spaces with robotic presence.

EXPECTED OUTCOMES

Our research aims to identify the essential experiences and contextual factors in the deployment of a social robot to a public service context. First, all studies contribute to discovering relevant UX goals for human-robot interaction [7], which can be utilized in experience-driven design [9] of social robots. We expect to gain insight into hedonic and pragmatic experiences, differences between first encounters with a robot vs. repeated interaction, and needs for customer-specific adaptation. Second, our investigation of contextual factors will lead to increased understanding of contextual influences on human-robot interaction design. Third, the analysis of staff members' experiences will yield implications for co-worker experience design.

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