ABSTRACT

Nursing and care are central aspects of healthcare services, and improvements in the quality and efficiency of healthcare processes are important issues. Since these tasks involve both physical actions and information processing, they can be described as what the authors call “action-oriented intellectual services.” There are striking mismatches between such services and current information and communication technology systems, which are generally designed as tools for deskwork. In addition, almost all nursing and care services are realized by the collaborative work of multiple staff members in distributed locations in the field, a situation with which conventional communication media are of limited utility. A smart voice tweet system for nursing and care is proposed to overcome these problems. To realize this technology, one needs to understand how staff communicates to realize collaborative work in healthcare domains. The authors therefore observed bathing assistance, night shift operations, and handover tasks at a private elderly care home for 8 days. The authors collected approximately 400 h of recorded speech, 42,000 transcribed utterances, data from an indoor location-tracking system, and handwritten notes by human observers. The authors also analyzed speech interactions in the bathing assistance task. The authors found that (1) staff members were almost always speaking during tasks, (2) remote communication was rare, (3) about 75% of utterances were spoken to the residents, (4) the intended recipient of utterances was frequently switched, and (5) about 17% of utterances contained personal names. The authors also attempted clustering utterances into what the authors call “passages”, and about 33% of passages contained only one personal name. These results should be applicable in semi-automatic long-term care record taking.

Keywords: Care, Communication, Cooperative Work, Field Study, Nursing, Speech Interaction, Support System, Voice Tweet, Work Analysis

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INTRODUCTION

Japan’s increasingly aging population is a major issue, one urgent aspect of which is caring for elderly persons with disabilities. Nowadays, care services are often provided through the devoted efforts of care staff at long-term care facilities. Care services are characterized by what we call “action-oriented intellectual services.” Care staff makes many decisions regarding medical care which require specialized knowledge. They also assist elderly persons with disabilities in many activities of daily living. Care service staff is made up of many professions and specialties. Also, care services must operate at all hours, throughout the year, and successfully doing so requires a high degree of information sharing among staff, for example, keeping records of care performed.

Lemonidou, Plati, Brokalaki, Mantas, and Lanara (1996) pointed out that medical staff spends much time on indirect care, including recordkeeping and information sharing. Conventional IT systems are fundamentally designed for deskwork, however, and do not support hands-free and eyes-free operations suited to action-oriented intellectual services.

Uchihira, Torii, Hirabayashi, Sugihara, and Iwata (2012) have proposed a “voice tweet system,” which is being developed to overcome these problems. In that system, “voice tweets” spoken by a staff member are tagged with the staff member’s location and motion, spoken keywords, and associations with background knowledge, and based on these tags, the tweets are automatically delivered to an appropriate staff member. This system provides semi-hands-free and eyes-free communication among medical and care staff. Developing such a system requires knowing what kind of speech communication supports cooperative work in medical and care domains. We therefore performed field studies at an elderly care home in Japan to analyze cooperative work and speech interaction among care staff.

We set the following two research questions for this study.

1. What kind of voice communication is utilized in human-to-human collaborative work at care work fields?
2. From the results regarding research question 1, what kind of support can be realized to reduce the workload on staff at care work fields?”

We report on a series of field studies and the insights extracted from analysis of the collected data. The remainder of this paper is organized as follows. The second section describes previous work, and the third section gives an overview of the voice tweet system. The fourth section describes the field and the tasks examined. The fifth section describes the study methodology, and the sixth section presents an analysis of the collected data. Finally, the seventh section gives our conclusions and proposed areas for future study.

RELATED WORKS

Bardram and Bossen (2005) pointed out that ad hoc coordination and social awareness of other colleagues’ work are very difficult because all staff are on the move constantly in the distributed work field such as hospitals. They also noted that, although asynchronous communication can be handled by writing Post-it notes, exchanging email, sending a fax, or leaving a message with a secretary, some cases at large scale hospitals, some issues needs to be handled through dialogue, for example, urgent matters and situations where authorization is required.

Lee, Tang, Park, and Chen (2012) analyzed dynamically formed teams in a hospital emergency room, and identified three key factors in the design of team communication technology: (1) maintaining awareness within the team, (2) making informative interruptions, and (3) supporting role-based calling. However, this study was limited to a few directly connected rooms on a single floor. Further investigation of more widely distributed locations may therefore be necessary, such as in larger hospitals or care facilities with multiple floors.
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