Human Robot Communication with Facilitators for Care Robot Innovation

Taizo Miyachi, Saiko Iga, Takashi Furuhata

Abstract

Numbers of Caregivers and care facilities are already in a shortage in Japan. Instead, communication type of care robot could contribute more for facility care and day service. New collaboration services between human and the communication type of care robots with AI and BigData that exceed human capabilities could be an effective solution for caregiver and care facility shortage problems. We analyze how Communication between Human and care Robots (HRC) successfully performed for both recreations and health gymnastics in two types of cares, (I) facility care and (II) day service, using the robot function of humanoid speaking and actions. We also discuss effective roles of facilitators and strategies of facilitations for managing new collaboration that produces synergy effects among caregivers, care-receivers, and the communication type of robots, as “care robot innovation.”

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1. Introduction

Japan has already become a super ageing society. Japanese government’s aim in 2017 is “Healthy life expectancy is 80 years old (HLE80)” [1]. For example, Ministry of Health and Welfare Japan calculated nine years longer
healthy life of male persons could potentially reduce social welfare cost (25 percentages of the welfare budget). Japan needs to also solve the shortage of both caregivers and care homes. One effective solution could be new care robots service systems that are connected to both BigData and AI that exceed human capabilities. Collaboration among such care robots, aged persons, and caregivers will improve healthy life of the aged persons and the environment of both caregivers and aged persons. We called “Care Robot Innovation (CRI).” Many kinds of communication robots [2 and 3] and “Telepresence robot” [4 and 5] are effective for taking care of older people, observation, and avatar. Robot therapy has also been investigated [6]. Autonomous care robots with many functions have been experimented in many care facilities [7 and 8]. We analyze how Communication between Human and care Robots (HRC) [9 and 10] successfully performed both recreations and health gymnastics in two types of cares, nursing (I) facility care and (II) day service, using the robot function of humanoid speaking and action in the two different cities. Human factor is very important for CRI. Especially, excellent facilitations would create the aged persons higher motivations and let them develop new life challenge and up to unpredictable level of performance for their life. We also discuss effective roles of facilitators for the new collaboration.

2. Expand healthy life expectancy and prevent dementia

Nine years longer healthy life of male persons is Japanese government aim in “Healthy life expectancy is 80 years old (HLE80).” However, National Polis Agency Japan showed that missing persons by dementia is 12,208 persons/year (33 Persons / Day) on 19th June, 2016 (https://info.ninchisho.Net /archives/10051). Japan already faces the shortage of caregivers and care facilities in a super ageing society. This also caused the environment of the care facilities become more intense therefore currently 101,100 people with nursing care services leaving their jobs in 2016. This will cause Japanese economy GDP down, too. Currently, there are two types of care services in Japan. (1) Facility care, and (2) “day service” for home care. However, there still exist mainly three problems.

**P1.** Shortages of good price care facilities
**P2.** Shortages of caregivers
**P3.** Inefficient services (exercise in brain, conversation, study of literatures (Haiku poetry), reflection with nostalgic music, and feeling the mood of future, etc.) in both facility care and day service in order to realize HLE80

For P1, Japanese government should build more inexpensive care facilities. For P2, introducing foreign caregivers and care robots has been started. In this paper we focus on communication assist care robot (“Communication robot”) to solve the problems from P2 to P3.

For example, Japanese Ministry of Health, Labour and Welfare (MHLW) defines six “Care Prevention Actions (CPA)” in order to prevent deterioration of living function [7].

(CPA1) Improve motor function, (CPA2) Nutrition improvement, (CPA3) Improve oral function, (CPA4) Prevention/ support of dementia, (CPA5) Prevention/ support for depression, and (CPA6) Prevention/ support of confinement. Communication robots should assist caregivers by the six kinds of CPAs.

3. Assist by communication care robot with facilitators

Communication care robots “PALRO [7],” have useful functions for HLE80. We focus on next three aims by utilizing communication care robot for nursing (1) Facility care, and (2) Day service in Japan.

**Aims.**

A1. Improve facility care for “Healthy life expectancy 80 years old”
A2. Improve day service for “Healthy life expectancy 80 years old”
A3. Assist caregivers in order to decrease caregivers’ jobs

In a daily life, Caregivers always attempt to create a pleasant recreation time for care-receivers by a sequence of fun care services each of that is built by a combination of an attractive content and sometimes some exercises. However, all caregivers cannot stay close to care-receivers because of many other duties (e.g., grocery shopping, cooking, cleaning laundry, etc). Therefore, a communication care robot can execute some simple basic tasks, such as reading sentences, singing a song, playing a dance, asking a question, etc. For future nursing style, fun interactions among
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