Robot Assisted Activities: Scientific Evidence of Activating Human Communication by Robots

Masahiro Fujita, VP, Senior Chief Researcher, AI Collaboration Office, Sony Corporation, Japan

aibo
AI x Robotics x Wellness:
Robot Assisted Activities

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VP, Senior Chief Researcher, AI Collaboration Office
Sony Corporation

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(Supplementary information)
## History of AI x Robotics R&D in Corporate Lab.

<table>
<thead>
<tr>
<th>Year</th>
<th>AIBO R&amp;D</th>
<th>AIBO Product</th>
<th>Robocup AIBO League for Academia R&amp;D</th>
<th>SDR/QRIO R&amp;D</th>
<th>Autonomous Cognitive Development Intelligence</th>
<th>Force Control Actuator, Generalized Inverse Dynamics</th>
<th>Face / Object Recognition, SLAM,AR</th>
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AIBO: The World First Fully Autonomous Robot

- Ears
- Judgement
- Eyes
- Touch
- Voice
- Instinct/Emotion

Self Battery Charge
Survey papers on phycological effects by Human-Robot Interactions

"On Activating Human Communication with Pet-Type Robot AIBO"

→ Pet-type robots activate human emotional activity effectively.

The important references by
A. Yokoyama,
K. Suga, M. Satoh, and K. Hasegawa,
B. Friedman, P. H. Kahn, Jr., and J. Hagman,
On Activating Human Communications With Pet-Type Robot AIBO

MASAHIRO FUJITA, MEMBER, IEEE

AIBO : Owner Age Distribution

- About 70%–80% users feel a strong attachment to AIBO.
- Furthermore, about 26%–40% users say, they feel strong attachment and they may be at a loss if AIBO is lost.
- This tendency is stronger for ERS-31X owners than for ERS-210 owners.

Note: The statics was for ERS110, 210, 31X. 1999~2002
Some experiments using AIBO (1)
Animal Assisted Therapy (AAT) and Robot Assisted Therapy (RAT)

- Healing Effect of AAT
  - Physiological Effect: ex) Improve his/her blood pressure
  - Psychological Effect: ex) Improve his/her depression
  - Social Contact Effect: ex) Improve communication with others

- Advantage of RAT
  - Sanitary Condition
  - No Food and no evacuation/no elimination.
  - Safety (not biting)
  - No pet-loss phenomena (but AIBO loss ......)
  - Programable
Some experiments using AIBO (2): Effect on Immune System

(Suga, et.al, Koireisha-care, Vol.6, No.4, 2002)

Three trials of AIBO interactions for 30 min every other day. Continue for 6 month.

A) 13 elderly people (ave. age ~ 72.0)
   - S-IgA : Lower means “Relaxed”.
     - 100→175 μg/ml after 3 trials.
     - 175→300 μg/ml after 2 months

B) 15 patients ( 5 = Alzheimer dementia, 5 = Senile dementia, 5 = normal)
   - HVA(Homovanillic Acid) : 
     - HVA density levels of Alzheimer group became the same level of the normal group
Some experiments using AIBO (2): Effect on Immune System

(Suga, et.al, Koireisha-care, Vol.6, No.4, 2002)
aibo: Fully Autonomous robot with Cloud

Various Motions

Expression with Eyes

Tactile Interactions

AI-Bone

Ball Handling

Running
Joint Research with National Center for Children Health and Development

Pilot study to research the therapeutic effects of aibo

- Pilot study conducted between April to May of 2018
- Test if periodic play (physical contact) with aibo will improve emotional exchange and change in mood in patients

Overview

Starting from December 2018 for three years, study the qualitative and quantitative therapeutic effects of aibo on the patients and family
Some other trials for Elderly care as well as Children’s communication improvement.

**aibo in Nursing Home**

**aibo introduced to Sony Group’s retirement home with nursing function**

Reinforcing positive emotions through the physical and emotional bond with aibo and bringing a bit of fun and happiness to their lives

**Effects**

Residents stay in the common space more frequently and longer, enhances communication within the residents

**aibo in Nursery School**

**Experimental introduction of aibo to nursery school Global Kids**

Observe the effects of aibo at the nursery school of children aged from 1 to 3 years of age

**Results**

Improved communication through daily interaction and activities such as naming aibo
「料理」の新しい可能性 AI×Robotics×Cooking - Sony Japan
https://www.sony.co.jp/brand/stories/our/products_services/cooking/
Independent Kitchen: AI x Robotics Augmenting Human
New Opportunities in “Cooking” with AI and Robotics

Scientific Approach to 医食同源

Integrating the senses with nutrition and health

Subjective Judgement

We think food and medicine are continuous.
Summary: AI x Robotics x Wellness

- Robotic Assisted Activities
  - Elderly and Children
  - Healing: Scientific Evidences are being found.
  - Programming as Prescription?

- AI x Robotics x Gastronomy
  - AI x Robotics augmenting human
  - Scientific Approach to “医食同源”