

論文 / 著書情報
Article / Book Information

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論文要旨

THESIS SUMMARY

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Industrial Engineering and Economics

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Academic Degree Requested Doctor of (Engineering)

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要旨 (英文 800 語程度)

Thesis Summary (approx.800 English Words)

With the increased use of social robots in prominence and beyond functional performance, they are expected to foster trust and confidence in people. Various factors involve providing social robots with more trustworthy behavior. This dissertation aimed to investigate the effectiveness of social robots' different behaviors on perceived trust in human-robot interaction. Three behaviors were studied including; 1) listening behaviors, 2) benevolence and competence attributes, and 3) self-backstory disclosure. Three studies were conducted to inspect the effect of these behaviors on different types of general, cognitive and affective trust. The studies were conducted based on the interaction between a social robot (NAO, PEPPER) and a participant, evaluating the participants' perception of the robot's trustworthiness using a questionnaire method. The experiments were conducted using the Wizard of Oz methodology, in which the experimenter remotely operated the robot, while the participants believed they were interacting with the robot itself.

The first study investigated whether the listening behaviors of social robots could affect the perception of trustworthiness in human-robot interaction. During the experiment, participants interacted with the NAO robot, which exhibited various types of listening behaviors. The results indicated that "active empathic listening behavior" provided the participants with the highest impression of trustworthiness, compared to other forms of listening such as "active listening", specifically in affective trust. For nonverbal and verbal dimensions of listening behaviors, it was confirmed that nonverbal behaviors such as nodding, body movement, and eye gaze along with verbal behaviors, had a significant effect in eliciting higher affective trust in human-robot interaction. Moreover, the social robot with active empathic listening behavior was perceived as more alive, likable, and intelligent. Therefore, it could enhance the anthropomorphic attributes of social robots.

The second study investigated how the competence and benevolence characteristics of social robots affected the perception of trustworthiness and were integrated in human-robot trust relations. During the experiment, participants interacted with the NAO robot, which was characterized by different combinations of benevolence and competence attributes. The results revealed the effectiveness of both benevolence and competence attributes in human-robot trust, as the social robot that behaved as competent-benevolent, competent-nonbenevolent, and benevolent-noncompetent was assessed to have higher general trust than that of the noncompetent-nonbenevolent robot. Furthermore, the results confirmed the primacy of benevolence in fostering affective trust, and

modulating general and cognitive trust. However, the perceived competence of the social robot did not significantly influence cognitive trust.

The third study examined the influence of a social robot which disclosed its own backstories and experiences, on the development of trust in human-robot interaction. During the experiment, participants interacted with the PEPPER robot which disclosed its happy and sorrowful backstories, in addition to a situation which the robot expressed general and technical information about itself (no backstory). The results indicated that the social robot disclosing a happy backstory provided the participants with higher impression of trustworthiness in general and affective trust compared to the social robot telling no backstory. However, the social robot disclosing sorrowful backstory was not evaluated to lead to higher trustworthiness than the social robot with no backstory. Furthermore, the social robot with happy backstory scored higher than the one with sorrowful backstory in all types of general, affective and cognitive trust.

Overall, the results indicated the importance of social robots' behaviors in human-robot trust, and confirmed that social robots' behaviors influence people's perceived trust in different ways. It was appeared that influential factors and behaviors in interpersonal trust could be comparable to human-robot trust, and participants treated social robots in a manner similar to human beings. Moreover, empathic and emotional behaviors of social robots played a significant role in enhancing trustworthiness of robots, specifically in terms of affective trust, which emphasizes the importance of developing emotional robots in future.

備考：論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 1 部提出してください。

Note: Thesis Summary should be submitted in either a copy of 2000 Japanese Characters and 300 Words (English) or 1copy of 800 Words (English).

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