(様式 5)

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学位（博士）論文要旨

(Doctoral thesis abstract)

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論 文 題 目 (Title)	Exploring different means of human-robot interactions by using environmental data to adapt the robot's behaviours 環境データを用いたロボットの行動適応による、人とロボットの多様なインタラクションの手段に関する研究

論文要旨 (2000 字程度)
(Abstract(400 words))

With the development of robots for the general public and their usage outside of factories, they would have to interact with humans in a closer way, further from the controlled environment of the laboratories or factories. To improve the interaction between humans and robots, to make them closer to a partner than just automate even a tool, they must take advantage of the environmental data.

In this thesis, we will explore with two robotic projects how we can create scenarios where the robots change their behaviour according, to either user's emotions or weather data. The first project uses an industrial robot, that has no initial purpose for social interactions. The scenario was created to have no prior training from the user, and to achieve a very specific task during a fair in Japan with the general public. The answer from about 200 participants was gathered with four questionnaires to collect their opinion about the scenario. Results suggest that participants considered our proposed scenario as enjoyable, safe, and interesting. For the second project, we created from scratch an abstract presence robot for the home. With the aim to serve as a link between a couple in their home, for a long-term interaction. This robot, called Yokobo, uses non-verbal expressive means of communication (movement and light), and weather data to change its behaviours. Two set of two-week experiments were done in our laboratories to evaluate the robustness and usability of Yōkobo, and the perception and reception of the participants. The results show that Yōkobo can sustain long-term interaction and serve as a welcoming partner. In order to be integrated inside the home, a smartphone application has been developed and tested to configure the Raspberry Pi (the central unit of Yōkobo) without using a screen, mouse or keyboard. The solution was tested with 11 users that managed to configure the robot by themselves. Finally, for the purpose of long-term interaction, we propose a solution to adapt the behaviours of Yōkobo from the world data thanks to a casual representation, and a reinforcement learning algorithm to create the action.