

DEVELOPMENT OF THE DESIGN GUIDE-LINE ON INTELLIGENT SERVICE ROBOT FOR CHILDREN

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ABSTRACT:

Robot design is different from conventional product design, as humans interact emotionally with the product. Understanding user preference is, therefore, highly recommended. This is especially so when the design process involves the participation of children and requires careful consideration of unique user characteristics. However, until recently, robot design is treated as designing a chassis to wrap and conceal the mechanical parts inside. It is a good thing that the field of robot design has recently shown some efforts to adopt new materials and unique form factors.

This study is to gain empirical experience in the field of intelligent service robot. It started with the Development of Service Contents and Prototype for Ubiquitous Robot Companion in Child Use. In this three-year project, the primary goal of the research in the first year was to develop an initial understanding of and a set of design guidelines on the way robot design for children should be

carried out, and ultimately, to develop a concept of kid-monitoring robot in accordance with the design guidelines developed. [Figure 1] shows the overall research process.

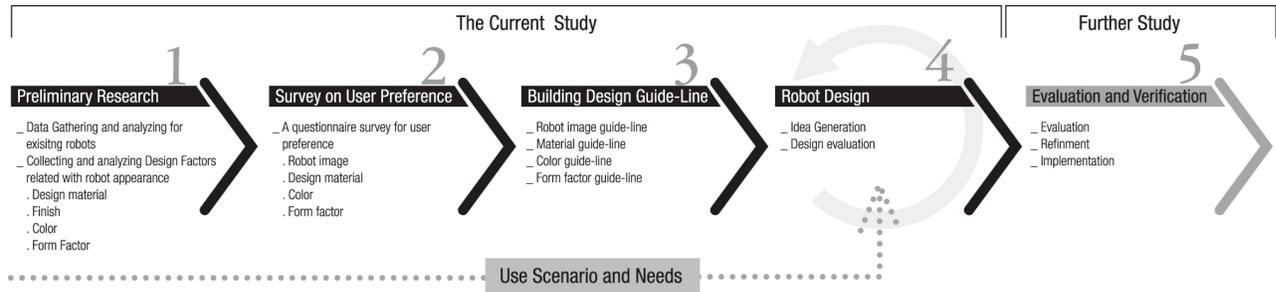


Figure 1: Research Process

This study to develop and apply robot design guidelines consists of three main phases. In the first phase, various issues related to robot design were synthesized and analyzed with appropriate scales. 36 robots for entertainment and home services developed or launched in the real market were investigated. All the robots investigated were evaluated for their characteristics by price, appearance, purpose, type of interaction, size, and type of movement to identify the trends of robot design. Also several design factors related to robot appearance, such as material, finish, color, and form factor, were investigated and analyzed. The result of this preliminary research would provide a solid basis on which to build the guidelines for the robot design. Moreover a check-list was developed to evaluate all the safety issues of the design alternatives. In the second phase, a questionnaire survey on user preferences for robot image, material, color, and form factor was carried out. On the basis of the survey, a set of design guidelines for kid robots was developed as follows;

1. Children prefer an intimate toy image to a technical robot image.
2. Primary colors, such as yellow, blue, red, and green, are preferred.
3. A flexible and dull material like urethane is preferred for the robot surface. [Figure 2]
4. The preferred shape of the robot would be in the Mechanical & Massy, Massy& Primitive, and Mechanical & Transformed spaces at the FORM FACTOR MAP developed in this study.
5. The robot should be carefully reviewed for safety according to the check-list.

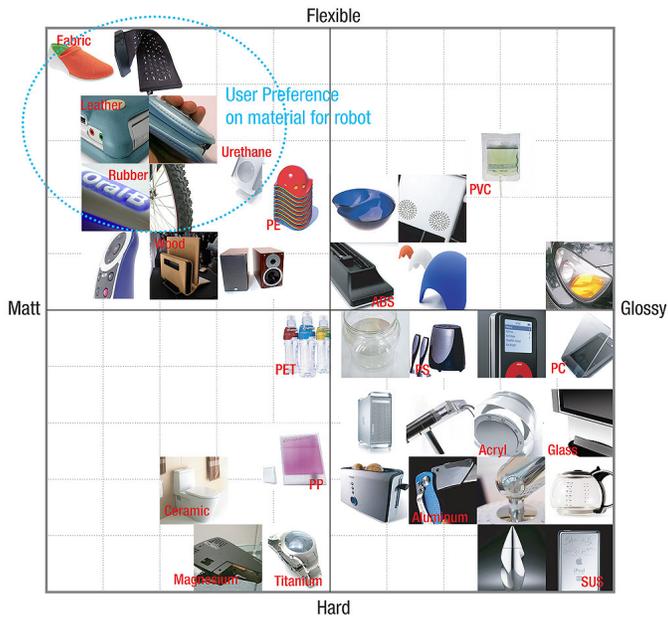


Figure 2: User Preference on material for robot

Finally, we developed a robot for children in accordance with the set of guidelines developed. [Figure 3] shows a rendering image of the robot. The guidelines provided an effective perspective for resolving traditional design conflicts in deciding on form, material, and color.



Figure 3: Concept robot image developed in accordance with user preferences

This study shows a systematic approach to robot design with a wide range of data collected, a user survey, and the development of design guidelines. Work is now under way to shape up the robot by evaluating the concept design developed in this study and refining the technical details for mass production.

REFERENCES:

Kwak Sona and Kim Myungsuk (2003) Design Process for Constructing Personality of an Entertainment Robot Based on Psychological Types, Proceeding of the 2nd Semi-annual Design Conference of KSDS, Korean Society of Design Science, 14-15.