

Investigating Play Scenarios for Robot-Assisted Play with Children with Autism

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ABSTRACT

This work is part of our investigation in the IROMEC project (IROMEC - Interactive RObots as MEdiators Companions), a European FP6 project supported by the European Commission. The project recognizes the important role of play in child development and targets children who are prevented from or inhibited in playing, either due to cognitive, developmental, or physical impairment, which affect their playing skills leading to general impairment in their learning potential, cognitive development, and may result in isolation from the social environment. IROMEC investigates how robotic toys can become social mediators encouraging children with disabilities to discover a range of play styles, from solitary to social and cooperative play, and provide opportunities for learning and enjoyment involving other children as well as carers/teachers or parents who “join in” the game with the robot.

Our group has about 10 years of experience in robot-assisted play involving various mobile and humanoid robots that have been used to engage children with autism in interactive play [1, 2]. Therapeutically relevant skills are targeted in our trials, e.g. imitation [3], joint attention [4] or, importantly, social mediation whereby the robot serves a mediator between a child with autism and other children or adults [5].

Our presentation specifically addresses the role of our team within the IROMEC project concerning the development of a robotic toy specifically for children with autism. We discuss our investigation of play scenarios for robot-assisted play developed specifically for these children.

In the IROMEC project, in order to understand the play needs of this user group, and to investigate how robotic toys could be used as a play tool to assist in the children’s development, a panel of experts (therapists, teachers, parents) was formed and interviewed. Results of the expert panel interviews highlight key points characterizing the play of children with autism. This developmental process of constructing relevant play scenarios for children with different disabilities is driven by a comprehensive literature review that is related to play activities of children from different target user groups with existing technology, by consultation with the above mentioned panel of experts (therapists, teachers, parents) and by the results of experimental investigations of user requirement in trials with children with disabilities.

Traditionally, scenarios have been used as tools in various stages of system development, from problem definition to envisioning solutions, helping all stake holders to contribute to the analysis, design and evaluation of systems. Carroll [6] described scenario-

based design as ‘a family of techniques’, describing the use of future systems at early points in their development. Scenarios serve as central representations throughout development cycles, first describing the goals and concerns of current use, and then being successively transformed and refined through iterative design and evaluation processes [7].

In the IROMEC project we have adopted the concept of scenarios and used it for an additional purpose. Here, scenarios are seen as higher-level conceptualizations of the ‘use of the robot in a particular context’. Scenarios are used not only as intermediary steps or tools in the design and development process of the robot, but more importantly as play contexts which allow users to evaluate specifically implemented functionalities of the final robot to be designed (the IROMEC robot).

Various aspects of the user requirements, as expressed in the user panel meetings, have been implemented in experimental play scenarios and have been investigated in field trials using existing available technology. The results of these trials are documented in play scenarios that reflect the specific play activities. The field trials also highlighted important aspects for the future robot design.

This task is of an on-going nature in order to feed into both the design of interactions, and to the robot design, and helps to form the final scenarios for robot assisted play and robot mediators.

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