

# Interspecies Playful Interactions: How Technology Can Help Improving Children and Animals' Wellbeing

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## ABSTRACT

The field of Animal Computer Interaction has been growing since its emergence in 2011, and playful technology for animals has shown to be helpful to improve their wellbeing as well as to provide them mental and physical stimulation. This work takes a step further and explores how playful technology could help to enhance the relationship between children and animals, potentially improving both animals and children's wellbeing.

## CCS CONCEPTS

• **Interaction Design:** User centered design • **Computing / technology policy:** User Characteristics; Children; Animals.

## KEYWORDS

Animal Computer Interaction, Child Computer Interaction, Play, User-centered Design, Interspecies Interaction

## 1 INTRODUCTION

In the last years, the field of Animal Computer Interaction (ACI) [1] has gained a lot of attention, and playful interactions of animals with technology have been extensively studied, as they can help to improve the animals' wellbeing [3, 4]. However, there are few works proposing interactive systems for both animals and humans, and they usually require them to be in the same physical space. We believe that technology could allow for remote playful interactions between humans and animals, especially for the case in which they are unable to spend time together or cannot move from their physical location.

This work presents a remote interactive system that allows hospitalized children to control a small robot located in a canine daycare facility and play with the dogs staying there. The playful interspecies system presented in this work aims to (1) help improve the children's wellbeing during their hospital stay, (2) foster a healthy relationship between children and animals by means of play, and (3) provide physical and mental stimulation for animals at home, shelters or daycare facilities.

## 2 SYSTEM DESIGN AND EVALUATION

The system consists of two applications that communicate remotely over the network. On the canine daycare facility, we have deployed a Microsoft Kinect® camera to record the play area and track the dog's movements. We have developed a .NET streaming server that records images and sends them in real time to a connected client. We have also developed an Android client application that connects to the streaming server over the network, receiving and displaying live images from the daycare facility on the screen. The application has buttons to control a robot: when the user presses a button, the corresponding command is sent to the server in real time, which then sends it to a Sphero® robot via Bluetooth (Fig. 1).

We have been evaluating the system over the last two months, and a usability study has allowed observing that children enjoy the system very much. Normally, children can only watch live videos of animals without being able to interact directly with them. The children are thus showing great excitement towards our system when they realize they can play with the animal in real time. In parallel, a comparative study is evaluating the interest and playful behavior of dogs with the Sphero® being controlled by a child, towards an autonomous version in which the Kinect® depth-sensor tracks the dog's movements and an intelligent system decides how to move the robot accordingly [2]. Several behavioral patterns have been identified, and dogs are usually more active when the child is controlling the robot. This allows us to study how intelligent playful systems could be built for animals when there is no human around by using learning algorithms that can learn from the humans' interactions with the animal to then play autonomously with the dog and create an engaging activity.



Figure 1: Hospitalized child controlling a Sphero® to play remotely with a dog in a canine daycare facility.

## 3 CONCLUSIONS

We have designed, developed and evaluated an interactive system that allows hospitalized children to play remotely with a dog by controlling a small robot located in a canine daycare facility. This system aims to help improving the wellbeing of both the child and the animal. In addition, we have developed a pervasive system capable of playing with the dog autonomously, which could help to improve animals' playful interactions in the future with intelligent and adaptive systems.

## ACKNOWLEDGMENTS

This work is supported by the European Development Regional Fund (EDRF-FEDER), Spanish MINECO (TIN2014-60077-R), and Spanish MECD (FPU13/03831 awarded to Patricia Pons).

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