

# Passive UHF RFID technology for reliable perception in real-world social robotics applications

We invite applications for PhD studentships in the Adaptive Systems Research Group at the University of Hertfordshire to investigate and develop technologies utilising Ultra-High Frequency Radio-Frequency Identification (UHF RFID) for use in social robotics applications.

Research in the domain of Human-Robot Interaction (HRI) is becoming increasingly popular due to the rapid advancement of technology and the reduction in the cost of components that facilitate the development of robotic systems. One of the areas of HRI that the University of Herts focuses on is the development of the humanoid robot Kaspar designed to interact with children who have Autistic Spectrum Disorder (ASD). Whilst robotic technology in this field for children with ASD has shown some promising results, the autonomous capabilities of such systems are often limited due to the constraints of accurate sensing technologies in noisy real-world environments such as classrooms.

In this project the applicant will work on the development of a system that uses Ultra-High Frequency Radio-Frequency Identification (UHF RFID) to enable accurate long-range object orientation detection, thereby facilitating robust HRIs with children with ASD in native child friendly environments. Further to this the technology developed will be used as a verification method for reinforcement learning systems. The end goal of this research is to develop a system whereby toys in a playroom can be tagged and the robot interaction partner will be able to play therapeutic games with children based around these toys, by having knowledge of which toy the child is interacting with and its approximate location within the environment.

Our research to date suggests that UHF RFID technology has the capacity to perform long range object orientation detection and possesses a number of useful advantages over vision-based systems and could have wide reaching implications in HRI.

## **Applicant requirements**

Applicants will need to have excellent programming skills and the ability to use multiple languages with proven experience of programming hardware (robots). Whilst a very strong degree is desirable, applications from individuals with proven experience only (no degree) are also welcomed.

## **For more information about this project or relevant questions, please contact:**

Dr Luke Wood (principle supervisor)

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## **This project will be co-supervised by:**

Professor Farshid Amirabdollahian

Dr Ben Robins