

PhD Research Topic: End-user personalisation of social/companion robot for long-term engagement.

Robots are becoming increasingly common in domestic environments, a trend that is likely to continue as they begin to play more significant roles in people's everyday lives. This growing presence has led to a rise in research focused on domestic robotics, particularly in areas such as Social Robots and Companion Robots. These robots are designed to provide both assistance and companionship across a range of contexts, supporting human activities in daily living. To be effective, they must not only perform tasks that meet practical needs but also behave in ways that align with social expectations and interact with people in a socially appropriate manner.

This project focuses on the end-user personalisation of companion robots to enhance long-term user interaction. Personalisation is a crucial aspect of Human-Robot Interaction (HRI) that promotes sustained engagement beyond the initial period of novelty. It extends beyond visual or aesthetic customisation to include the ability for users to teach robots new tasks in ways that reflect their individual preferences and expectations.

Robots capable of adapting to users' needs and behaviours are likely to be perceived as more useful, trustworthy, and personally meaningful. In turn, this adaptability can help foster stronger bonds between robots and their users, an important factor, as previous studies have shown that a socially assistive agent's capacity to build a relationship with its user is key to maintaining long-term engagement and continued use.

Potential areas of investigation include, but are not limited to:

- Robotic software architectures and planning frameworks that support adaptive and personalised user interactions.
- Task design and behavioural capabilities in robots that assist with activities of daily living and foster sustained user engagement.
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- Development of expressive, socially intelligent, and context-aware robot behaviours that enhance emotional connection and social acceptance.
- Methods, and tools that end-user personalisation, enabling users to teach and customise robot behaviours according to their preferences and needs.

Requirements: Applicants are required to have a strong first degree or (preferably) a specialist Master's degree in Computer Science, Machine Learning, Artificial Intelligence, Robotics or a related field with a strong background in mathematical and statistical knowledge, as well as technical and programming skills in Python or C++. Prior knowledge and experience in programming mobile robots and experience or interest in social sciences or psychology are desirable. Candidates are expected to have excellent English oral and writing skills as well as general interest in interdisciplinary research and willingness to collaborate with researchers from other disciplines.

The successful candidate will be supervised by *Dr. Kheng Lee Koay*, *Dr. Patrick Holthaus*, and *Dr. Gabriella Lakatos*.

For more information about the field, please contact:

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References:

1. L. Riches, K.L. Koay, P. Holthaus (2024). *Evaluating the Impact of a Personal Data Communication Policy in Human-Robot Interactions*. The Seventeenth International Conference on Advances in Computer-Human Interactions (ACHI 2024).
2. A. Rossi, K. Dautenhahn, K.L. Koay, and M.L. Walters (2023). *A matter of consequences: Understanding the effects of robot errors on people's trust in HRI*. *Interaction Studies: Social Behaviour and Communication in Biological and Artificial Systems*, 24(3), 380–421.
3. A. Chanseau, K. Dautenhahn, K.L. Koay, M.L. Walters, G. Lakatos, and M. Salem (2019). *How does peoples' perception of control depend on the criticality of a task performed by a robot*, *Paladyn, Journal of Behavioral Robotics*, vol. 10, no. 1, 2019, pp. 380-400.
4. J. Saunders, D. S. Syrdal, K. L. Koay, N. Burke and K. Dautenhahn, "Teach Me–Show Me"—End-User Personalization of a Smart Home and Companion Robot, in *IEEE Transactions on Human-Machine Systems*, vol. 46, no. 1, pp. 27-40, Feb. 2016, doi: 10.1109/THMS.2015.2445105