Bahar Irfan
ROBOTICIST (PHD), COMPUTER ENGINEER (MSC), AND MECHANICAL ENGINEER (BSC)

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SUMMARY

Roboticist, computer engineer and mechanical engineer with a goal to create personal robots that learn and adapt to assist in everyday life. 9 years of research experience with a focus on multi-modal personalization in long-term human-robot interaction, continual learning, conversational AI, real-world deployments, user-centered design, task planning, and building robots.

SKILLS

Soft Skills: Creativity · Determination · Critical thinking · Leadership · Collaboration · Adaptability · Communication

Technical Skills: Python · C++ · PyTorch · C · ROS · Gazebo · MoveIt · Docker · Git · MATLAB · R · MySQL · Java

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher and Digital Futures Fellow
KTH Royal Institute of Technology (Sweden)   June 2022 – Present

- Developing a lifelong learning model for long-term personalization in open-domain dialogue with large language models.
- Conducted participatory design studies with 34 older adults to develop a personal companion robot based on their needs [1].
- Identified the challenges of large language models, based on 4 hours of robot interactions and 11 hours of interviews [1].

Research and Development Associate
Evinoks Service Equipment Industry and Commerce Inc. (Turkey)   February 2020 – May 2022

- Developed customized software for industrial robots, virtual reality, and smart buffets to increase flexibility for customers.

Research and Development Lab Associate
Disney Research Los Angeles (USA)   July 2019 – November 2019

- Developed a reinforcement learning model for dynamic and personalized emotional adaptation in dialogue for long-term interactions of a virtual interactive character, based on users' and agent's emotional models and personality [6].

Early-Stage Researcher
University of Plymouth (UK) and SoftBank Robotics Europe (France)   April 2016 – May 2019

- Evaluated personalization, continual learning, and few-shot learning in data-driven models for task-oriented dialogue [2].
- Developed the first multi-modal open world user recognition model with incremental and online learning, which improved identification by 48% on benchmark, reached 94% accuracy in human-robot interaction, and decreased bias [3]. ⌂
- Created open-source benchmark datasets for task-oriented dialogue [2] and multi-modal long-term user recognition [3]. ⌂ ⌂
- Supervised a MSc intern for 6 months to develop a personal barista Pepper robot with a rule-based dialogue manager [7].
- Developed social and personal autonomous robots for long-term cardiac rehabilitation in collaboration with international researchers and medical specialists, which improved 17 patients' health and motivation at a hospital in 2.5 years [4] [5].
- Founded 2 HRI workshops, co-organized 2 summer schools and HRI conference, supported teaching in 2 robotics courses.

Research and Teaching Assistant
Bogazici University (Turkey)   February 2014 – February 2016

- Developed a dishwasher loading robot in simulation with user-centered design for task planning and manipulation.
- Implemented motion planning and behavior planning for NAO robots at RoboCup robot football competition for 2 years.
- Supported teaching in 6 BSc computer engineering classes with over 70 students each, and volunteered at 3 conferences.

EDUCATION

PhD in Computing *(Specialization: Human-Robot Interaction)*
University of Plymouth (UK)   April 2016 – December 2020
                                                    Passed with no corrections

MSc in Computer Engineering *(Specialization: AI and Robotics)*
Bogazici University (Turkey)   September 2012 – March 2016
                                                    GPA: 3.69 (over 4.0)

BSc in Mechanical Engineering *(Specialization: Mechatronics)*
Bogazici University (Turkey) with placement at Purdue University (USA)   September 2007 – June 2012
                                    Graduated as 3rd in class, GPA: 3.62 (over 4.0)

- Designed and built mobile educational robots that are still used in the robot control course at the university for over 10 years.

SELECTED ORGANIZATIONS AND INVITED TALKS

Lifelong Learning and Personalization in Long-Term Human-Robot Interaction workshop ✎
Founder, Coordinator, and Panel Moderator, International Conference on Human-Robot Interaction March 2021 – Present
- The workshop had 70 to 100 attendees each year. It is the most popular workshop at HRI. Experts from academia (e.g., MIT, Stanford, Yale) and industry (e.g., Google, Sony, Toyota Research Institute) presented and participated in the panels.

Unveiling the Future: How Large Language Models Are Redefining Social Robotics ✎
Moderator, 5th Furhat Conference on Social Robotics June 2023
- 200 people attended the 2-hour conference. I moderated talks and Q&A with 4 researchers from industry and academia.

Personalisation in Long-Term Human-Robot Interaction: Challenges and Suggestions ✎
Invited speaker, SoftBank Robotics Europe Humanizing Technology And Robots Talk (HEART) webinar February 2021
- 120 people attended my virtual seminar.

Personalization in Long-Term Human-Robot Interaction workshop ✎
Founder and Coordinator, International Conference on Human-Robot Interaction (HRI) March 2019
- 40 people attended the full-day workshop in person, which was the most popular workshop at HRI 2019.

FELLOWSHIPS AND AWARDS

Jubilee Appropriation – Received travel grant of $1,860 for my keynote at IROS Geriatronics workshop
Knut and Alice Wallenberg Foundation June 2023

Digital Futures Postdoc Fellowship – Received funding of $200,000 for my own project proposal
KTH Royal Institute of Technology June 2022 – June 2024

Second prize at Three Minute Thesis competition ✎
University of Plymouth May 2020

Winning project proposal contributor – University was awarded a Pepper robot ($20,000)
EPSRC Robotics & Autonomous Systems Network Social Care Challenge April 2017

EU H2020 Marie Skłodowska-Curie Actions Innovative Training Networks Fellowship
Applications of Personal Robotics for Interaction and Learning (APRIL), University of Plymouth April 2016 – May 2019

PUBLICATIONS

🗎 Journal Articles (5 of 5)

[1] **B. Irfan**, S-M. Kuoppamäki, and G. Skantze, "Between Reality and Delusion: Challenges of Applying Large Language Models to Companion Robots for Open-Domain Dialogues with Older Adults", *Autonomous Robots* (under review). ✎

[2] **B. Irfan**, M. Hellou, and T. Belpaeme, "Coffee with a Hint of Data: Towards Using Data-Driven Approaches in Personalised Long-Term Interactions", *Frontiers in Robotics and AI* (2021).

[3] **B. Irfan,** M. Garcia Ortiz, N. Lyubova, and T. Belpaeme, "Multi-modal Open World User Identification", *Transactions on Human-Robot Interaction* (2021).

[4] **B. Irfan**, N. Céspedes, J. Casas, E. Senft, C. A. Cifuentes, L. F. Gutierrez, M. Rincon-Roncancio, T. Belpaeme, and M. Munera, "Personalised Socially Assistive Robot for Cardiac Rehabilitation: Critical Reflections on Long-Term Interactions in the Real World", *User Modeling and User-Adapted Interaction* (2022).

[5] N. Céspedes, **B. Irfan**, E. Senft, C. A. Cifuentes, L. F. Gutierrez, M. Rincon-Roncancio, T. Belpaeme, and M. Munera, "A Socially Assistive Robot for Long-Term Cardiac Rehabilitation in the Real World", *Frontiers in Neurorobotics* (2021).

👥 Conference Proceedings (2 of 14)

[6] **B. Irfan**, A. Narayanan, and J. Kennedy, "Dynamic Emotional Language Adaptation in Multiparty Interactions with Agents", *ACM International Conference on Intelligent Virtual Agents* (2020).

[7] **B. Irfan**, M. Hellou, A. Mazel, and T. Belpaeme, "Challenges of a Real-World HRI Study with Non-Native English Speakers: Can Personalisation Save the Day?", *International Conference on Human-Robot Interaction (HRI)* (2020).