

Ying Siu (Sheryl) Liang

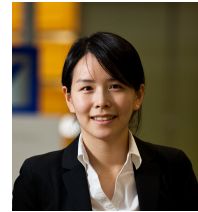
Robotics Software Engineer

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Nationality: Austria



Summary

My interest lies in developing generalisable solutions for robots to operate and adapt to real-world conditions. I have previously developed solutions that enable robots to interact with end-users in diverse environments, with a focus on enhancing user experiences and improving their quality of life.

Education

- 2016–2019 **Ph.D. in Computer Science**, *Université Grenoble Alpes*, France.
Major in Artificial Intelligence and Robotics. Defended in June 2019
Dissertation: *End-User Robot Programming in Cobotic Environments*
- 2015–2016 **Master of Science (M.S.) in Informatics**, *Grenoble INP - ENSIMAG*, France.
Specialisation: Artificial Intelligence and Web
Courses: Machine Learning, Knowledge Representation & Reasoning, Multi-Agent Systems
- 2008–2012 **Integrated Master of Science (MSci) in Mathematics and Computer Science**, *Imperial College London*, United Kingdom, *First Class Honours*.
- 2000–2008 **Bundesrealgymnasium 18, Wien, Vienna**, Austria, Secondary school, emphasis on Geometric Modelling, IT & Communication Technology, *Graduated with straight As*.
Matura (A-Level equivalent) in Mathematics, English, Geometric Modelling, German, French

Work Experience

- Jan 2022–Present **Robotics Software Engineer**, *Aeolus Robotics*, Vienna, Austria.
Robot Behaviour Planning and Execution
- Develop and implement solutions for robots to plan and execute high-level reasoning in user-defined scenarios (C++).
 - Test implementation both in simulation and on the real robot to handle potential failures experienced in with end-users and evaluate their performances (Python, ROS).
- Jan 2020 – Dec 2021 **Research Scientist**, *Institute for High Performance Computing*, A*STAR, Singapore.
CollabAI project in Social and Cognitive Computing (Clojure, Python, ROS)
- Group leader of the Cognitive Systems Group
 - Worked on the robot's cognitive architecture (ICARUS) to integrate functions from perception, manipulation, and NLU to perform high-level reasoning and control the robot's behaviour to achieve goals with Universal Robots (UR5, UR16e).
 - Collaborated with other development teams to implement, test, and troubleshoot new robotic behaviours to improve the robot's capabilities [1].
 - Improved the robot's belief management with a new object permanence model [2,3] that tracks invisible displacements and outperformed state-of-the-art models.
- Jun–Sep 2019 **Research Intern**, *Institute for Infocomm Research*, A*STAR, Singapore.
Inferring the Geometric Nullspace for Robot Skills from Human Demonstrations [5]
- Worked on a setup to infer geometric constraints and their nullspace from human demonstrations (using OptiTrack) that can be used by the iCub robot to generalise skills to perform more complex tasks (C++).
- Oct 2016 – Jun 2019 **Ph.D.**, *Grenoble Informatics Lab*, Univ. Grenoble Alpes, France.
End-User Robot Programming of Action Models for Symbolic Task Planning [6,7,9]
- Designed and implemented iRoPro, an interactive Robot Programming framework for end-users to teach a robot new actions that can be reused to solve unseen problems [4].
 - Integrated functions from object perception (Point Cloud segmentation), manipulation (Programming by Demonstration), motion planning (MoveIt), behaviour planning (PDDL) and human-computer interaction (JavaScript/Polymer) into a full-stack software deployed on a Baxter robot (C++, ROS).
 - Conducted human-robot experiments for user acceptance testing and system evaluation.

- Jul–Dec 2017 **Student Intern**, *Human-Centered Robotics Lab*, Univ. of Washington, USA.
Simultaneous End-User Programming of Goals and Actions for Robotic Shelf Organisation [8]
- Learned about the specifics of the robot programming infrastructure Rapid PbD and contributed to new software releases.
 - Designed and implemented a software on a Fetch mobile manipulator to learn goals and actions from human demonstrations for robotic shelf organising tasks (C++, ROS).
- Feb–Jun 2016 **Student Intern**, *Grenoble Informatics Lab*, Univ. Grenoble Alpes, France.
Robot Programming by Demonstration in Cobotic Environments [10]
- Designed and implemented a robot programming by demonstration software using OpenCV and the Baxter Robot SDK (Python, ROS).
 - Conducted qualitative user experiments to evaluate the software's usability with non-robotics end-users.
- Sep 2012 – Sep 2015 **Software Engineer**, *Global Technology, Deutsche Bank*, London, United Kingdom.
- Developed functionalities for data retrieval from external data sources to allow users to query and modify data directly from an OLAP Cube via a web app (C#, HTML/JavaScript).

Skills

Development C++, Python, Clojure, JavaScript, HTML, Git
 Previous Java, Prolog, Haskell, MATLAB, C#, Perl, PHP, SQL
 OS Ubuntu Linux, Windows, MacOS
 ROS, Visual Studio Code, OpenCV
 Robots Aeolus Robot, Universal Robot, Baxter Robot, Fetch Mobile Manipulator, PR2, QT Robot

Languages German (native), English (bilingual), French (C2), Chinese (B2), Spanish (A2)

Attended Courses

Q3 2021 IS5452 Affective Computing, National University of Singapore, Singapore
 Aug 2018 ROS Summer School, FH Aachen, Germany

Additional Responsibilities

- Jan–Dec'21 **Team lead**, *Project on Engagement Detection in Virtual Classes*, Singapore.
 April 2021 **Co-coordinator**, *NIE-ASTAR AI in Education workshop*, Singapore.
 2017–Present **Reviewer**, *HRI'23, IROS'21, ICRA'18,19,21, ACII'21, RSS'19, RO-MAN'19, HRI'18*.
 May–Jul 2018 **Supervision of 2 undergraduate interns**, *UI design for iRoPro*, Grenoble, France.
 Feb 2017 **Teaching Assistant**, *Introduction to Databases*, Grenoble, France.
 2021– **Math Tutor Volunteer**, *South Central Community Family Service Centre*, Singapore.
 2020– **Trishaw Pilot Volunteer**, *Cycling Without Age*, Singapore.
 2013–2015 **Math Tutor Volunteer**, *Volunteering Matters*, London, United Kingdom.

Awards and Honours

2016–2019 French Ministry PhD research grant by MSTII Doctoral School (ED MSTII)
 Mar 2018 Prize for best presentation at the LIG PhD day
 Jul 2017 IDEX Intl. Mobility Grant to collaborate with the Univ. of Washington
 Jun 2017 Prize for best presentation at the ED MSTII PhD day

Hobbies

Basketball, Table tennis, Snowboarding, Boardgames, Languages

Publications and Other Communication

- [1] D. Choi, W. Shi, Y.S. Liang, K.H. Yeo, J.J. Kim (2021). **Controlling Industrial Robots with High-level Verbal Commands**. Intl. Conf. on Social Robotics (ICSR). Singapore: IEEE/RSJ Press.
 - [2] Y.S. Liang, C. Zhang, D. Choi, K. Kwok (2021). **Improving Object Permanence using Action Annotations and Reasoning**. Intl. Conf. on Intelligent Robots and Systems (IROS). Virtual (Oral): IEEE/RSJ Press.
 - [3] Y.S. Liang, D. Choi, K. Kwok (2021). **Maintaining a Reliable World Model using Action-aware Perceptual Anchoring**. Intl. Conf. on Robotics and Automation (ICRA). Xi'An, China (Oral): IEEE Press.
 - [4] Y.S. Liang, D. Pellier, H. Fiorino, S. Pesty (2021). **iRoPro, an interactive Robot Programming Framework**. Intl. Journal of Social Robotics (IJSR). Springer-Verlag.
 - [5] C. Cai, Y.S. Liang, N. Somani, Y. Wu (2020). **Inferring the Geometric Nullspace of Robot Skills from Human Demonstrations**. Intl. Conf. on Robotics and Automation (ICRA). Virtual: IEEE Press.
 - [6] Y.S. Liang (2019). **End-User Robot Programming in Cobic Enviroments**. PhD thesis. Grenoble, France.
 - [7] Y.S. Liang, D. Pellier, H. Fiorino, S. Pesty (2019). **End-User Programming of Low- and High-Level Actions for Robotic Task Planning**. Intl. Symposium on Robot and Human Interactive Communication (RO-MAN). New Delhi, India (Oral): IEEE Press.
 - [8] Y.S. Liang, D. Pellier, H. Fiorino, S. Pesty, M. Cakmak (2018). **Simultaneous End-User Programming of Goals and Actions for Robotic Shelf Organization**. Intl. Conf. on Intelligent Robots and Systems (IROS). Madrid, Spain (Oral): IEEE/RSJ Press.
 - [9] Y.S. Liang, D. Pellier, H. Fiorino, S. Pesty (2017). **Evaluation of a Robot Programming Framework for Non-Experts using Symbolic Planning Representations**. Intl. Symposium on Robot and Human Interactive Communication (RO-MAN). Lisbon, Portugal (Poster): IEEE Press.
 - [10] Y.S. Liang, D. Pellier, H. Fiorino, S. Pesty (2017). **A Framework for Robot Programming in Cobic Environments: First User Experiments**. Intl. Conf. on Mechatronics and Robotics Engineering (ICMRE). Paris, France (Oral): ACM.
- May 2018 **Spotlight talk**, *A Robot Programming Framework for Non-Experts*, Robots in Human Environments (RHUM) Workshop, Grenoble, France.
- Jun 2017 **Oral presentation**, *Robot Programming by Demonstration*, Affects, Artificial Companions and Interactions (ACAI) Working Group, Paris, France.