Vaios Papaspyros

Robotics & AI Software Engineer

General Information

Mail:
vaios.papaspyros@gmail.com

Professional Disciplines

Computer Science & Engineering; Robotics; Machine/Deep Learning; Collective Behaviour; Swarm Intelligence

Technical skills

C/C++(20), Python, Robot Operating System (ROS), OpenCV, shell, Qt, LaTeX, Software design, Tensorflow/Keras, PyTorch (C++/Python API)

Web Presence

Personal Website
Twitter
LinkedIn
Github
Bitbucket

OS Experience

Linux ★★★★★
MacOS ★★★★★
Windows ★★★☆☆

Languages

Greek (native) ★★★★★
English (C2) ★★★★★
French (B2) ★★★☆☆

Experience

06/18 - 11/23 **Doctoral Assistant** EPFL, Lausanne, Switzerland

Description: I conducted and published research on collective behavior models and their transferability to mixed groups of animals and robots. I designed and implemented high-fidelity social interaction models based on analytical and machine/deep learning approaches. I also implemented the computer vision, robot planning and control, networking interface, and the low level robot software that allows for transferring the models into closed-loop real-life systems. Finally, I assisted in and taught courses and supervised various student projects and exams.

03/18 - 05/18 **Research Intern** EPFL, Lausanne, Switzerland

Description: I conducted research on social interaction models that allowed a robot to engage in meaningful bidirectional interactions with groups of fish.

06/17 - 11/17 **Research Engineer** MEAD, Univ. of Patras, Patras, Greece

Description: I led the research team in organizing the project timeline, designing, implementing, and testing the communication protocols and software tools (*e.g.*, with ROS) that supported the operation of a heterogeneous swarm of drones.

05/16 - 10/16 **Research Intern** Inria Nancy Grand-Est, Nancy, France

Description: I conducted and published research on intelligent algorithms that allow robots to adapt from damage. More specifically, I developed a safety-aware trial-and-error algorithm (based on constrained Bayesian optimization and Gaussian processes) that allowed a humanoid to adapt to its damages and crawl again (in simulation).

Education

06/18 - 11/23 **Doctor of Philosophy - Ph.D.** EPFL, Lausanne, Switzerland
Robotics, Control, and Intelligent Systems
Supervisor: Francesco Mondada.

09/12 - 11/17 **M.Eng in Computer Engineering & Science** Univ. of Patras, Patras, Greece
GPA: 7.35 / 10
Thesis title: Safety-Aware Intelligent Trial-and-Error for Robot Damage Recovery.
Supervisors: Ioannis Hatzilygeroudis, Jean-Baptiste Mouret.

09/10 - 06/12 **High School** Costeas-Geitonas School, Athens, Greece
GPA: 19.2 / 20

Open-source project contributions

C/C++ **Author to Behavioural Observation & Biohybrid Interaction (BOBI) framework (https://github.com/epfl-mobots/bobi)**
BOBI is ROS-based code that supports a robot-animal experimentation setup.

C/C++ **Author to Lurebot low-level control code (https://github.com/epfl-mobots/lurebot_low_control)**
The repository contains the low-level code that allows the LureBot to communicate with high-level systems (*e.g.*, BOBI)

Python **Author to Fish INteraction moDeling framework (find) (https://github.com/epfl-mobots/find)**
"find" contains analysis and modelling tools (primarily) aimed at fish behaviour

C/C++ **Co-author to robot_dart (https://github.com/resibots/robot_dart)**
robot_dart is a flexible and generic C++11 wrapper for DART and is suitable for evolutionary computation.

C/C++ **Contributor to limbo (https://github.com/resibots/limbo)**
limbo is a highly templated C++11 Bayesian optimization framework.

Reviewing Experience

I have been repeatedly invited to review for various top-tier venues including:

- Nature Communications
- IROS
- ICRA
- NeurIPS (BayesOpt)
- RO-MAN
- AAMAS

Teaching Experience

- **Winter Semester**

2020-2022 **Basics of Mobile Robotics** EPFL
2h / week - 1st year Master of Robotics

Description: Assisted in the design and teaching of introductory exercises on mobile robot systems. The exercises included topics such as sensing, computer vision, robot control, localization, SLAM, neural networks & genetic algorithms, graph algorithms. I also contributed in guiding teams during their semester projects spanning those topics and exam corrections.

• Spring Semester

2020-2022 **Robotics practicals | Robot Operating System (ROS) basics** EPFL
4h / week - 1st year Master of Robotics

Description: I created, organized, and taught an introductory course on the Robot Operating System (ROS). During the course, I taught students the fundamentals of ROS and general good practices in robotics (software) projects. I also supervised and graded team projects that required the students to control a differential drive mobile robot first in simulation, then in real life, and conduct an assessment of the reality gap.

Publications

• Journals

Aug 2023 *"Quantifying the biomimicry gap in biohybrid systems"*,
Papaspyros V, Theraulaz G, Sire C, Mondada F.
Preprint/Under review

June 2023 *"A biohybrid interaction framework for the integration of robots in animal societies"*,
Papaspyros V, Burnier D, Cherfan R, Theraulaz G, Sire C, Mondada F.
IEEE Access

Apr 2023 *"Predicting long-term collective animal behavior with deep learning"*,
Papaspyros V, Escobedo R, Alahi A, Theraulaz G, Sire C, Mondada F.
Preprint/Under review

Apr 2022 *"The role of feedback and guidance as intervention methods to foster computational thinking in educational robotics learning activities for primary school"*,
Chevalier M, Giang C, El-Hamamsy L, Bonnet E, **Papaspyros V**, Pellet JP, Audrin C, Romero M, Baumberger B, Mondada F.
Computers & Education

Sept 2020 "A data-driven method for reconstructing and modelling social interactions in moving animal groups",
El-Hamamsy L, **Papaspyros V**, Kangur T, Mathex L, Giang C, Skweres M, Bruno B, Mondada F.
Philosophical Transactions of the Royal Society B

Aug 2019 "Bidirectional interactions facilitate the integration of a robot into a shoal of zebrafish Danio rerio",
Papaspyros V, Bonnet F, Collignon B, Mondada F.
PLOS One

- **Peer-Reviewed Conferences/Workshops**

Dec 2021 “Exploring a handwriting programming language for educational robots”, El-Hamamsy L, **Papaspyros V**, Kangur T, Mathex L, Giang C, Skweres M, Bruno B, Mondada F.
RiE

Dec 2016 “Safety-aware robot damage recovery using constrained bayesian optimization and simulated priors”,
Papaspyros V, Chatzilygeroudis K, Vassiliades V, Mouret JB.
BayesOpt NIPS

Interests

- Machine Learning & AI
- Robotics
- Programming
- Basketball, Photography & Music