

ANATOLI TZIOLA

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RESEARCH INTERESTS

Robotics and autonomous systems, task planning, formal methods, multi-agent systems, automata theory, optimisation and mobile robots, manufacturing logistics.

EDUCATION

PhD. Candidate in Robotics and Autonomous Systems

January 2019 – onwards

Mechanical Engineering Dept., Cyprus University of Technology

Limassol, Cyprus

Advisor: Prof. Savvas G. Loizou

- Developed a new framework, the SuPERvisory Control Task plannER (SPECTER), for high-level task planning problems with respect to agent capabilities, constraints and failure modes.
- Implementing SPECTER task planner for manufacturing logistics optimization problems.
- System modeling using automata expressing the system's behaviour and combining the agents capabilities and constraints at the individual and group level, including failure modes.
- Determined the optimal task plan that satisfies the task specification without the need to repeat the preprocessing cycle for solving other scenarios.
- Developed sub-optimal solutions to reduced complexity of the task planing problem.
- Incorporation of failure modes on-the-fly, after building the global system model.
- Successfully applied the SPECTER task planner to manufacturing SMEs to automate the intra-factory logistics and enable cost effective deployment with no infrastructure changes.

Diploma in Production Management Engineering

October 2012 – October 2017

Democritus University of Thrace

Xanthi, Greece

Diploma Thesis: Place Recognition: Efficiency Comparison of Image Local Descriptors.

Graduation Rank: 7th out of a class of 81 students (Highest 8.6 %)

GPA: 8.53/10.0 (EXCELLENCE)

RESEARCH EMPLOYMENT

CIRCULOOS

September 2023 – onwards

- CIRCULOOS aims to deliver circular manufacturing tools which orchestrate and continuously optimise the supply-chain end-to-end and comprehensively integrate planning and execution to configure and execute disruptive circular manufacturing processes for sustainable production that cover the entire life cycle of products which become waste and are recycled in the same or other life cycles.
- Implementation and expansion of SPECTER task planner for real-time visibility to improve customer experience, streamlined production planning, reduced cost and response times, and predictive analytics.
- Develop the Supply Chain Optimisation Tool (SCOPT) which leverages model-based and data-driven approaches built on top of the SPECTER task planner.
- Work package and tasks leadership of the experiments execution phase to ensure the smooth execution of the plan and achievement of KPIs.

Better Factory

October 2020 – onwards

- Expansion of SPECTER task planner methodology.
- Implementation of SPECTER task planner to SMEs (Tapi Nero and Staramaki S.C.) as a resources optimization tool to determine the minimum number of resources required for the production of products and as a scenario verification tool to identify a better arrangement of machines and operations of the factory workflow before any implementation is implemented in the factory.

- Mentoring and supporting SMEs (Europack Bulgaria M Ltd., Tapi Nero, Staramaki S.C.) to:
 - adopt manufacturing process management systems, logistics and resource optimization tools to become cyber-physical systems, transforming them into Lean-agile production facilities.
 - gain access in robotics and digitization technologies to improve efficiency, productivity and products customization.
 - facilitate the collaboration between SMEs and Technology Suppliers for the deployment of the Open and Standardized Advance Production Planning and Scheduling (APPS) resulting to 3 successful stories of Knowledge Transfer Experiments (KTEs) (FOLD, Shoes in Circle, STARIoT)

Logistics for Manufacturing (L4MS)

September 2018 – May 2020

- Aiming to accelerate the production capacity and profits for manufacturing SMEs and mid-caps by automating the intra-factory logistics.
- Expansion of SPECTER task planner methodology.
- Developed the Business Process Optimization (BPO), an open-source component for manufacturing logistics optimization problems. BPO exploits combinatorial optimizations techniques and implements a custom model checking engine with the capability to incorporate formal models.
- An Open Platform for Innovations in Logistics (OPIL) was developed to provide digitalization to enable cost effective deployment of customized logistics solutions with no infrastructure changes.
- Mentoring and supporting pilot application experiments (KLAPPER, RIOgistics) to:
 - implement advanced technologies to automate factory floor logistics.
 - facilitate collaboration between SMEs (EMKA Sealing Systems S.L., KLEFER S.A.) and Technology Suppliers (Robotnik, Bosonit, CERTH) to implement advanced technologies to automate factory floor logistics.

TEACHING EXPERIENCE

Mechanical System Dynamics (MEM324)

Fall 2019 – onwards

Teaching Assistant

- Cyprus University of Technology, Mechanical Engineering Dept.: Undergraduate course.

Automatic Control I (MEM322)

Spring 2019 – onwards

Teaching Assistant

- Cyprus University of Technology, Mechanical Engineering Dept.: Undergraduate course.

INVITED TALKS

- [IT.3] “Autonomous Task Planning for Heterogeneous Multi-agent Systems”, Cyprus University of Technology, Department of Mechanical Engineering and Materials Science Engineering, November 2023.
- [IT.2] “Autonomous Task Planning for Heterogeneous Multi-agent Systems”, Rice University, Houston, TX, USA, July 2023 (Online presentation to the group of Prof. Lydia Kavvaki).
- [IT.1] “Autonomous Task Planning for Heterogeneous Multi-agent Systems”, Georgia Institute of Technology (Georgia Tech.), Atlanta, GA, USA, October 2022 (Online presentation to Prof. Spyridon Reveliotis).

PROFESSIONAL ACTIVITIES

Reviewer

- IEEE Conference on Robotics and Automation.
- IEEE Conference on Decision and Control.
- IEEE Mediterranean Conference on Control and Automation.

Seminars

- Autonomy Talks, Institute for Dynamic Systems and Control, ETH Zurich, 2021-2022 Fall-Summer Seminars, online.
- 2021-2022 Fall-Summer Seminars (online) by UPenn GRASP Laboratory, Pennsylvania, USA.

- 2021-2022 Fall Seminars by Department of Mechanical Engineering and Materials Science and Engineering, Cyprus University of Technology, Limassol, Cyprus.
- Horizon Europe Proposal Writing Webinar by Research and Innovation Foundation (RIF), September 2021.

Workshops

- Compositional Robotics: Mathematics and Tools, Workshop on 2022 IEEE International Conference on Robotics and Automation (ICRA22), ETH Zurich, May 2022.

Professional Memberships

- Technical Chamber of Greece (TEE).

Organizer

- Info Session 2019 - L4MS, RIMA (co-organizer), Cyprus University of Technology, Limassol, Cyprus, Fall 2019.

TECHNICAL SKILLS

Languages: C++, Python, MatLab, Markdown

Developer Tools: VS Code, CLion, PyCharm

Technologies/Frameworks: Linux (Ubuntu), ROS, LaTeX, Windows 10, Microsoft 365 (Office), GitHub, GitLab, FIWARE, RAMP IoT, ProjectPlace, ProofHub

JOURNAL ARTICLES

- J.2 A.A. Tziola and S.G. Loizou, “Multi-Agent Control Synthesis with Reactive Failure-Mode based Reconfiguration”, IEEE Robotics and Automation Letters (under preparation).
- J.1 A.A. Tziola and S.G. Loizou, “Automatic task planning for heterogeneous multi-agent systems”, in IEEE Transactions on Automatic Control (under review).

CONFERENCE PUBLICATIONS

- C.2 A.A. Tziola and S.G. Loizou, “Manufacturing Logistics Optimization using the SPECTER Task Planner: A Shoe Manufacturing Logistics Case Study”, European Robotics Forum, March 13-15, Palacongressi, Rimini, Italy, 2024.
- C.1 A.A. Tziola, and S.G. Loizou, “Autonomous Task Planning for Heterogeneous Multi-Agent Systems”, IEEE International Conference on Robotics and Automation (ICRA), May 29 - June 2, ExCeL London, UK, 2023.

PRE-PRINTS

- PP.1 A.A. Tziola and S.G. Loizou, “Autonomous task planning for heterogeneous multi-agent systems”, Preprint submitted to arXiv.org, September 2022.