Fotios Lygerakis

ligerfotis@gmail.com   Leoben, Austria

My aspiration is to make machines learn the way we humans do. Through seeking, abstraction, incremental conclusions, transfer learning, and creativity.

RESEARCH INTERESTS

Self-Supervised Representation Learning

- Variational Autoencoders
- Contrastive Learning
- Transformers
- Multimodal
- Hyperbolic latent spaces

Robot Learning

Reinforcement Learning
- Offline
- Visuotactile

Human-Robot Interaction

Human-Robot Interfaces

EXPERIENCE & EDUCATION

DOCTORAL STUDENT
University of Leoben, Austria
03/2022 - Present

- Thesis: "Advanced Robotic Autonomy through Learning of Compact Representations and Sample-Efficient Reinforcement Learning"
- Supervisor: Univ.-Prof. Dr. Elmar Rueckert
- Teaching: 190.013 Introduction to Machine Learning Lab, Spring 2023

TEACHING ASSISTANT
University of Texas at Arlington, USA
01/2020-12/2021

- CSE 6363-004 Machine Learning
- CSE 1325-001 Object-Oriented Programming
- CSE 2315 002 Discrete Structures
- CSE 2440 002 Electrical Circuits

RESEARCH ASSISTANT
National Center for Scientific Research Demokritos, Greece
Short-term contracts through
09/2019-09/2021

- RL (ROS-integrated) SAC algorithm for collaborative learning with 28% less human engagement.
- 3D pose tracking system built with OpenPose for data collection.
- BERT fine-tuned on Greek corpus dataset for chatting application.

RESEARCH INTERN
Cambridge Research Lab, Toshiba Research Europe Limited, UK
01/2019-05/2019

- Reinforcement Learning for Statistical Dialogue Systems.
- 63% performance gain using GP-SARSA and autoencoder.
- 76% performance gain with LSPI and denoising VAEs.
- Supervisor: Dr. Margarita Kotti

MASTER OF ENGINEERING IN ELECTRICAL AND COMPUTER ENGINEERING
Technical University of Crete, Greece
09/2012-07/2019

- Thesis: *Robust Belief State Space Representation for Statistical Dialogue Managers Using Deep Autoencoders.*
- *GPA: 8.06/10.00*
- *Supervisors: Prof. Vasilis Digalakis, Dr. Vasilis Diakoloukas*

JOURNAL PUBLICATIONS

- M. Kyrarini, **F. Lygerakis,** A. Rajavenkatanarayanan, C. Sevastopoulos, H. R. Nambiappan, K. K. Chaitanya, A. R. Babu, J. Mathew, F. Makedon, A Survey of Robots in Healthcare. Technologies 2021, 9, 8.
- V. Diakoloukas, **F. Lygerakis**, M. G. Lagoudakis, M. Kotti, "Variational Denoising Autoencoders and Least-Squares Policy Iteration for Statistical Dialogue Managers," in IEEE Signal Processing Letters

CONFERENCE PUBLICATIONS

- **F. Lygerakis,** V.Dave, E. Rueckert, M2CURL: Sample-Efficient Multimodal Reinforcement Learning via Self-Supervised Representation Learning for Robotic Manipulation, 2024 (Under Review)
- V.Dave, **F. Lygerakis**, E. Rueckert, Multimodal Visual-Tactile Representation Learning through Self-Supervised Contrastive Pre-Training, 2024 (Under Review)
- **F. Lygerakis,** E. Rueckert, CR-VAE: Contrastive Regularization on Variational Autoencoders for Preventing Posterior Collapse, 7th Asian Conference on Artificial Intelligence (ACAIT), 2023
- **F. Lygerakis,** M. Dagioglou, V. Karkaletsis, Accelerating Human-Agent Collaborative Reinforcement Learning, PETRA 21, 2021
- **F. Lygerakis,** A. C. Tsitos, M. Dagioglou, F. Makedon, V. Karkaletsis "Evaluation of 3D markerless pose estimation accuracy using OpenPose and depth information from a single RGB-D camera," PETRA 20
- **F. Lygerakis**, V. Diakoloulas, M. Lagoudakis, M. Kotti, "Robust Belief State Space Representation for Statistical Dialogue Managers Using Deep Autoencoders," 2019 IEEE Automatic Speech Recognition and Understanding Workshop (ASRU), Singapore, 2019,

M.SC. THESIS SUPERVISION

| University of Leoben, Austria **2023** | *"A ROS2-based Human-Robot Interaction Framework with Sign Language."* |
| University of Leoben, Austria **2022** | *"Development of Software and Deep Learning Methods for Automated Inspection in a Continuous Casting Steel Plant."* |

TEACHING

| University of Leoben, Austria **Summer Semester 2023** | *190.013 Introduction to Machine Learning Lab* |
| University of Leoben, Austria **Winter Semester 2023** | *190.015 Applied Machine and Deep Learning* |

TECHNICAL SKILLS

- **ML Libraries**: PyTorch, Tensorflow, Sci-Kit Learn, Pandas
- **Languages:** Python, C++, C, C#, MatLab, BASH
- **Tools**: PyBullet, Gym, Mujoco, Git, Unity3D, slurm, docker
- **OS/Middleware:** Linux, ROS2, Windows

OUTREACH & VOLUNTEERING

Neural Coffee Reading Group
University of Leoben, Austria
2022 - Today

Weekly research chat on deep learning, open to everyone.

Robotics Club "Kouretes"
University of Leoben, Austria
2016 - 2018

Behavioral programming of NAO robots.

Human-Robot Interaction

Chair: Prof. Michail G. Lagoudakis

REVIEWING & CONFERENCE ACTIVITIES

Reviewer	*ECAI*	*IEEE IROS*	*IEEE Intelligent Systems*
Conference Committee	*ECESCON 9*	*PETRA 2021*	
Workshop Chair	*AI and Digital Technologies in Coronavirus Pandemic and Beyond, PETRA 2021*		

MEDIA/CONTENT

Youtube Lectures

PyTorch Tutorial

Deep Representation Learning: Introduction to Core Approaches & Methods

Youtube CPS Lab Outreach

Xmas Video 2023

Xmas Video 2022