EFIMIA PANAGIOTAKI

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RESEARCH INTERESTS

3D Spatial Perception, Multimodal Semantic Localisation, Representation Learning, Scene Understanding, Graph Neural Networks, Foundation Models, Learning by Abstraction, eXplainable AI

EDUCATION

University of Oxford, Oxford Robotics Institute October 2021 - Present
DPhil in Engineering Science (PhD) *Expected Graduation: June 2025*

Google DeepMind Engineering Science Research Scholarship
Supervisor: Dr Lars Kunze, Cognitive Robotics Group

- Projects: Learning by abstractions for SLAM algorithms; Multimodal hierarchical graph representations for semantic localisation using VLMs and GNNs; Natural language explanations using temporal scene graphs and LLMs; Generation of synthetic datasets using heterogeneous GNNs; Explainable semantic GNN-based localisation.
- RobotCycle Project Research Lead and author of 3 x grant proposals
- Supervisor and mentor of 4 students, defining and guiding their research projects
- B16: Software Engineering (OOP, C++) Lab Demonstrator

ETH Zürich, D-ITET, Computer Vision Lab (CVL) February - September 2017
Master Thesis Visiting Student

Title: An Efficient Track Detection and Mapping System for an Autonomous Driving Race Car
Supervisors: Prof. Luc Van Gool & Dr. Dengxin Dai

- Development of a lightweight object detection algorithm and perception pipeline for semantic boundaries classification as prior to a visual-inertial SLAM system based on ORB-SLAM and Rovio
- Design, development, and integration of a prototype Visual Inertial (VI) sensor; System design for computational simplicity, focusing on minimizing propagation and transmission latency
- System evaluation and testing in real-world trials under challenging perceptual conditions

National Technical University of Athens (NTUA) September 2012 - October 2017
MEng Electrical and Computer Engineering, Diploma (5 years Integrated degree, 300 ECTS)

Major in Electronics and Systems Engineering

- AMZ Racing Driverless Formula Student (FS) Team: Perception Software Engineer (2017)
- Prom Racing FS Team: Head of Partnerships, Business and Marketing Manager (2014-2017)
- EESTEC LC Athens: Member, Robotics Workshop Linköping University

PROFESSIONAL EXPERIENCE

StreetDrone Ltd (PrestonEV)
Lead Self-Driving Software Engineer (R&D) — *Oxford, UK* *June 2020 - October 2021*

Leading all self-driving software research and development efforts, including the 5G-enabled CAL project as part of the "5G Create Scheme" for a prototype self-driving truck at the Nissan factory. Responsible for defining the technical direction, strategy, and (R&D) goals of the software team.

- Technical Lead; defining the technical roadmap, direct collaboration with the CEO to shape the software strategy of the company

- Team Lead; provided technical expertise and guidance, led the software team to the successful delivery of the 5G-enabled CAL project and various real-world AV demonstrations, as well as the development of StreetDrone's SaaS product and an open-source AV software project Project Aslan
- Led features development by defining software requirements, high-level architecture (HLA), and low-level software design (LLD)
- Designed and integrated Security requirements (PAS 11281-2018) in liaison with Coventry University
- Established an automated Software Quality Assurance methodology: Software-in-the-loop (SIL), Hardware-in-the-loop (HIL with IPG Automotive), regression testing, unit testing, and CI/CD tools

Software Engineer (R&D) — *Oxford, UK* *June 2018 - June 2020*

Developed a full stack open-source self-driving software [project page] for the Nissan ENV200 and Renault Twizy for the SMLL Urban AV Trials, CCAV and Innovate UK project.

- Development of object detection and path planning software extending A* and pure pursuit algorithms using the input from lidar and radar point clouds
- Implementation and evaluation of a robust localization and mapping system using NDT scan matching
- Front-end and back-end development of a UI for the self-driving software and ROS tools using wxGlade and python bindings
- Development of the 3–DoF Vehicle Model of the Renault Twizy for Gazebo simulation [project page]
- Development of the software communication between the ROS framework and the vehicle's embedded CAN Bus, using SocketCAN Protocol for Linux [project page]

Williams Grand Prix Engineering Ltd January - June 2018
Data Processing Engineer — *Grove, UK*

- Sensors data processing within MAT ATLAS framework, using .NET Framework for C# and MATLAB
- Development of a Graphical User Interface (GUI) for vehicle setup using MvvM pattern
- Factory-based Race Support during the official Formula 1 events

CONFERENCES, HONORS, AND AWARDS

PhD Scholarship	Google DeepMind Engineering Science Research Scholarship
RobotCycle	Program Grant and Equipment Grant Awards
IEEE ICAR2023	2 x Papers Accepted with Poster Presentations
IEEE ICRA2023	Poster and Highlight Presentation at Explainable Robotics Workshop
Pembroke College	Senior Studentship Award for DPhil studies
Pembroke College	Dean of Graduate Funds Award (x2)
Forbes (2020)	New Open-Source Software Looks To Kickstart The Autonomous Revolution
Formula Student	1st place overall with AMZ Driverless (Germany 2017)

VOLUNTEERING

Project Aslan	Co-founder, Lead Technical Steering Committee (2020 - 2021) Open-source self-driving software based on Autoware
Metadrasi	Action for Migration and Development - Mathematics Tutor (2017)

SKILLS AND INTERESTS

Technical Skills	Python, C/C++, Docker, ROS/ROS2, PyG, pytorch, NetworkX, git Unix Bash, PCL, wxGlade, OpenCV, Matlab, xacro
Languages	**Greek** (Native), **English** (Fluent), **French** (Basic)
Personal Interests	Hello World!: Technical blog about self-driving cars Harp, piano, drama, running, surfing, travelling

PAPERS

George Drayson*, Efimia Panagiotaki*, Daniel Omeiza, & Lars Kunze. (2023). CC-SGG: Corner Case Scenario Generation using Learned Scene Graphs. *Equal Contribution. Under Review paper

Efimia Panagiotaki, Daniele De Martini, Georgi Pramatarov, Matthew Gadd, & Lars Kunze. (2023). SEM-GAT: Explainable Semantic Pose Estimation using Learned Graph Attention. (ICAR2023) paper

Efimia Panagiotaki, Daniele De Martini, & Lars Kunze. (2023). Semantic Interpretation and Validation of Graph Attention-based Explanations for GNN Models.(ICAR2023) paper

Efimia Panagiotaki, Daniele De Martini, & Lars Kunze (2023). Towards Semantic Interpretation and Validation of Graph Attention-based Explanations. (ICRA2023 XRo Workshop) paper