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Ali Tourani

Work permit: Luxembourgish | **Date of birth:** 30/01/1991 | **Place of birth:** Iran |

Gender: Male | **Phone number:** (+352) 661697868 (Mobile) | **Email address:** a.tourani1991@gmail.com | **Website:** https://alitourani.github.io/ | **Website:** https://github.com/alitourani | **LinkedIn:** alitourani |

Address: 281A (Residence Mimosa), Route d'Arlon, L-8011, Strassen, Luxembourg (Home)

WORK EXPERIENCE

SNT, UNIVERSITY OF LUXEMBOURG – LUXEMBOURG, LUXEMBOURG

Business or Sector: Professional, scientific and technical activities | **Department:** Interdisciplinary Centre for Security, Reliability, and Trust (SnT) | **Website:** https://www.uni.lu/snt-en/ | **Links** : https://snt-arg.github.io/vsgraphs-results/ | https://snt-arg.github.io/iMarkers/ | https://snt-arg.github.io/robot_suite/ | https://huggingface.co/datasets/snt-arg/smapper-light

R&D SPECIALIST | POSTDOCTORAL RESEARCH ASSOCIATE – 01/04/2026 – 31/07/2026

- Led research on **Generative AI** (mainly Large Language Models (LLMs) and Vision-Language Models (VLMs)) grounding for robotic perception, environment understanding, spatial reasoning, and knowledge retrieval
- Designed and deployed an **embodied AI** core (Gemini-powered) for spatial reasoning and context-aware perception in unstructured environments
- Designed and validated real-world **robotic systems** with end-to-end AI-driven reasoning for practical use
- Developed **containerized** (Docker-based) and **robot-agnostic** (ROS2-based) versions of the implemented system
- **Mentored** three Ph.D. students and junior researchers across system development, experimental design, and publication workflows
- **Stack**: Python, C++, OpenCV, OpenAI, Llama, Gemini, PyTorch, ROS2, Docker
- **Person-days**: 80 (4 months * 20 workdays)

DOCTORAL RESEARCHER – 01/04/2022 – 31/03/2026

- Developed multiple **spatial AI** and **computer vision** software frameworks to improve autonomous robots' situational awareness
- Made a novel system of imperceptible robotic landmarks (called iMarkers), including the development of the full-stack hardware sensor and detection software pipeline
- Designed, packaged, and maintained 5+ **open-source** software packages, adopted widely across embodied/applied AI and robotics industry and research teams
- Developed **containerized** (Docker-based) and **robot-agnostic** (ROS2-based) versions of the implemented system
- Authored 15+ **scientific publications** across top-tier scientific venues (journals and conferences)
- Collaborated within the Automation and Robotics Research Group (ARG)
- **Stack**: C++, Python, OpenCV, ROS1, ROS2, Rviz, Voxblox, PCL, Docker
- **Person-days**: 960 (4 years * 12 months * 20 workdays)

FULL-STACK DEVELOPER – AVID TECHNOLOGY DEVELOPMENT CO. (NOTIONWAVE) – 19/01/2019 – 31/12/2021 – TEHRAN, IRAN

Business or Sector: Education | **Website:** https://notionwave.ai/ | **Links** : https://lernito.com/ | https://www.linkedin.com/company/avid-technology-development/about/

- Developed and deployed production-grade **full-stack software frameworks** for international enterprise clients across 5+ countries, ensuring scalable software delivery
- **Mentored** junior developers and led **Agile/Scrum** sprints as secondary **Scrum Master** for teams of 10+ people
- Deployed robust **backend** architectures and diverse database solutions to optimize data retrieval and system performance
- Implemented CI/CD pipelines and DevOps/MLOps workflows to support reliable production releases

- Developed **containerized** (Docker-based) systems and deployed them across various dissimilar production/test environments
- **Stack:** Node.js, React.js, Next.js, GraphQL, PostgreSQL, MongoDB, Elasticsearch, Neo4j, Docker, NGINX, Webpack
- **Person-days**: 720 (3 years * 12 months * 20 workdays)

UNIVERSITY OF GUILAN – RASHT, IRAN

Business or Sector: Education | **Website:** https://en.guilan.ac.ir/ |
Links : https://github.com/alitourani/computational-intelligence-class-9801 | https://github.com/alitourani/computational-intelligence-class-9802 | https://github.com/alitourani/computational-intelligence-class-9901 | https://github.com/alitourani/computational-intelligence-class-9902

UNIVERSITY LECTURER – 15/01/2018 – 15/09/2021

- Lectured the "Computational Intelligence" course to **100+ undergraduate students** over four consecutive semesters (2019 to 2021), covering machine learning, deep learning, fuzzy systems, and more.
- Provided **technical training** for the Software Laboratory course (Spring 2018), offering hands-on project-based learning
- **Person-days**: 220 (11 months * 20 workdays)

TEACHING ASSISTANT – 01/09/2018 – 30/07/2019

- Delivered **tutorial sessions** for undergraduate "Artificial Intelligence" and "Parallel Processing" courses, clarifying complex algorithmic concepts
- Managed **academic assessment**, graded technical assignments, and reported feedback to the professor
- **Person-days**: 280 (14 months * 20 workdays)

RESEARCH SOFTWARE ENGINEER – GUILAN SCIENCE AND TECHNOLOGY PARK BUSINESS INCUBATOR – 01/07/2019 – 31/07/2021 – RASHT, IRAN

Website: https://www.iasp.ws/our-members/directory/@6098/guilan-science-and-technology-park |
Links : https://github.com/alitourani/yolo-license-plate-detection |
https://github.com/alitourani/deep-learning-vehicle-detection | https://github.com/alitourani/vehicle-speed-measurement

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- Deployed two production-grade **computer vision** systems for vehicle tracking and license plate recognition in real-world traffic
- Bridged research and industry by applying academic methods to scalable **Intelligent Transportation Systems (ITS)** and **Smart City** domains
- Led the full software development lifecycle, from gathering technical requirements to software deployment
- **Stack**: C++, C#, Python, OpenCV, EmguCV, TensorFlow, YOLO, SQL Server
- **Person-days**: 400 (20 months * 20 workdays)

ANDROID/WEB DEVELOPER – ABF VARNA CO. – 01/11/2016 – 30/11/2017 – RASHT, IRAN

Business or Sector: Professional, scientific and technical activities

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- Designed intuitive **UI/UX interfaces** for web and mobile applications, focusing on responsive design and user-centric workflows
- Collaborated within **cross-functional** teams, participating in code reviews for scalable software solutions
- **Stack:** Java, JavaScript, HTML/CSS, Bootstrap, PHP, MySQL
- **Person-days**: 240 (12 months * 20 workdays)

INTERACTIVE E-LEARNING CONTENT DEVELOPER – IEHT GUILAN TRAINING CENTER – 31/05/2013 – 30/12/2018 – RASHT, IRAN

Business or Sector: Education | **Website:** https://ieht-gtc.ir/

- Developed high-impact **interactive content** that transformed technical concepts into **digital learning** experiences
- Managed full-lifecycle instructional design, from scriptwriting to **interactive media** content for e-learning platforms
- Collaborated with **Subject Matter Experts (SMEs)** to deliver industry-specific training modules for international distribution
- **Stack:** Articulate Storyline, Adobe Flash, ActionScript 3.0
- **Person-days**: 1340 (67 months * 20 workdays)

HELP DESK TECHNICIAN – AVANG HUB CO. – 01/05/2012 – 15/01/2013 – RASHT, IRAN

- Provided **technical support** and troubleshooting services for customers as an intern
- Network, Microsoft Office (Word, Excel, PowerPoint)
- **Person-days**: 160 (8 months * 20 workdays)

EDUCATION AND TRAINING

01/04/2022 – 31/07/2026 Luxembourg, Luxembourg

PH.D. IN COMPUTER SCIENCE (DOCTORAT EN INFORMATIQUE) SnT, University of Luxembourg

Supervision:
- Supervisor: Prof. Holger Voos
- Adviser: Dr. Jose Luis Sanchez-Lopez

Honors and Awards:
- Full scholarship for PhD studies (Project TRANSCEND)
- Nominated for the Excellent Thesis Award of the University of Luxembourg (March 2026)

Activities:
- Pitching the research outcomes at SnT Partnership Day (2024, 2025)
- Demonstration of the research outcomes at the European Investment Bank (2024)
- Demonstration of the research outcomes at the Science Festival (2023, 2025)
- Demonstration of the research outcomes at the Researchers Day (2024)
- Advising a graduate student on an M.Sc. final thesis (February 2024)
- Mentoring undergraduate students over six semesters for their Bachelor Student Projects (BSPs)

Address 29, Avenue John F. Kennedy, L-1855, Luxembourg, Luxembourg | **Website** https://www.uni.lu/en/ |

Field of study Software and applications development and analysis | **Final grade** Excellent Thesis Award Nominee |

Level in EQF EQF level 8 | **National classification** 8 | **Type of credits** Interdisciplinary | **Number of credits** 20 |

Thesis Enhancing Robots' Situational Awareness using Imperceptible Artificial Landmarks

Links https://hdl.handle.net/10993/68133 | https://alitourani.github.io/assets/files/PhD-Thesis-Slides.pdf | https://www.uni.lu/snt-en/news/meet-ali/ | https://www.youtube.com/watch?v=3lV7aHhw_Lc

15/08/2016 – 15/01/2019 Rasht, Iran

M.SC. IN COMPUTER SOFTWARE ENGINEERING University of Guilan

Supervision:
- Supervisor: Prof. Asadollah Shahbahrami
- Adviser: Dr. Alireza Akoushideh

Honors and Awards:
- Full scholarship for Master's studies, granted through a nationwide examination among +25,000 applicants
- Best Student Researcher Award (class of 2016, Department of Computer Engineering)
- Academic Excellence Award (ranked 1st among students of the class of 2016, Department of Computer Engineering)

Activities:
- Mentoring and teaching assistant for "Advanced Data Science" and "Parallel Processing" courses
- Founder and chief of the "Iran Society of Machine Vision and Image Processing – Guilan University Student Branch"
- Holding a workshop on "Digital Image Processing Applications in Intelligent Transportation Systems"

Address Persian Gulf Highway, 41996-13776, Rasht, Iran | **Website** https://en.guilan.ac.ir/ |

Field of study Software and applications development and analysis | **Final grade** 18.97 out of 20.00 (A+) |

Level in EQF EQF level 7 | **National classification** 7 | **Number of credits** 32 |

Thesis Automatic Vehicle Speeding Violation Detection using Computer Vision Solutions

Links https://github.com/alitourani/vehicle-speed-measurement | https://www.youtube.com/watch?v=Qs-alxle-FU

15/08/2009 – 15/06/2013 Rasht, Iran

B.SC. IN COMPUTER SOFTWARE ENGINEERING University of Guilan

Supervision:
- Supervisor: Prof. Asadollah Shahbahrami

Activities:

- Teaching assistant for undergraduate courses, including advanced programming, database design, and multimedia
- Member of the Student Programming Team of the University of Guilan

Address Persian Gulf Highway, 41996-13776, Rasht, Iran | **Website** https://en.guilan.ac.ir/ |

Field of study Software and applications development and analysis | **Final grade** 14.64 out of 20.00 | **Level in EQF** EQF level 6 |

National classification 6 | **Number of credits** 141 |

Thesis An E-Ticketing Software Platform for Appointment Scheduling in Medical Clinics

LANGUAGE SKILLS

Mother tongue(s): **PERSIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1
FRENCH	B2	B2	B1	B1	B1
GERMAN	A2	B1	A2	A2	A2
LUXEMBOUR-GISH	A1	A1	A1	A1	A1
TURKISH	A2	A2	A2	A2	A2
ARABIC	A2	A2	A2	A2	A2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

SKILLS

computer engineering | provide assistance to lecturer | PHP | engineering processes | use technical drawing software | understand spoken English | Good listener and communicator | interact verbally in English | oversee development of software | advise on lesson plans | teach computer science | computer vision | develop computer vision system | robotics | human-robot collaboration | develop digital content | digital twin technology | Python (computer programming) | C++ | C# | Microsoft Visual C++ | Visual Basic | ICT debugging tools | artificial neural networks | deep learning | build recommender systems | data mining | principles of artificial intelligence | emergent technologies | data science | analyse scientific data | machine learning | utilise machine learning | apply statistical analysis techniques | Java (computer programming) | JavaScript | ICT project management methodologies | manage ICT virtualisation environments | apply 3D imaging techniques | set up automotive robot | robotic components

CERTIFICATIONS

LinkedIn, 14/09/2026

Java Essential Training: Objects and APIs

Mode of learning: Online

Link https://www.linkedin.com/learning/certificates/6d3a656643a72de0461196bb8f225373e02372f51138177c67ccbba5351760ea

LinkedIn, 25/08/2026

Platform Engineering Foundations

Mode of learning: Online

Link https://www.linkedin.com/learning/certificates/989d7a178b66dce2c168dac513bfe88be261c7f117049c90f1c978d0c85d6c04

Coursera | University of Colorado Boulder
Deep Learning Applications for Computer Vision

Mode of learning: Online

Link https://www.coursera.org/account/accomplishments/verify/86RGBH66FCFJ

CONFERENCES AND SEMINARS

01/06/2026 – 05/06/2026 Vienna, Austria
IEEE International Conference on Robotics & Automation (ICRA'26)

Link https://www.youtube.com/watch?v=3lV7aHhw_Lc

14/10/2024 – 18/10/2024 Abu Dhabi, UAE
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'24)

04/06/2024 – 07/06/2024 Chania, Crete, Greece
International Conference on Unmanned Aircraft Systems (ICUAS'24)

09/05/2023 – 02/06/2023 London, United Kingdom
International Conference on Robotics and Automation (ICRA'23)

18/09/2022 – 23/09/2022 Seattle, Washington, USA (Virtual)
ACM Conference on Recommender Systems (RecSys'22)

10/01/2021 – 15/01/2021 Zhongshan, China (Virtual)
International Conference on Pattern Recognition and Artificial Intelligence (ICPRAI'20)

06/03/2019 – 08/03/2019 Tehran, Iran
International Conference on Pattern Recognition and Image Analysis (IPRIA'19)

PROJECTS

01/04/2026 – CURRENT
Sentra (Visual Question-Answering Core)

- **Affiliation:** Postdoctoral Researcher, SnT, University of Luxembourg
- **Target Audience:** Robotics & Information Retrieval Research Communities
- A lightweight, modular **Generative AI** and **artificial intelligence** framework to give robotic systems advanced visual-linguistic reasoning capabilities
- Uses state-of-the-art **Vision-Language Models (VLMs)** (Gemini, Llama, OpenAI) to extract multi-modal visual embeddings from active camera streams.
- Implements a real-time, context-aware **Retrieval-Augmented Generation (RAG)** workflow that cross-references spatial graphs with local vector indexes.
- **Stack:** Python, Vision-Language Models, ROS2, Docker
- **Person-days**: 120 (6 months * 20 workdays)

Link https://github.com/snt-arg/sentra

15/11/2025 – CURRENT
Multimodal Retrieval-Augmented Generation (RAG)

- **Target Audience:** Information Retrieval Research Community
- A real-time, context-aware RAG workflow as an end-to-end solution for integrating multimodal data sources for recommendation systems
- Supports various **MM-LLM backends**, including Gemini, Groq, Mistral, OpenAI, and Llama
- Extensible, agnostic architecture that covers a plug-and-play architectural structure, providing clean abstraction layers so developers can swap downstream LLMs, VLMs, or custom reasoning kernels
- **Stack:** Python, Language Models (LLM/VLM)
- **Person-days**: 220 (11 months * 20 workdays)

Links https://github.com/alitourani/Omni-RAG | https://github.com/alitourani/mm-graph-rag

01/05/2025 – 30/01/2026

SMapper (Multi-Modal Data Acquisition Device)

- **Affiliation:** Research Mentor/Advisor, SnT, University of Luxembourg
- **Target Audience:** Robotics Research Communities
- A complete, replicable multi-modal data acquisition device and ecosystem designed to solve the reproducibility challenges in **spatial AI**
- Integrates fully synchronized LiDAR, multi-camera arrays, and inertial (IMU) **sensing layers** backed by a precise hardware-level alignment pipeline
- Modular open-hardware CAD design with a compact physical chassis supporting both mobile handheld execution and steady robot-mounted configurations
- **Stack:** ROS2, C++, Python, CAD, Docker
- **Person-days**: 180 (9 months * 20 workdays)

Links https://doi.org/10.1007/s10846-026-02351-7 | https://snt-arg.github.io/smapper_docs/

01/09/2024 – 15/12/2025

LLM-Driven Robotic Control Suite

- **Affiliation**: Research Mentor/Advisor, SnT, University of Luxembourg
- **Target Audience**: Robotics Research Communities
- Uses **LLMs** to parse spontaneous human natural language instructions, decoupling users from predefined terminal commands or complex manual controls
- Translates probabilistic LLM outputs into reliable execution sequences by dynamically generating and updating reactive Behavior Trees
- **Stack:** ROS2, Python, C++, GenAI, Docker
- **Person-days**: 280 (14 months * 20 workdays)

Links https://github.com/snt-arg/robot_suite | https://doi.org/10.1109/ACCESS.2025.3635471

15/01/2023 – 30/03/2026

vS-Graphs (3D Digital Twin Generation for Mobile Robots)

- **Affiliation**: Ph.D. Core Research Project, University of Luxembourg
- **Target Audience**: Robotics Research Communities
- A real-time framework for autonomous mobile robots that generates semantic and spatial maps of the operating environments as human-readable **3D maps** (**digital twins**)
- Translates low-level semantic components (like walls) into broader spatial entities (like rooms), creating an organized semantic hierarchy
- Embeds environmental logic into a unified, optimizable 3D graph structure, continuously refining both topological associations and spatial metrics
- **Stack:** Python, C++, OpenCV, ROS
- **Person-days**: 780 (39 months * 20 workdays)

Links https://snt-arg.github.io/vsgraphs-results/ | https://github.com/snt-arg/visual_sgraphs | https://youtube.com/playlist?list=PLK7g4G7RJRmpxKyM9ki40lGgIfj1SNkod&si=R2eZVA_XiUpGAiVd | https://doi.org/10.48550/arXiv.2503.01783 | https://doi.org/10.48550/arXiv.2604.24707 | https://doi.org/10.1109/IROS55552.2023.10341891

01/04/2022 – 15/03/2026

iMarkers (Imperceptible Robotic Landmarks)

- **Affiliation:** Doctoral Researcher, Interdisciplinary Research Project, University of Luxembourg
- **Target Audience:** Robotics & Augmented Reality (AR) Research Communities
- Next-generation, interdisciplinary tracking system that overcomes the visual-aesthetic limitations of traditional robotic perception
- Offers **production flexibility** to customize the exact optical visibility range and underlying data-encoding algorithms based on specific scenario demands
- **Stack:** Python, C++, OpenCV, ROS, Docker
- **Person-days**: 720 (36 months * 20 workdays)

Links https://snt-arg.github.io/iMarkers/ | https://www.uni.lu/snt-en/news/meet-ali/ | https://doi.org/10.1109/MRA.2026.3693135 | https://github.com/snt-arg/iMarker_detector_standalone

01/01/2021 – 30/06/2026

Multimodal Video Recommendation Systems

- **Affiliation**: Independent Research Initiative
- **Target Audience**: Streaming Platforms, Media Labs, & Scientific Research Community
- Advanced **content-based** personalization ecosystem designed to parse and model rich multimedia inputs (including visual, audio, and textual data)
- Processes diverse visual, textual, and audio embeddings extracted directly from full-length movies, trailers, and individual cinematic sequences to build comprehensive item profiles
- Supports LLMs and deep neural network pipelines to analyze video properties down to movie shots, capturing pacing changes, color semantics, and aesthetic features
- **Stack:** Python, PyTorch, HuggingFace Transformers, LLM APIs, Docker
- **Person-days**: 1300 (39 months * 20 workdays)

Links https://github.com/RecSys-lab/Popcorn | https://github.com/RecSys-lab/RAG-VisualRec | https://doi.org/10.48550/arXiv.2606.09595 | https://doi.org/10.1145/3818681

15/01/2019 – 30/09/2021

Real-Time Vehicle License Plate Tracking System

- **Affiliation**: Research Software Engineer at GSTP Incubation Center, Rasht, Iran
- **Target Audience**: Traffic Law Enforcement, Smart Toll Booths, & Secured Parking Systems, Rasht, Iran
- Production-ready intelligent transportation asset with a high-speed **license plate recognition** system
- The largest specialized **open-source dataset** for Persian alphanumeric OCR with 83,000+ instances
- Tuned to recognize non-standard variations, syntax arrangements, and individual alphanumeric properties
- **Stack:** Python, OpenCV, YOLO, Keras, TensorFlow
- **Person-days**: 400 (20 months * 20 workdays)

Links https://github.com/alitourani/yolo-license-plate-detection | https://github.com/alitourani/Iranis-dataset | https://doi.org/10.1109/ACCESS.2020.3035992 | https://doi.org/10.1007/978-3-030-59830-3_37 | https://doi.org/10.1142/S0218001421600089

15/09/2016 – 30/03/2019

Smart City - Vehicle Detection & Tracking

- **Affiliation**: M.Sc. Research Project (University of Guilan) & Post-Graduation Grant (GSTP-funded)
- **Target Audience**: Intelligent Transportation Systems (ITS) & Smart City Authorities, Rasht, Iran
- A deep learning-based system to achieve accurate localized visual features for multi-class vehicles
- Isolates visual features of targets directly from roadway camera streams, with precise tracking across varied environmental conditions.
- **Stack:** Python, MATLAB
- **Person-days**: 600 (30 months * 20 workdays)

Links https://github.com/alitourani/deep-learning-vehicle-detection | https://doi.org/10.1109/PRIA.2019.8785988 | https://github.com/alitourani/vehicle-speed-measurement | https://doi.org/10.5815/ijigsp.2019.04.04 | https://youtu.be/Qs-alxle-FU?si=eE-LAZehb6YP2C8T

HONOURS AND AWARDS

21/03/2026

Best Ph.D. Thesis Award Nominee – University of Luxembourg

Nominated for the Scientific Contributions, University of Luxembourg

15/09/2021

Full-Scholarship for Ph.D. Studies – University of Luxembourg

Competitive Position (TRANSCEND Project)

30/01/2019

Best Student Researcher Award (Class of 2016) – University of Guilan

Nominated for Scientific and Practical Contributions

30/01/2019

Academic Excellence Award (Class of 2016) – University of Guilan

Highest GPA in M.Sc. Computer Engineering

01/08/2016

Full Scholarship for Master Studies

Granted through a Nationwide Examination among +25,000 Applicants

Top-15 Business Planners Award – 10th Sheikh Bahai National Technopreneurship Competitions