Edin Jelačić

(He/Him)
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Professional Summary

- R&D Software Engineer and Researcher specializing in **Safety-Critical Systems**, **Verifiable AI**, and **Embedded Intelligence**. Combines a strong foundation in high-performance engineering (C++/C/Python) with advanced research in **simulation environments** and machine learning reliability. Proven track record at **Cosylab** developing control components for clinical facilities and at **Mälardalen University** building automated validation tools for industrial systems. Eager to apply expertise in intelligent systems, algorithm design, and real-time control to advanced engineering challenges.

Skills

- **Programming**: **Python**, **Java**, **C++**, **C**, **C#**
- **AI & ML**: **PyTorch**, **TensorFlow**, AI model deployment and analysis
- **Development Tools**: **Docker**, **SQLite**, **Electron.js**, designing **CI/CD pipelines**
- **Modeling & Simulation**: **MATLAB**, **Simulink**, **LTSpice**, **LabVIEW**, **ABB RobotStudio**
- **Hardware & Embedded**: Data Acquisition (DAQ), Signal Analysis, Electrical Measurement, PCB design
- **Languages**: **Bosnian** (Native), **English** (Expert proficiency), **Slovenian** (Advanced proficiency), **Swedish** (Beginner proficiency)

Work Experience

- **Fully-Funded PhD Researcher via the Knowledge Foundation (KK-Stiftelsen) - Computer Science (2023-present)**
  IDT - School of Innovation, Design and Technology Västerås, Mälardalens University
  Ongoing project: **PerFlex: Performant and Flexible digital Systems through Verifiable AI**
  - Architected and implemented an automated vehicular scenario generation pipeline utilizing the **esmini** simulation environment. Integrated a novel **HASCo** (Hybrid AI Scene Compiler) framework to orchestrate complex traffic scenarios for the validation of autonomous drive features under industrial safety constraints.
  - Engineered a **Deep Learning-based cache simulator** using **LSTM** networks to predict cache miss distributions, achieving near-native accuracy while significantly optimizing execution time compared to tools like DynamoRIO.
  - Developed a **CPU load forecasting framework** for industrial embedded systems, implementing **Conformal Prediction** for uncertainty quantification and **Shapley values** for real-time interpretability on resource-constrained hardware.
  - Architected a full-stack **Electron/Typescript** application to streamline AI model deployment, integrating **Docker** containerization for reproducible testing across simulation environments.
  - Co-authored a neural network reduction and verification algorithm building on top of the formal verification tool **Marabou**.
  - Collaborating with industrial partners (**Volvo Cars**, **Hitachi Energy**, **Ericsson**) to align research with production-grade safety standards, and supervised multiple Master Thesis students in AI/Reinforcement Learning topics.
- **Software Engineer, Control Systems Laboratory - Cosylab Ljubljana, Slovenia 2021 – 2023**
  - Engineered critical Java modules for radiation therapy control, architecting a unit safety analysis framework that ensured regulatory compliance for clinical facilities.
  - On-site engineering for an international client medical facility in Helsinki, Finland.
  - Successfully coordinated with international clients and technical experts.
  - Engineered and took responsibility for several software components of a high-level radiation therapy control system.
- **Student Developer, Control Systems Laboratory - Cosylab Ljubljana, Slovenia 2019 – 2021**
  - Contributed to the development and software engineering of commercial projects using C#.

- Assisted in project architecture implementation of SCADA protocols within a C# architecture.

Education

- **Master's Degree - Department of Robotics (2019-2021)**
  Faculty of Electrical Engineering Ljubljana, University of Ljubljana
  Master Thesis - **Dynamic Movement Primitives in High-Precision Robotic Applications** - Presented at the **30th International Electrotechnical and Computer Science Conference ERK 2021** (thesis available at this link)
  - Analyzed dynamic movement primitives as an algorithmic trajectory generation and reproduction tool.
  - Developed a new second-order filter approach to improve the precision of dynamic movement primitives on the example of camera-guided bacterial colony extraction.
  - Utilized MATLAB and Simulink, along with C++ PD controller.
  - Robotics control, forward and inverse kinematics and dynamics, signal and sensor theory studied throughout various courses and practical implementations.
  - Collaboration with ABB Robotics in Ljubljana, with ABB RobotStudio utilized on a novel pick-and-place implementation based on multiple laser distance measurements to target.
  - High academic results achieved throughout studies, with grade point average 9.4 out of 10.0 throughout Master studies.
- **Bachelor's Degree - Department of Automatic Control and Electronics (2016-2019)**
  Faculty of Electrical Engineering Sarajevo, Sarajevo University
  Bachelor Thesis - **Lazy Probability Roadmap Path Planning Algorithm for Robotic Manipulators**
  - Analyzed, described and implemented a graph-based Lazy PRM algorithm for path planning.
  - Implemented the algorithm in C++ (Boost Library) and MATLAB.
  - Undertook various courses on control theory, electronics and fundamentals of robotics.
  - National Silver Medal recipient for outstanding academic results throughout Bachelor studies, with grade point average 9.31 out of 10.0.

Publications

- **"Abstraction-based Reduction of Input Size for Neural Networks"** at the **AISoLa 2023 Conference**, Greece 2023.
- **"Machine-Learning Based Cache Miss Prediction"** at the **Springer International Journal on Software Tools for Technology Transfer - STTT**, Germany 2025
- **"A Conformal Prediction-Based Framework for CPU Load Forecasting: A Black-Box Approach"** at the **COMPSAC 2025 Conference**, Toronto, Canada 2025