# Adrian Mladenić Grobelnik

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**Work:** Jozef Stefan Institute, Jamova 39, 1000 Ljubljana (Slovenia)

## ABOUT ME

Driven and creative A.I. researcher & entrepreneur with 7+ years of experience researching, adapting and deploying state of the art A.I. systems. Bridging academia and industry through impactful A.I. applications. Published 8 papers (1 Best Paper Award), Stanford visiting researcher, founder of Zopyros Solutions.

## WORK EXPERIENCE

### *Jozef Stefan Institute*

#### Artificial Intelligence Researcher & Engineer

[ 07/2020 – Current ]

Primarily, I focus on researching, adapting and deploying Artificial Intelligence systems. My domain of expertise is Natural Language Processing, multi-agent systems, and LLM Agent Systems.
Secondarily, I develop and deploy full stack web applications with interactive data visualizations. Examples include "multicomet.ijs.si" and "at.ircai.org".
Additionally, I advise and assist PhD students in writing scientific articles, and share my work through publishing research papers at international conferences. Published 8 papers including 1 Best Paper Award.

### *Zopyros Solutions* – Ljubljana, Slovenia

**City:** Ljubljana | **Country:** Slovenia

#### Founder & Team Lead

[ 04/2024 – Current ]

Founded AI transformation consultancy for medium to large enterprises. Lead strategic AI implementation projects, helping companies harness the full potential of AI through custom solutions and cutting-edge technology integration. Successfully completed projects for major clients including Dormeo and Big Bang.

### *Stanford University*

#### Visiting Student Researcher

[ 06/2024 – 07/2025 ]

Conduct advanced research in AI and machine learning, focusing on compound AI systems optimization and graph neural networks. Published research on "Optimas: Optimizing Compound AI Systems" advancing multi-agent coordination methodologies.

### *Carnegie Mellon University (Mentored by Prof. Rayid Ghani)* – Pittsburgh, United States

**City:** Pittsburgh | **Country:** United States

### Artificial Intelligence Intern for Healthcare Applications

[ 08/2023 – 09/2023 ]

At CMU, I delved deep into real-world challenges of AI in healthcare. Key contributions:

- Pre-trained and fine-tuned large language models tailored to healthcare applications as part of the AI for Social Good initiative.
- Developed a comprehensive machine learning pipeline, allowing others to train their own models for the same applications.
- Collaborated on solutions set for deployment at IHHN Hospital, Pakistan.

## PROJECTS

[ 06/2024 – 07/2025 ]

**Optimas: Compound AI Systems Research**

Stanford University research collaboration on optimizing compound AI systems with globally aligned local rewards. Co-authored paper with researchers from Stanford, Amazon, and other leading institutions, advancing multi-agent AI coordination methodologies.

[ 05/2025 – Current ]

**Dormeo AI Solutions**

Completed AI implementation projects for Dormeo d.o.o. supporting their rapid growth. Delivered custom AI solutions enhancing customer experience through advanced technology integration and intelligent automation.

[ 08/2024 – 01/2025 ]

**Big Bang AI Product Transformation**

Helped Big Bang d.o.o. leverage AI for their product catalog management. Implemented AI-driven solutions transforming product discovery, classification, and customer recommendation systems.

[ 10/2023 – 12/2023 ]

**Predicting Impactful Events with Graph ML**

Research project using Graph Machine Learning for predicting impactful events. Developed novel methodologies for event prediction and impact analysis using graph neural networks on temporal data.

**Link:** https://medium.com/@adrian.mladenic.grobelnik/predicting-impactful-events-with-graph-ml-ccd0feefa869

[ 07/2020 – 08/2022 ]

**MultiCOMET Web**

Created and deployed a full stack interactive web application for multilingual commonsense description. Users can input any sentence, and request seven types of commonsense descriptions in a variety of languages. This was done under the scope of the project Development of Slovene in a Digital Environment.

**Link:** multicomet.ijs.si

[ 07/2020 – 03/2021 ]

**AI & Assistive Technology in Media**

Developed a full stack web application providing real-time interactive media coverage for the taxonomy of assistive technology in the form of an interactive visualization. This was done in collaboration with University College London and the International Research Centre On Artificial Intelligence.

## PUBLICATIONS

[2025]

**Optimas: Optimizing Compound AI Systems with Globally Aligned Local Rewards**

Compound AI systems integrating multiple components, such as Large Language Models, specialized tools, and traditional machine learning models, are increasingly deployed to solve complex real-world tasks. However, optimizing compound systems remains challenging due to their non-differentiable structures and diverse configuration types across components, including prompts, hyperparameters, and model parameters. To address this challenge, we propose OPTIMAS, a unified framework for effective optimization of compound systems. The core idea of OPTIMAS is to maintain one Local Reward Function (LRF) per component, each satisfying a local–global alignment property, i.e., each component's local reward correlates with the global system performance.

[2025]

**Towards AI-Powered Real-Time Negotiation Agent**

Here we introduce a web-based negotiation agent that combines AI's analytical power with human intuition, providing live recommendations during simulated conversations. Unlike prior tools limited to post-event analysis or structured tasks, our agent transcribes dialogue, builds a dynamic world model, and offers tailored advice beyond what standalone AI or humans typically achieve.

[2025]

**Automation of Slovenian Honey Pollen Analysis**

Applied computer vision and AI techniques to automate pollen analysis in Slovenian honey samples.

[2023]

**Best Paper Award: Emergent Behaviors from LLM-Agent Simulations**

This paper investigates the emergence of complex behaviors in multi-agent simulations using Large Language Models. Through progressively intricate simulations, we observe emergent behaviors ranging from simple games to geopolitics, highlighting the potential of LLMs in replicating societal structures.

Conference on Data Mining and Data Warehouses

[2023]

**A commonsense-infused language-agnostic learning framework for enhancing prediction of political bias in multilingual news headlines**

We propose a framework to predict political bias in multilingual news headlines using Inferential Commonsense Knowledge and a Translate–Retrieve–Translate strategy. Our evaluations highlight improved accuracy and underscore the impact of translation quality on prediction performance.

Knowledge-Based Systems

[2022]

**SLOmet – Slovenian Commonsense Description**

This paper presents Slovenian commonsense description models based on the COMET framework for English. Inspired by MultiCOMETs approach to multilingual commonsense description, we finetune two Slovenian GPT-2 language models.

Conference on Data Mining and Data Warehouses

[2021]

**Understanding Text Using Agent Based Models**

The paper proposes a novel approach to text understanding and generation focusing on short and simple stories. The proposed approach attempts to understand and generate stories by creating an explainable, agent-based world model of the story.

Conference on Data Mining and Data Warehouses

**Link:** https://videolectures.net/sikdd2021_mladenic_grobelnik_text/

[2020]

**MultiCOMET – Multilingual Commonsense Description**

This paper presents an approach to generating multilingual commonsense descriptions of sentences provided in natural language. We have expanded on an existing approach to automatic knowledge base construction in English to work on different languages.

Conference on Data Mining and Data Warehouses

**Link:** http://videolectures.net/sikdd2020_mladenic_grobelnik_multicomet/

[2019]

**The Next Big Thing In Science**

This paper presents an approach to predicting the future development of scientific research based on scientific publications from the past two centuries. We have applied machine learning methods on the Microsoft Academic Graph dataset of scientific publications.

Conference on Data Mining and Data Warehouses

**Link:** http://videolectures.net/sikdd2019_mladenic_grobelnik_next_big_thing/

## EDUCATION AND TRAINING

### Bachelors in Mathematics and Computer Science

***University of Ljubljana*** [ 10/2021 – 09/2025 ]

**City:** Ljubljana | **Country:** Slovenia | **Website:** https://www.uni-lj.si/en

### Wolfram Summer School Alumnus

***Wolfram Summer School (Mentored by Stephen Wolfram)*** [ 06/2023 – 07/2023 ]

**City:** Boston | **Country:** United States | **Website:** https://education.wolfram.com/summer-school | **Field(s) of study:** Artificial Intelligence ; Large Language Models ; Multi-agent Simulations

**Link:** https://community.wolfram.com/groups/-/m/t/2960085

I worked closely with Stephen Wolfram to develop simulations using the Wolfram Language to create and analyze complex multi-agent systems, with agents represented by Large Language Models such as GPT-3.5 and GPT-4. This process also involved crafting detailed prompts for these agents.

### High School Graduate & Former Head Boy

***British International School of Ljubljana*** [ 08/2009 – 07/2021 ]

**Address:** C. 24. Junija 92, 1231 Ljubljana (Slovenia) | **Website:** https://britishschool.si/

## HONOURS AND AWARDS

[ 06/2018 ] Association for Technical Culture of Slovenia
**1st Placed Junior Competitive Programmer in Slovenia**

Link: https://www.zotks.si/

[ 09/2016 ] Junior Balkan Olympiad in Informatics
**Honorable Mention**
After competing with the best under-18 competitive programmers in the Balkans, I received an honorable mention. Moreover, I was one of the youngest competitors at the age of 13.

Link: http://jboi2016.cs.org.mk/

[ 01/2018 ] Association for Technical Culture of Slovenia
**2nd Placed Junior Competitive Programmer in Slovenia**

Link: https://www.zotks.si/

[ 02/2019 ] World Scholars Cup, Ljubljana Regional Round
**1st Placed Debate Team**

Link: https://www.scholarscup.org/

[ 02/2018 ] World Scholars Cup, Ljubljana Regional Round
**1st Placed Argumentative Essay**

Link: https://www.scholarscup.org/

[ 03/2019 ] ACM High School Competition in Computer Science and Informatics
**Silver Medal**

Link: https://rtk.ijs.si/2019/rezultati.html

[ 06/2018 ] World Scholars Cup, Kuala Lumpur Global Round
**2nd Placed European Team**

Link: https://www.scholarscup.org/

[ 06/2019 ] World Scholars Cup, The Hague Global Round
**3rd Placed European Team**

Link: scholarscup.org

[ 11/2018 ] World Scholars Cup, Yale University Final Round
**1st Placed Slovenian**

Link: scholarscup.org

## SKILLS

### AI & Machine Learning

PyTorch / Transformers / Deep Learning (Tensorflow, Pytorch(basic), Jax/Flax(basic) ) / Large Language Models / Multi-Agent systems / Prompt-Engineering / Graph Neural Networks / Computer Vision / Machine Learning, NLP / Model Fine-tuning / Vector Databases / RAG Systems / Knowledge Graphs / Hugging Face Transformers / Prompt Engineering

**Web Development**

React / HTML5 / CSS / JavaScript / Apache ECharts / JavaScript / Angular framework / D3 / Bootstrap / Node.js / Full-Stack Development / TypeScript / Django/fastAPI

**Programming Languages**

Java / C/C++ / Wolfram Language / HTML5/CSS, Javascript / MATLAB / SQL / Python / Wolfram Language + Wolfram Mathematica

**Cloud & Infrastructure**

MongoDB / Git / Microsoft Azure, Microsoft 365 / Platform : AWS Cloud / PostgreSQL / Docker

**Research & Analysis**

Scientific Writing / Data Analysis / Graph ML / Time Series Analysis / Agent-Based Modeling / Predictive Modeling

**Business & Leadership**

AI Strategy & Transformation / Startup Leadership (Founder & Team Lead) / Project Management / Technical Mentorship / Public Speaking

## LANGUAGE SKILLS

**Mother tongue(s):** Slovenian | Croatian

**Other language(s):**

**English**

**LISTENING** C2 **READING** C2 **WRITING** C2

**SPOKEN PRODUCTION** C2 **SPOKEN INTERACTION** C2

**French**

**LISTENING** B1 **READING** B1 **WRITING** B1

**SPOKEN PRODUCTION** B1 **SPOKEN INTERACTION** B1

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

## SOCIAL AND POLITICAL ACTIVITIES

[ 08/2021 – 08/2021 ] Thessaloniki, Greece

**Thessaloniki International Forum '21-7th International Forum of EYP Greece**

The European Youth Parliament is a peer-to-peer educational programme that brings together young people from across Europe to debate the pressing issues of our time. I participated in their sessions as a delegate, debating a variety of issues European society presently faces and proposing a multitude of solutions drafted in a comprehensive resolution document.

Link: http://www.eypgreece.org/en/page/1063/call-for-delegates-tif-21

[ 09/2019 – 09/2019 ] Hamburg, Germany

**91st International Session in Hamburg, Germany**

Link: https://eyp.org/90th-international-session-in-hamburg-germany/

[ 07/2019 – 07/2019 ] Ljubljana, Slovenia

**5th National Selection Conference of European Youth Parliament Slovenia**

Link: https://m.facebook.com/ljubljana2019/community/

[ 02/2019 – 05/2019 ] Ljubljana, Slovenia

**12th Regional Session of European Youth Parliament Ljubljana, Slovenia**

Link: https://eypslovenia.org/

## HOBBIES AND INTERESTS

**Guitar**

**Swimming**

**Skiing**

**Running**