

Curriculum Vitae: Karlo Babić

CONTACT INFORMATION	University of Rijeka Faculty of Informatics and Digital Technologies Radmile Matejčić 2 HR-51000, Rijeka Croatia	<i>phone:</i> +385 51 584-718 <i>mail:</i> karlo.babic@inf.uniri.hr <i>web:</i> www.inf.uniri.hr
	Researcher ID ORCID	E-5801-2019 https://orcid.org/0000-0001-6343-0938

EDUCATION

PhD, Information Science, University of Rijeka, Faculty of Informatics and Digital Technologies, 2019-2025.
Thesis Topic: *The Pyramidal Recursive Neural Network for Multilevel Text Representation*.
Supervisor: Ana Meštrović.

M.Sc., Informatics, University of Rijeka, Faculty of Informatics and Digital Technologies, 2016-2018.
Thesis Topic: *Visualization of learning algorithms of neural networks*. Supervisor: Ana Meštrović.

B.E., Informatics, University of Rijeka, Faculty of Informatics and Digital Technologies, 2013-2016.
Thesis Topic: *Implementing the Solar System model using OpenGL library and C++ language*. Supervisor: Ana Meštrović.

LIFELONG LEARNING AND PROFESSIONAL SPECIALIZATION	4th International School on Deep Learning Las Palmas de Gran Canaria, Spain Workshop "Search tools for scientific sources" University of Rijeka, Rijeka, Croatia Early Career Training Event COSTNET The Department of Statistics, Ludwig-Maximilians-University, Munich, Germany February 2019	26-30 July 2021 9 April 2019 11-13 February 2019
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PROFESSIONAL POSITIONS	Assistant Faculty of Informatics and Digital Technologies, University of Rijeka 2018 - present
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RESEARCH INTERESTS	Machine learning, neural networks, simulations, natural language processing, representation learning
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RESEARCH PROJECTS	Researcher <ul style="list-style-type: none">Hybrid approaches of artificial intelligence in natural language processing and knowledge generation, uniri-iz-25-215 2025 - 2029Artificial intelligence methods for media text analysis and research on information dissemination, uniri-iz-25-44 2025 - 2029Multilayer Framework for the Information Spreading Characterization in Social Media during the COVID-19 Crisis (HRZZ InfoCoV) 2020 - 2022Keyword Extraction and Summarization Based on Language Networks (LangNet), uniri-drustv-18-20 2019 - 2022Methods for measuring semantic similarity of texts (SemTex), uniri-drustv-18-38 2019 - 2022
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Journal publications

Babić, Karlo, and Ana Meštrović. "Recursively Autoregressive Autoencoder for Pyramidal Text Representation." *IEEE Access* 12 (2024): 71361-71370.

Pitoski, Dino, Karlo Babić, and Ana Meštrović. "A new measure of node centrality on schedule-based space-time networks for the designation of spread potential." *Scientific reports* 13.1 (2023): 22561.

K. Babić, M. Petrović, S. Beliga, S. Martinčić-Ipšić, M. Matešić, A. Meštrović. "Characterisation of COVID-19-Related Tweets in the Croatian Language: Framework Based on the Cro-CoV-cseBERT Model." *Applied Sciences*, 2021, 11, 21.

K. Babić, F. Guerra, S. Martinčić-Ipšić, A. Meštrović. "A Comparison of Approaches for Measuring the Semantic Similarity of Short Texts Based on Word Embeddings." *JIOS*, 2020, 44, 2.

A. Vorkapić, K. Babić, R. Radonja, S. Martinčić-Ipšić. "Machine learning methods in monitoring operating behaviour of marine two-stroke diesel engine." *Transport*, 2020, 35, 5.

K. Babić, S. Martinčić-Ipšić, A. Meštrović. "Survey of Neural Text Representation Models." *Information*, 2020, 11, 511.

Conference proceedings

K. Babić. "Selection in the Meme Pool: Graph-Based Evolution of Textual Content." *ECAI*, 2025, Bologna, Italy. Accepted for publication.

K. Babić, A. Meštrović. "Pyramidal Recursive Composition of Multi-Word Units into Unified Representations." *CECIIS*, 2025, Varaždin Croatia. Accepted for publication.

K. Babić, M. Petrović, S. Beliga, S. Martinčić-Ipšić, M. Pranjić, A. Meštrović. "Prediction of COVID-19 Related Information Spreading on Twitter." *MIPRO, DS-BE*, 2021, Opatija, Croatia, 2021, pp. 395-399.

K. Babić, M. Petrović, S. Beliga, S. Martinčić-Ipšić, A. Jarynowski, A. Meštrović. "COVID-19-Related Communication on Twitter: Analysis of the Croatian and Polish Attitudes." *ICICT*, London, England, 2021, pp. 379-390.

K. Babić, S. Martinčić-Ipšić, A. Meštrović, F. Guerra. "Short texts semantic similarity based on word embeddings." *CECIIS*, Varaždin, Croatia, 2019, pp. 27-33.

K. Babić, A. Meštrović. "Visualizations of the training process of neural networks." *MIPRO, SP*, 2019, Opatija, Croatia, 2019, pp. 1619-1623.

Talks

K. Babić, S. Martinčić-Ipšić. "The representation of text in a multilayer complex network for deep learning." 4th COSTNET Action conference, Bilbao, Spain, 9-11 September 2019. (Poster)

K. Babić. "The representation of text in a multilayer complex network for deep learning." Early Career Training Event COSTNET, the Department of Statistics, Ludwig-Maximilians-University, Munich, Germany, 11-13 February 2019.

K. Babić, A. Meštrović. "Neural networks visualizations." 10th International Conference on Information Technologies and Information Society, Novo Mesto, Slovenia, 24-26 October 2018.

TEACHING EXPERIENCE	Undergraduate courses	
	<ul style="list-style-type: none"> • Introduction to software engineering, FIDIT¹, University of Rijeka • Basics of game development, FIDIT, University of Rijeka • Programming Paradigms and Languages, FIDIT, University of Rijeka • Formal Languages and Compilers 2, FIDIT, University of Rijeka • Declarative programming languages, FIDIT, University of Rijeka • Formal Languages and Compilers 1, FIDIT, University of Rijeka • Programming 1, Department of Polytechnics, University of Rijeka 	2023 2022-2023 2021- 2019-2020 2019-2022 2018-2021 2018-2019
TECHNICAL SKILLS	Graduate courses	
	<ul style="list-style-type: none"> • 3D game development, FIDIT, University of Rijeka • Data intelligence, FIDIT, University of Rijeka • Big data analytics, FIDIT, University of Rijeka • Programming for artificial intelligence, FIDIT, University of Rijeka • Object-Oriented Languages, FIDIT, University of Rijeka • Natural Language Processing, FIDIT, University of Rijeka • Decision Support Systems, FIDIT, University of Rijeka • Management of IT Projects, FIDIT, University of Rijeka 	2024- 2023- 2023- 2023- 2021 2019- 2019-2022 2018-2021
HOBBY PROJECTS	Operating Systems	
	GNU/Linux, MS Windows	
	Programming Languages	
	Advanced: Python, JavaScript Intermediate: C++, C#, Java, Bash Beginner: Haskell, PHP	
	Tools	
	L ^A T _E X, TensorFlow/Keras, Godot, Unity	
	Simulations	
	Abstracted fluid, fluid flow on terrain, dynamics of falling flat object through air, pendulums, evolution tree generation, animated mathematics of chaos	
	Cellular automata	
	Game of life and modified versions, liquid automaton	
	Web scraping	
	Celestial events information, weather information, website crawler with audio and video scraping	
	Web	
	Simulations and games using JavaScript	
	Video games	
	For Web with JavaScript, and for mobile phones with Godot (Paperfall is on Google Play)	
LANGUAGES	<i>Fluent:</i> Croatian, English	

¹FIDIT - "Faculty of Informatics and Digital Technologies"