

Prospective supervisor's form

Name of the supervisor: Julian Szymański

Academic title: phd Habilitated

Orcid ID number: <https://orcid.org/0000-0001-5029-6768>

Faculty of Electronics, Telecommunications and Informatics

Gdańsk University of Technology Department of Computer Architecture

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Discipline: technical informatics and telecommunication none

Optional

Key words (obligatory four key words describing research interests / expertise):

artificial intelligence

natural language processing

cognitive science

IoT

Bibliometric indicators

1. Number of journal publications in WoS/ Scopus 57/77

2. Citations excluding self-citations WoS 152 Scopus 204

3. Hirsch index WoS 8 Scopus 11

1. The number of PhD students who have graduated under your supervision: 0

2. The number of PhD students currently supervised:

a. within the current doctoral school 0

b. within doctoral studies (previous system) 1

3. Are you currently accepting new PhD students:

a. Polish Yes/No Yes

b. Foreign Yes/No Yes

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Research interests or topics offered for PhD research (no more than 2000 characters)ⁱⁱ

My research interests are in the domain of artificial intelligence and cognitive sciences. Especially the applications of the machine learning algorithms for information retrieval. As part of my research, I develop algorithms for more accurate extraction of information from text. In my approach, I use natural language processing tools and computational intelligence methods. Cognitive theories about human cognition serve me as an inspiration for the algorithms that can better process textual data, in a way similar to humans. I currently work on automated document categorization methods that are based on innovative semantic similarity measures. I'm researching methods of text representation and methods for effective indexing of large collections of the text based on so-called semantic hashing. I'm also involved in projects related to image processing especially with the usage of deep neural networks.

My competences from the machine learning area I use in the domain of signal processing. Here I'm working on the algorithms of analyzing the data from the sensors that are used for making the predictions in the modeled area. Especially I'm interested in beehive sensing for making computational models of the bee family. Also, I'm involved in the project of analyzing EEG data for making brain-computer interfaces.

The general list of the topics of my interest:

- Information retrieval
- Search engines
- Natural language processing
- Deep neural networks for text and image processing
- Signal processing for sensor data
- EEG signal analysis
- Brain-computer interfaces
- Internet of Things
- Blockchain

Funding or special equipment needed to carry out a PhD project ⁱⁱⁱ:

1. Is funding available for experimental work: *Yes/No/not needed*

2. Is the equipment needed to complete a PhD project available in your lab/department: *Yes/No/not needed*

Most important publications – no more than 5 published after 1.01.2018

No	Authors/title/journal	Number of points according to the current list of the Ministry of Science and Higher Education	Publication year
1.	Higinio Mora Mora, Jesús Peral Cortés, Antonio Ferrández Rodríguez, David Gil, Julian Szymanski: Distributed Architectures for Intensive Urban Computing: A Case Study on Smart Lighting for Sustainable Cities. IEEE Access 7:	140	2019
2.	Andrzej Sobecki, Julian Szymanski, David Gil, Higinio Mora: Deep learning in the fog, International Journal of Distributed Sensor Networks	70	2019

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3.	David Gil, Magnus Johnsson, Higinio Mora Mora, Julian Szymanski: Advances in Architectures, Big Data, and Machine Learning Techniques for Complex Internet of Things Systems. Complexity	70	2019
4.			
5.			

Most recent externally funded projects you were involved in – no more than 3

No	Project title, the name of the Principal Investigator (PI) and the institution the project was carried out	Years	Role in the project ^{iv}
1.	Health Discoverer - repozytorium danych medycznych wraz z platformą analityczną do wspomaganie decyzji medycznych, Andrzej Sobecki, Gdańsk University of Technology	2018-2019	Co-I
2.	Modelowanie wydajności, niezawodności i zużycia energii wielopoziomowych systemów równoległych wielkiej skali z uwzględnieniem CPU oraz GPU, Paweł Czarnul, Gdańsk University of Technology	2013-2016	Co-I
3.	Metody heterarchicznego wyszukiwania informacji wspomaganie sieciami leksykalnymi, Julian Szymański, Gdańsk University of Technology,	2010-2013	PI

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Additional relevant information – (no more than 1600 characters)^v



ⁱ You may select up to two disciplines out of 12 disciplines represented in the Doctoral School

ⁱⁱ Observe the limit of not more than 2000 characters

ⁱⁱⁱ Leave only one answer

^{iv} Select the role in the project: PI stands for principal investigator (refers to the holder of an independent grant and the lead researcher for the grant project), Co-I for co-investigator (Co-I assists the principal investigator in the management and leadership of the research project), R for researcher

^v Add any other relevant information e.g. awards for PhD students whom you supervised (no more than 1600 characters)