



Report

Workshop on the application of machine learning in solving global challenges in the field of water and energy

Under the auspices of the of the WSDAC, UNESCO 2nd Category Center, a workshop entitled Application of Machine Learning in Solving Global Challenges in the Field of Water and Energy was organized on 25th December at the Faculty of Natural Sciences and Mathematics in Kragujevac. In addition to the associates of the Center for Computer Modeling and Optimization of the Faculty of Natural Sciences and Mathematics (CERAMO), researchers from the Jaroslav Cerni Water Institute from Belgrade, experts from the Kragujevac company Vodena and professors from the Faculty of Civil Engineering in Belgrade also participated in the workshop. The aim of the workshop was to train experts from various fields to solve global problems in the field of water and energy using machine learning methods, as well as to establish mutual cooperation between researchers from several institutions dealing with this type of problem.

At the beginning of the workshop, the director of the UNESCO WSDAC Center Brankica Majkić Dursun, addressed the participants via video link, after which Professor Boban Stojanović and Boško Laković (Vodena) gave an interactive lecture on basic concepts of machine learning . During the workshop, Lazar Krstić (PMF) spoke about the possibilities of the Tensorflow library "under the hood", important for the formation of complex models of machine learning. In the third part of the workshop, Professor Miloš Ivanović (PMF) and Branka Jovanović (PMF) presented the latest research results in the field of application of artificial neural networks enriched with information on physical laws (PINN) and their advantages over traditional modeling methods.

Thanks to a very lively panel discussion, the workshop resulted in the formation of several mixed teams from different institutions that will work together in the coming period on research in the application of PINN methods in solving global challenges in the field of water and energy. It is expected that the first results of the research will be presented at the international conference Applied Artificial Intelligence (<http://aai2022.kg.ac.rs>), which will be held in the spring in Kragujevac.



Participants on the Workshop on the application of machine learning in solving global challenges in the field of water and energy

List of participants:

| | | |
|------------------------|---|-------------|
| Luka Milivojević | Faculty of Electrical Engineering, University of Belgrade | Student |
| Dušan Marjanović | Water Institute Jaroslav Cerni | PhD Student |
| Dejan Milošev | Water Institute Jaroslav Cerni | PhD Student |
| Vukašin Ćirović | Water Institute Jaroslav Cerni | Researcher |
| Andrija Savic | Faculty of Mathematics, University of Belgrade | Student |
| Bojana Borovićanin | Faculty of Natural Sciences and Mathematics, (University of Kragujevac) | Professor |
| Miloš Milašinić | Faculty of Civil Engineering, (University of Belgrade) | Professor |
| Maja Laković | Faculty of Natural Sciences and Mathematics, (University of Kragujevac) | PhD Student |
| Ognjen Ninković | Faculty of Engineering (University of Kragujevac) | Student |
| Dragan Rakić | Faculty of Engineering (University of Kragujevac) | Professor |
| Marija Milovanović | Water Institute Jaroslav Cerni | PhD Student |
| Srdjan Kostic | Water Institute Jaroslav Cerni | PhD |
| Ivan Marisavljević | Water Institute Jaroslav Cerni | Researcher |
| Nikola Bojović | Vodena | Engineer |
| Nevena Cvijanović | Water Institute Jaroslav Cerni | PhD Student |
| Vladimir Bačanin | Vodena | Engineer |
| Dušan Stefanović | Vodena | Engineer |
| Uros Stankovic | Vodena | Engineer |
| Tomislav Mrđa | Vodena | Engineer |
| Ana Kaplarević-Mališić | Faculty of Natural Sciences and Mathematics, (University of Kragujevac) | Professor |



Centar za vode za održivi razvoj i prilagođavanje klimatskim promenama pod pokroviteljstvom Uneska doo
Water for Sustainable Development and Adaptation to Climate Change (WSDAC), Centre under the auspices of UNESCO

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|------------------------|---|-------------|
| Lena Rašević | Faculty of Electrical Engineering, University of Belgrade | Student |
| Luka Stojadinović | Water Institute Jaroslav Cerni | PhD Student |
| Ognjen Micic | Faculty of Electrical Engineering, University of Belgrade | Student |
| Nikola Drakulić | Faculty of Electrical Engineering, University of Belgrade | Student |
| Marija Gradistanac | Other | Other |
| Visnja Simic | Faculty of Natural Sciences and Mathematics, (University of Kragujevac) | Professor |
| Бранко Арсић | Faculty of Natural Sciences and Mathematics, (University of Kragujevac) | Professor |
| Milos Blagojevic | Vodena | Engineer |
| Aleksandar Bodić | Faculty of Engineering (University of Kragujevac) | PhD Student |
| Miroљjub Krstic | Vodena | Engineer |
| Dušan Prodanović | Faculty of Civil Engineering, (University of Belgrade) | Professor |
| Milan Bojovic | Faculty of Engineering, (University of Kragujevac) | PhD Student |
| Života Lazarević | Vodéna | Engineer |
| Momcilo Prodanovic | Institute for informatics, (University of Kragujevac) | PhD Student |
| Brankica Majkić-Dursun | WSDAC Center | Director |

A handwritten signature in blue ink, reading 'Brankica Majkić-Dursun', written over a horizontal line.

dr Brankica Majkić-Dursun
Director WSDAC