

Proposals for MSc theses
Field of study: Informatics, speciality:
Geoinformatics and mobile technologies

In English

1.

Master Thesis Subject (Polish)	Badanie i klasyfikacja dna morskiego poprzez wydobywanie informacji przestrzennej na temat morfologii powierzchni dna z danych pochodzących z sondowania sonarem wielowiązkowym
Master Thesis Subject (English)	Seafloor investigation and classification by derivation of spatial information on seabed morphology from multibeam sounding data
Supervisor	dr hab. inż. Zbigniew Łubniewski
Consultant	-
Aim	In the thesis student should propose, implement and test on selected datasets the algorithms for processing the bathymetry data derived from multibeam echosounding, for seafloor investigation and characterisation. The proposed algorithms should be based on calculations, for the investigated seabed area, of bathymetry derivatives describing local seabed morphology, like slope, rugosity, curvature or BPI in a small as well large scale.
Tasks	1. State of the art analysis in using multibeam sonars in investigation of seafloor 2. Development and implementation of algorithms 3. Testing of algorithms, analysis and discussion of the results
Literature	1. Scientific publications and other materials at the supervisor's disposal
Number of contractors	1
Comments	-

2.

Master Thesis Subject (Polish)	Warunkowana generalizacja danych geoprzestrzennych
Master Thesis Subject (English)	Constrained generalization of geodata
Supervisor	dr hab. inż. Zbigniew Łubniewski
Consultant	-
Aim	Development, implementation, verification and performance comparison of algorithms processing spatial vector data for generalisation purpose, under the defined constrains and conditions. For instance, student will have a task to analyze the existing methods and propose his/her own approach to simplification of polygons representing administrative division in a manner preserving topology (i.e. the exact touching of adjacent polygons) as well as the feature area, perimeter etc. (using the defined tolerance).
Tasks	1. State of the art analysis in generalisation of spatial data 2. Development and implementation of algorithms 3. Testing of algorithms, analysis and discussion of the results
Literature	1. P. A. Longley, M. F. Goodchild, D. J. Maguire, D. W. Rhind, Geographic information systems and science. Wiley, 2004 2. Materials at the supervisor's disposal
Number of contractors	1
Comments	-

3.

Master Thesis Subject (Polish)	Zastosowanie dedykowanych metod heurystycznych w marszrutyzacji pojazdów
Master Thesis Subject (English)	Using dedicated heuristic methods in vehicle routing problem
Supervisor	dr hab. inż. Zbigniew Łubniewski
Consultant	-
Aim	The aim of the thesis is development and verification of algorithms solving the Vehicle Routing Problem (VRP) for vehicles delivering goods to the defined set of destinations, e.g. shops, wholesales etc. It is possible to make assumptions reducing the mentioned problem to the classical travelling salesman problem, i.e. we should visit a number of destinations using only one vehicle, with optimal or near optimal order. To decrease the number of solutions in a searched space student should use the heuristics specific for geographical data, e.g. the location-based selection of groups of destinations foreseen to be visited in a one, indivisible sequence. The proposed solutions should be compared with those based on using known metaheuristics like simulated annealing, Tabu-Search etc.
Tasks	1. Analysis of the problem and formulation of the algorithms specification 2. Software implementation 3. Analysis and comparison of algorithms performance
Literature	1. Vehicle Routing Problem (http://neo.lcc.uma.es/vrp/) 2. P. A. Longley, M. F. Goodchild, D. J. Maguire, D. W. Rhind, Geographic information systems and science. Wiley, 2004 2. Scientific publications and other materials at the supervisor's disposal
Number of contractors	1-2
Comments	-

4.

Master Thesis Subject (Polish)	Badanie jakości mobilnych usług strumieniowych
Master Thesis Subject (English)	Quality Study of Mobile Streaming Services
Supervisor	dr inż. Przemysław Falkowski-Gilski
Consultant	-
Aim	The aim of the thesis is to perform a quality study concerning selected streaming services. The tests should include different types of devices, environments as well as mobile connections.
Tasks	1. Perform an analysis of the mobile streaming market. 2. Select devices and test environments. 3. Propose a test scenario and carry out investigation. 4. Prepare a final report.
Literature	1. Hoßfeld T., Seufert M., Sieber C., Zinner T., Tran-Gia P., Identifying QoE optimal adaptation of HTTP adaptive streaming based on subjective studies, Computer Networks, vol. 81, 320-332, 2015. 2. Vetro A., Sodagar I., The MPEG-DASH Standard for Multimedia Streaming Over the Internet, IEEE Computer Society, vol. 10-12, 62-67, 2011.
Number of contractors	1
Comments	

5.

Master Thesis Subject (Polish)	Analiza metod phishingu w mediach elektronicznych
Master Thesis Subject (English)	Analysis of Phishing Methods in Electronic Media
Supervisor	dr inż. Przemysław Falkowski-Gilski
Consultant	-
Aim	The aim of the thesis is to perform a study concerning phishing in selected electronic media. The tests should include different types of methods, environments and applications as well as target groups..
Tasks	<ol style="list-style-type: none"> 1. Perform an analysis of the phishing methods. 2. Select methods and test environments. 3. Propose a test scenario and carry out investigation. 4. Prepare a final report.
Literature	<ol style="list-style-type: none"> 1. Hong J., The State of Phishing Attacks, Communications of the ACM, vol. 55, no. 1, 74-81, 2012. 2. Jain A. K., Gupta B. B., A machine learning based approach for phishing detection using hyperlinks information, Journal of Ambient Intelligence and Humanized Computing, vol. 10, 2015-2028, 2019.
Number of contractors	1
Comments	

6.

Master Thesis Subject (Polish)	Analiza algorytmów w strategicznych grach turowych
Master Thesis Subject (English)	Analysis of Algorithms in Turn-Based Strategic Games
Supervisor	dr inż. Przemysław Falkowski-Gilski
Consultant	-
Aim	The aim of the thesis is to perform a study concerning selected algorithms in turn-based strategic games. The tests should include different types of algorithms, game mechanics and scenarios.
Tasks	<ol style="list-style-type: none"> 1. Perform an analysis of the strategic turn-based game market. 2. Select algorithms and test environments. 3. Propose a test scenario and carry out investigation. 4. Prepare a final report.
Literature	<ol style="list-style-type: none"> 1. Lesperance Y., Levesque H. J., Lin F. Scherl R. B., Ability and Knowing How in the Situation Calculus, Studia Logica, vol. 65, 165-186, 2000. 2. Muto K., Nishino J., Fuzzy Evaluation of Macroscopic Situation for Turn based Strategic Games, Proc. Joint 8th International Conference on Soft Computing and Intelligent Systems and 17th International Symposium on Advanced Intelligent Systems, 1-4, 2016.
Number of contractors	1
Comments	

7.

Master Thesis Subject (Polish)	Aplikacja mobilna wspomagająca kontrolę alergenów
Master Thesis Subject (English)	Mobile Application Supporting Allergen Control
Supervisor	dr inż. Przemysław Falkowski-Gilski
Consultant	-
Aim	The aim of the thesis is to perform a study concerning the possibility of utilizing a mobile application for allergen control purposes. The tests should include different types of allergens, individual needs of a particular user and lifestyle.
Tasks	<ol style="list-style-type: none"> 1. Perform an analysis of the mobile application market. 2. Select an operating system and programming environment. 3. Propose a test scenario and carry out investigation. 4. Prepare a final report.
Literature	<ol style="list-style-type: none"> 1. Sicherer S. H., Sampson H. A., Food allergy: Epidemiology, pathogenesis, diagnosis, and treatment, Journal of Allergology and Clinical Immunology, vol. 133, no. 2, 291-308, 2014. 2. Alm J. S., Swartz J., Lilja G., Scheynius A., Pershagen G., Atopy in children of families with an anthroposophic lifestyle, The Lancet, vol. 353, 1485-1488, 1999.
Number of contractors	1
Comments	

8.

Master Thesis Subject (Polish)	Koparka kryptowalut na platformie Nvidia GTX
Master Thesis Subject (English)	Cryptocurrency Excavator on Nvidia GTX Platform
Supervisor	dr inż. Przemysław Falkowski-Gilski
Consultant	-
Aim	The aim of the thesis is to perform a study concerning utilizing previous generation Nvidia GTX graphics cards as a cryptocurrency excavator. The task includes the design and development of a 3D model of the test bed, as well as selection of appropriate algorithms and environments.
Tasks	<ol style="list-style-type: none"> 1. Perform an analysis of the cryptocurrency market. 2. Design a stand and select the programming environment. 3. Propose a test scenario and carry out investigation. 4. Prepare a final report.
Literature	<ol style="list-style-type: none"> 1. Liu Z., Luong N. C., Wang W., Niyato D., Wang P., Liang Y. C., Kim D. I., A Survey on Blockchain: A Game Theoretical Perspective, IEEE Access, vol. 7, 47615- 47643, 2019. 2. Morisse M., Cryptocurrencies and Bitcoin: Charting the Research Landscape, Proc. 21st Americas Conference on Information Systems, 1-16, 2015.
Number of contractors	1
Comments	

9.

Master Thesis Subject (Polish)	Aplikacja mobilna monitorująca zanieczyszczenie powietrza w miastach
Master Thesis Subject (English)	Mobile Application for Monitoring Air Pollution in Cities
Supervisor	dr inż. Przemysław Falkowski-Gilski
Consultant	-
Aim	The aim of the thesis is to perform a study concerning the possibility of developing a mobile application for monitoring air quality in cities. The tests should include different websites and data bases, including public and private institutions.
Tasks	<ol style="list-style-type: none"> 1. Perform an analysis of available data sources on air quality in cities. 2. Select data sources, set test environments and develop a mobile application. 3. Propose a test scenario and carry out investigation. 4. Prepare a final report.
Literature	<ol style="list-style-type: none"> 1. Molina M. J., Molina L. T., Megacities and Atmospheric Pollution, Journal of the Air & Waste Management Association, vol. 54, no. 6, 644-680, 2004. 2. Gilmour M. I., et al., How Exposure to Environmental Tobacco Smoke, Outdoor Air Pollutants, and Increased Pollen Burdens Influences the Incidence of Asthma, Environmental Health Perspectives, vol. 114, no. 4, 627-633, 2006.
Number of contractors	1
Comments	

10.

Master Thesis Subject (Polish)	Algorytmy routingu dla sieci samochodów elektrycznych
Master Thesis Subject (English)	Routing algorithms for e-cars
Supervisor	Andrzej Chybicki, PhD.
Consultant	-
Aim	The aim of the thesis is to design and implement the SaaS platform that routing of the electric cars that would take under consideration additional constraints like charging stations localizations, range, destination, energy price etc.
Tasks	<ol style="list-style-type: none"> 1. System & algorithms design 2. Implementation 3. Tests 4. Summary
Literature	1. Electric Vehicle Routing Problems : models and solution Approaches, Jose-Alejandro Montoya, https://tel.archives-ouvertes.fr/tel-01441718/document
Number of contractors	1
Comments	

11.

Master Thesis Subject (Polish)	Metody projektowania aplikacji na klastry komputerowe w oparciu o gotowe rozwiązania do przetwarzania danych geoprzestrzennych
Master Thesis Subject (English)	Migration methods of applications that use geospatial data to computer clusters
Supervisor	dr inż. Jerzy Demkowicz
Consultant	
Aim	Migration methods analysis
Tasks	1. Problem analysis 2. Project and implementation 3. Comparison of existing methods 4. Defining of an iteration approach 5. Test and optimization
Literature	1.MPI: A Message-Passing Interface Standard Version 2., Message Passing Interface Forum June 4, 2015 2. 3.OpenMP Application Program Interface Version 4.5 November 2015, 3
Number of contractors	1
Comments	

12.

Master Thesis Subject (Polish)	Wykorzystanie wirtualnej maszyny Dalvik do tworzenia wbudowanych systemów czasu rzeczywistego
Master Thesis Subject (English)	Dalvik Machine
Supervisor	dr inż. Jerzy Demkowicz
Consultant	
Aim	1. VVM Environment 2.DVM analysis
Tasks	1.Problem analysis 2.Project and implementation UML Real Time 3. Real time system analysis 4.Real time systems in the context of Virtual system 5. Prototype implementation
Literature	1) Dalvik Machine manual.2019, 2019
Number of contractors	1
Comments	

13.

Master Thesis Subject (Polish)	Wykrywanie i ocenianie niebezpieczeństwa w systemie autonomicznym z wykorzystaniem sztucznej inteligencji
Master Thesis Subject (English)	Deep Learning in automation
Supervisor	dr inż. Jerzy Demkowicz
Consultant	
Aim	Deep Learning In everyday usage
Tasks	1.Problem analysis 2.Project and implementation
Literature	Deep Learning(Miękka) 2018, Autor: Bengio Yoshua, Courville Aaron, Goodfellow Ian
Number of contractors	1
Comments	

14.

Master Thesis Subject (Polish)	Porównanie algorytmów wyznaczania zasięgu powodzi z optycznych i radarowych zdjęć satelitarnych
Master Thesis Subject (English)	Comparison of algorithms for determining the extent of floods from optical and radar satellite images
Supervisor	dr inż. Tomasz Berezowski
Consultant	--
Aim	Implementation and testing of algorithms allowing effective mapping of flood extent from VIS-NIR and SAR images. Verification of operation for the data set from at least 2002-2019
Tasks	<ol style="list-style-type: none"> 1. Analysis of the problematic issues 2. Tests and selection of the best algorithms 3. Solution implementation and application of the algorithm for data series 2002-2019 4. Discussion and conclusions
Literature	<ol style="list-style-type: none"> 1. Martinis, S.; Kersten, J. & Twele, A. 2015 A fully automated TerraSAR-X based flood service . <i>ISPRS Journal of Photogrammetry and Remote Sensing</i>, 104, 203 – 212 2. Martinis, S. & Rieke, C. 2015 Backscatter Analysis Using Multi-Temporal and Multi-Frequency SAR Data in the Context of Flood Mapping at River Saale, Germany. <i>Remote Sensing</i>, 7, 7732
Number of contractors	--
Comments	1

15.

Master Thesis Subject (Polish)	Radarowe techniki polarymetryczne do mapowanie powierzchni zalewu rzecznoego w wysokiej rozdzielczości
Master Thesis Subject (English)	Radar polarimetric techniques for mapping the flooding in a floodplain in high resolution
Supervisor	dr inż. Tomasz Berezowski
Consultant	--
Aim	Tests and implementation of selected techniques of polarimetric analysis of radar data for mapping the extent of flood from high resolution imagery
Tasks	<ol style="list-style-type: none"> 1. Analysis of issues covered 2. Data processing from the RADARSAT-2 sensor 3. Experimental work: tests of polarimetric techniques and implementation 4. Verification on the basis of observations made in the field 5. Discussion and conclusions
Literature	<ol style="list-style-type: none"> 1. Martinis, S.; Kersten, J. & Twele, A. 2015 A fully automated TerraSAR-X based flood service . <i>ISPRS Journal of Photogrammetry and Remote Sensing</i>, 104, 203 – 212 2. Martinis, S. & Rieke, C. 2015 Backscatter Analysis Using Multi-Temporal and Multi-Frequency SAR Data in the Context of Flood Mapping at River Saale, Germany. <i>Remote Sensing</i>, 7, 7732
Number of contractors	1
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