

Name of the unit: Poznań University of Technology, Faculty of Computing and Telecommunications

Position title: Post-doc – full-time employment

Requirements:

1. A Ph.D. degree obtained¹ not earlier than January 1, 2017, in one of the following scientific disciplines: computer science, econometrics, management, or mathematics.
2. The Ph.D. should have been obtained from an institution other than the Poznań University of Technology, or the candidate has completed at least a 10-month continuous and documented postdoctoral fellowship at an institution other than the Poznań University of Technology and in a country other than the country of obtaining the Ph.D. degree.
3. Knowledge in the fields of operations research, multiple criteria decision support, group decision-making, and machine learning - particularly rule-based knowledge representation.
4. Familiarity with basic programming languages (Python, C++, Java).
5. Ability to conduct scientific research documented by publications in the required knowledge areas.
6. At least a good command of English in both speech and writing.
7. Availability, willingness for self-improvement, strong motivation for scientific work, creativity in problem-solving, independence, reliability, and ability to work in a team.

Job description:

Work within the project "Intelligent decision support based on explanatory analytics of preference data" under the leadership of Prof. Roman Slowinski will specifically involve the following topics:

1. Consensus reaching in group decision-making using compatible instances of decision makers' preference models.
2. Improved algorithms of rule induction and construction of ensemble classifiers composed of diversified decision rules.

Ad. 1. Based on the observation that many previous studies on group decision-making did not pay enough attention to individual participation and satisfaction of DMs in the decision-making process, we proposed in [Y. Zhao, Z. Gong, G. Wei, R. Słowiński, Consensus modeling with interactive utility and partial preorder of decision-makers, involving fairness and tolerant behavior. *Information Sciences*, 638 (2023) 118933, <https://doi.org/10.1016/j.ins.2023.118933>] a new kind of consensus models for group utility optimization. An interesting follow-up of this study would consist in the application of robust ordinal regression for determining a representative collective utility function based on preference information reflecting the value systems of individual DMs. Another way of

¹ This period may be extended by the time spent during this period on long-term (over 90 days) documented sick leave or rehabilitation benefits due to incapacity for work. Additionally, this period can be extended by the number of months spent on leave related to childcare and upbringing granted according to the principles set out in the Labor Code. In the case of women intending to participate in the competition, it can be extended by 18 months for each born or adopted child, if this method of indicating career breaks is more beneficial.

determining a representative collective preference model would be possible if individual preferences of DMs would be represented by “if..., then...” decision rules. It would be consistent with explainable preference analytics. Then, the preference information of all DMs provided in terms of pairwise comparisons or classifications of some reference alternatives would be used by Dominance-based Rough Set Approach to induce a collective rule preference model guiding interactively the consensus-reaching process.

Ad. 2. All tasks of the project are based on representation of preferences in terms of „if..., then...” decision rule. The methodology of rule induction from ordinal data employs Dominance-based Rough Set Approach. The methodology has been described in [M. Szeląg, R. Słowiński, Explaining and predicting customer churn by monotonic rules induced from ordinal data. *European Journal of Operational Research*, 317 (2024) no.2, 414-424. <https://doi.org/10.1016/j.ejor.2023.09.028>]. Another topic of decision rule induction that is worth investigation is construction of ensemble classifiers composed of diversified basic classifiers. The basic classifiers would be sets of “if..., then...” decision rules obtained by algorithms developed within this task. The method for finding diversified basic classifiers would rely on preliminary results obtained in [J. Błaszczczyński, B. Prusak, R. Słowiński: Multi-objective search for comprehensible rule ensembles. In: V. Flores et al. (eds.): IJCRS 2016, LNAI 9920, Springer, Berlin, 2016, pp. 503-513, https://doi.org/10.1007/978-3-319-47160-0_46].

Type of NCN competition: MAESTRO

Deadline for submissions: September 15, 2024, hrs: 23:59

Submission method: e-mail

Employment conditions:

- Duration: 6 months with the possibility of extension to 36 months
- Employment form²: employment contract
- Funding amount: salary of a PLN 8,660 gross/month.
- Start date: October 1, 2024

Candidates are requested to submit an application consisting of:

1. CV with a cover letter.
2. Ph.D. diploma and a description of the defended doctoral dissertation.
3. List of publications and copies of up to 3 of the best ones.
4. Name, surname, position, and email address of a person who can provide a reference.
5. Statement or certificate of English proficiency.
6. Statement of programming language proficiency.
7. Statement of consent for the processing of personal data for recruitment purposes with the following content: "I consent to the processing of my personal data contained in the

² During the period of receiving this salary, the post-doc will not receive a salary from another employer based on an employment contract, including an employer based outside the territory of Poland, nor any other remuneration from funds granted as direct costs of research projects financed within the framework of NCN competitions.

application documents by the Poznań University of Technology, located in Poznań, for the purpose of conducting the current recruitment process."

Interested candidates are requested to send the relevant documents to the email address: roman.slowinski@put.poznan.pl by September 15, 2024.

Competition resolution date: September 23, 2024.

Information clause

In accordance with Art. 13 of the Regulation of the European Parliament and of the Council (EU) 2016/679 of 27 April 2016 on the protection of individuals with regard to the processing of personal data and on the free movement of such data and repealing Directive 95/46 /EC (hereinafter referred to as GDPR) we inform that:

1. The administrator of your personal data is Poznan University of Technology located at Pl. Marii Skłodowskiej - Curie 5, 60-965 Poznań e-mail: biuro.rektora@put.poznan.pl, phone: 61 665 3639.
2. Contact details of the Data Protection Inspector - Piotr Otomański, e-mail: iod@put.poznan.pl,
3. Your personal data will be processed in order to carry out the recruitment process; the legal basis for the processing of your personal data is voluntarily and knowingly expressed by your consent according to art. 6 section 1 (b) GDPR.
4. Personal data will not be passed on to processing entities (art. 28 section 1 GDPR). They can be only transferred only to bodies authorized by law.
5. Personal data will be kept for the period of the recruitment process or until you withdraw your prior consent, but its withdrawal does not affect the legality of the processing which was carried out on the basis of consent before its withdrawal.
6. You have the right to access your personal data, the right to rectify them, the right to transfer them, and if applicable, also to remove them, to limit processing and the right to object to processing.
7. You have the right to lodge a complaint with the President of the Office for Personal Data Protection when you feel that the processing of your personal data violates the provisions of the General Data Protection Regulation of 27 April 2016 (GDPR).
8. Providing by you your personal data is voluntary, however, the consequence of not providing personal data may lead to inability to consider your candidacy for a vacancy.
9. Your data will not be processed in an automated way, including profiling.