Course project overview

The course project is the *main* part of your coursework! The project topic should be related to network science and should go beyond this course, while projects can also borrow from other courses. Students can choose the project topic on their own or select one of the suggested topics. Projects must be done in groups of three or four students, whereas other group sizes will be allowed only in exceptional cases.

Students will be encouraged to submit an extended paper describing their course project to the Student Computing Research Symposium *SCORES '24*, computer science journals *Informatica* or *Uporabna Informatika*, preprint server arXiv.org, make their work publicly available or other.

Project types

- **[theoretical]** analytical derivation of rigorous theoretical results
- **[empirical]** empirical evaluation of methods, models, or networks
- **[methods]** design of novel or improved models, methods or algorithms
- **[coding]** scalable implementation of popular methods or algorithms
- **[community]** contribution to the Slovenian network science community
- **[contribution]** materials for future students of this course (i.e. handout)

Examples of projects

- Ključevšek, A., & Krapić, L. (2016). Discovering novel ingredient pairings in molecular gastronomy using network analysis. e-print *arxiv:1602.03719*, pp. 5.
- Mrzelj, N., & Poličar, P.G. (2017). Data clustering using stochastic block models. e-print *arxiv:1707.07494*, pp. 6.
- Marc, T., & Šubelj, L. (2018). Convexity in complex networks. *Network Science*, **6**(2), 176–203.
- Zavrtanik, V., & Šubelj, L. (2018). Community detection in Slovene public spending. *Uporabna Informatika*, **26**(3), 107–117.
- Šircelj, J., Koželj, R., & Šubelj, L. (2018). Effects of species extinction on ecosystems stability. *Uporabna Informatika*, **26**(3), 118–127.
- Naglić, L., & Šubelj, L. (2019). War pact model of shrinking networks. *PLoS ONE*, **14**(10), e0223480.
- Stavanja, J., Klemen, M., & Šubelj, L. (2020). Predicting kills in Game of Thrones using network analysis. *Uporabna Informatika*, **28**(2), 55–65.
- Svete, A., Hostnik, J., & Šubelj, L. (2020). It is not just about the melody: How Europe votes for its favorite songs. *Uporabna Informatika*, **28**(2), 66–84.
- Poštuvan, T., Salkić, S., & Šubelj, L. (2021). Learning-based link prediction analysis for Facebook100

[network](#). *Uporabna Informatika*, **29**(2), 83–94.

- Stropnik, V., Đuranović, V., & Oražem, M. (2021). [Effect of key match events on football passmaps](#). e-print *arxiv:2108.05343*, pp. 5.
- Petkovšek, G., Božič, J., & Marolt, M. (2022). [Use of network features to improve 3D object classification](#). *Proceedings of SCORES* '22, 1-4.
- Jonke, Ž. (2022). [An analysis of time complexity and a discussion on interpretability for two methods of constructing social network graphs](#). *Proceedings of SCORES* '22, 17-20.
- Džubur, B., Trojer, Ž., & Zrimšek, U. (2022). [Semantic analysis of Russo-Ukrainian war tweet networks](#). *Proceedings of SCORES* '22, 33-36.
- Horvat, M., Sovinc, L., & Grzin, D. (2023). [Identifying communities and ranking of drivers' performance in Formula One](#). *Proceedings of SCORES* '23, 47-50.
- Babnik, Ž., Pegan, J., Kos, D., & Šubelj, L. (2024). [Generating lyrics using constrained random walks on a word network](#). *Informatica*, **48**(1), 131–140.

Examples of handouts

- Kljun, M., Krivec, J., & Teršek, M. (2022). [Graphlets and motifs](#). *INA* course materials, pp. 7.
- Trnovec, L., & Štrosar Grmek, L. (2023). [Network sampling](#). *INA* course materials, pp. 7.
- Velikajne, N., Pelhan, J., & Štremfelj, J. (2023). [Network comparison](#). *INA* course materials, pp. 5.

Project report

Project report should consist of $\approx$ **3 pages** in PNAS format (use this [template](#)). It should be submitted to [Gradescope](#) as a group submission (entry code JKX87N) and is due on **May 31st** at 11:59pm.

The project report should include a title and short abstract, problem definition, motivation and background, an overview of relevant literature, description of data, methods and algorithms, main results supported by plots, tables and diagrams, a summary of results, main contributions, final conclusions, and future work.

Project steps

1. read enough literature
2. decide on your project domain
3. find relevant data and check it
4. decide on your project problem
5. clearly state your project hypotheses
6. select appropriate tools and techniques
7. preliminary analysis of hypotheses
8. find related papers and read them

Project tips

- know your project domain

- assume data you can actually get
- make hypotheses as simple as possible
- use the simplest methods and techniques possible
- make results practically useful and valuable
- make project completion feasible
- start working on the project early
- work and write simultaneously