

Developing a recommender system for suggesting alternative ways of data visualization for Sustainable Development Goals

Iaroslav Boretskii ^{a*}, Menno-Jan Kraak ^b

^a Cartography M.Sc. student, borecky1998@gmail.com

^b Department of Geoinformation Processing, Faculty of Geoinformation Science and Earth Observation, University of Twente, m.j.kraak@utwente.nl

* Corresponding author

Keywords: data visualization, recommender systems, SDG, United Nations, storytelling

Abstract:

The UN Agendas for the Sustainable Development Goals (SDGs) remain engaged in technology, academia, media, policy and education. Most of the targets and indicators for the 17 goals already have an established methodology and can be expressed in a measure of value, and thus can potentially be visualized, mapped.

Indicators' and goals' data can be used for a plenty of analysis: comparisons between countries and territories, for assessing dynamics, identifying qualitative and quantitative transformations, classification, for possible forecasting. From time to time the data (not only the SDG data) is not necessarily visualized successfully: the type of data or presentation format may be not well understood, the design or visualization type itself (especially maps) may be inappropriate, the audience can be misplaced; the external support to see potential successful diagram variations, including the inclusion of some data transformation option, is often needed. Therefore, research on mapping and visualization within the SDGs is still needed; as a contribution to this ongoing overall research, this work attempts to develop an interactive system of guidelines and hints for proper visualization of SDG data, realized as a recommender system.

The first step for the recommendation system is the literature review on the systematization and classification of graphics and visualization methods (Engelhardt & Richards, 2018, 2020, 2021). Secondly, the software review and analysis are made to understand key features of computer-based algorithms for suggestions of charts and plots. Finally, the theoretical basis for the recommender system should be implemented, considering the data visualization' inventory size and SDG data formats. Final focus of the study is aimed at the correct formulation of the request from the user (with user-centered design), which determines the delivery order for possible visualization options. The system also includes map use environments, such as interactive maps, dashboards, storytelling options. Potential applications of the system outside the SDG framework are considered.

Figure 1 schematically explains the desired results with corresponding features and questions to be considered.

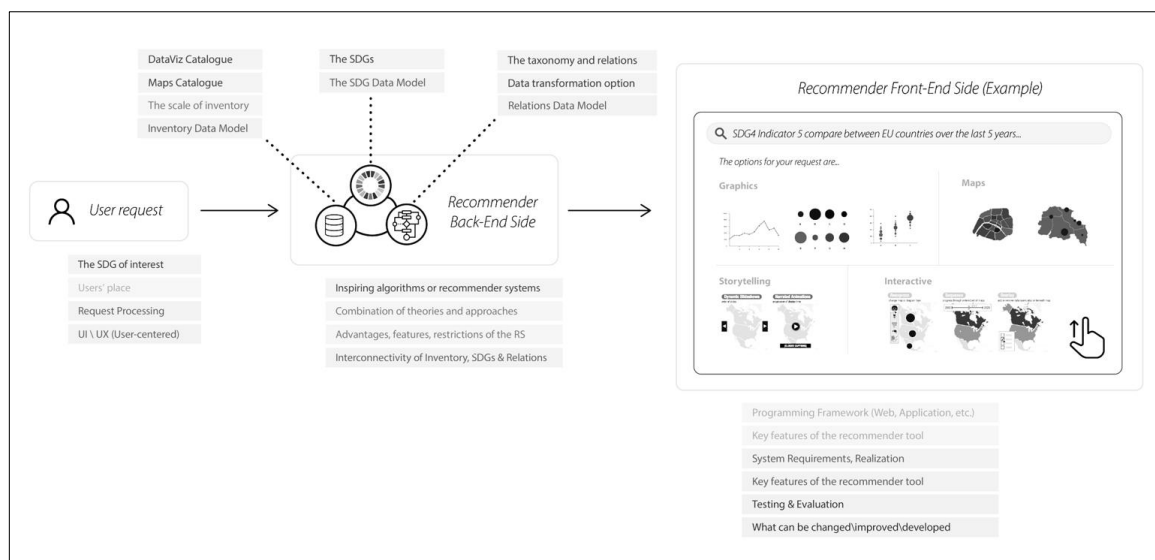


Figure 1. Recommender system concept schematic explanation

References

- Engelhardt, Y., & Richards, C. (2018). A framework for analyzing and designing diagrams and graphics. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 10871 LNAI. https://doi.org/10.1007/978-3-319-91376-6_20
- Engelhardt, Y., Richards, C. (2020). The DNA Framework of Visualization. In: Pietarinen, AV., Chapman, P., Bosveld-de Smet, L., Giardino, V., Corter, J., Linker, S. (eds) *Diagrammatic Representation and Inference. Diagrams 2020. Lecture Notes in Computer Science()*, vol 12169. Springer, Cham. https://doi.org/10.1007/978-3-030-54249-8_51
- Kraak M.-J., R.E. Roth, B. Ricker, A. Kagawa, G. Le Sourd. (2020). *Mapping for a Sustainable World*. The United Nations: New York, NY (USA).