

# A Commentary on the Erotetic Search Scenarios Generation Procedure

The notion of an erotetic search scenario is not used in a strict way in the research presented in [1]: one of the objects (*i10*) in the initial set was actually not a proper ESS, but a so-called imperative counterpart – IC [2] of another erotetic search scenario present in the set, *i8*. An IC is an object obtained from an ESS by removal of all of the auxiliary questions (in the considered case two formulas were removed in total). From the pragmatic point of view, an IC carries the same information as a corresponding ESS because auxiliary questions are not of practical importance. Structurally speaking though, those two objects differ. This difference is the reason for the preservation of the descendants of both of the mentioned objects throughout the generation procedure.

As the goal of the mentioned research was more focused on the presentation of a particular methodology than on the deep exploration of the properties of this particular, arbitrary set of objects, the conceptual difference between ESSs and their imperative counterparts was of minor importance. However, to check the impact of the IC but also of changes in the content of the initial set on the results a mini-study consisting of two experiments was performed. Both experiments employed almost the same procedure as the main study presented in [1]. The only differences were that in the first experiment the IC was removed from the initial set, and in the second one a new scenario similar to *i8* (the order of the introduction of the (two) queries was inverted) replaced the IC in the set. The data resulting from all of the studies are available in an archive file uploaded on the same web page as this document.

The first experiment yielded an expected decrease (the number of building elements in the initial set was lower) of the number of generated ESSs (3262 in total). The second study resulted in a roughly similar number of ESSs (5730) as in the main study. The number of the non-dominated ESSs when all the criteria were taken into consideration remained the same (5) in each experiment as well as in the main study. However, when the *purity* criterion was dropped the number of non-dominated ESSs was lower (68) in the first experiment and was similar (93) in the second one when compared to the main study. Finally, the orders of the values within the criteria, obtained by ranking those values with the numbers of ESSs that they characterize remained the same in both experiments and in the main study. However, the exact ratios of those numbers within the criteria differed significantly between the main study and the first experiment. These differences were small between the main study and the second experiment – with an exception of the redundancy criterion (but even in this case the differences between the values remained clearly visible in the second experiment).

The differences were expected, as both the number of the scenarios in the initial set and the order of occurrences of the formulas in the scenarios are non-transparent factors for the generation procedure. However, the overall results of this mini-study, especially the outcome of the second experiment, were in agreement with the results of the main study. This high similarity between the results of the main study and the second experiment can be likely accounted by the fact that both the IC and the ESS replacing it were identically evaluated and their structures resembled one another. Altogether, the results of the two experiments reinforce the statement that the pragmatical difference between ESSs and ICs is actually minor.

## References

- [1] Szymon Chlebowski, Maciej Komosinski, and Adam Kups. Automated generation of erotetic search scenarios: Classification, optimization, and knowledge extraction. *ACM Transactions on Computational Logic (TOCL)*, 18(2):8, 2017.
- [2] A. Wiśniewski. *Questions, Inferences and Scenarios*. College Publications, London, 2013.