Combining process efficiency with process flexibility: The promise of artificial intelligence

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ABSTRACT

Artificial intelligence may not just provide information services but could also have a major impact on the organization of planning processes, adding higher levels of flexibility to efficiency. Apart from AI's information services, the added value of flexibility may especially support processes that are confronted with high variabilities as, e.g. processes dealing with risk management and contingency planning.

Keywords: *Artificial intelligence; planning processes; flexibility; risk management.*

Editorial

Traditionally, planning activities rely on *data*, on (*mathematical) relationships* (models) between data, on *decision rules* and on *expert knowledge* which can provide all three of them. Data, models, and decision rules are the decisive elements of an integrated system underlying a planning process.

Expert knowledge

Expert knowledge is different from the three basic components of a planning system. It may not only contribute to the specification of necessary data, models, and decision rules but it may also provide a planning solution by utilizing the internal understanding of data, relationships and rules without explicitly specifying them.
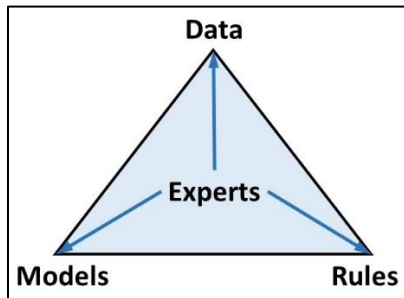
In the development of planning systems, major efforts of research have traditionally been placed on the extraction of expert knowledge (based on system analysis or judgements) for defining suitable data objects, models, and decision rules and to detach the planning process as much as possible from human inference (figure).

This approach has two advantages. Planning systems gain in efficiency as the process can easily be replicated and it detaches the process from individual expertise which is time consuming and might have deficiencies. However, the gain in efficiency is usually linked to a loss in flexibility which could be provided by human participation. This is not an issue in routine processes where the efficiency gain is of major interest.

In planning processes where flexibility is of major concern, the detachment from human contribution is less developed. A case in point are efforts in contingency planning where a planning process may be confronted by variations of newly emerging and, maybe, unexpected contingencies.

The promise of Artificial Intelligence

For these situations, *Artificial Intelligence* offers a new approach for replacing direct human incorporation while keeping flexibility and still reach high levels of efficiency. It allows to reduce the dependency on data, models, and decision rules, early extracted from expert knowledge and to enhance the use of artificial intelligence, i.e. to reverse the traditional approach for eliminating human dependency (figure).

Artificial Intelligence can be automatically approached through appropriate prompts and offers the documented combined knowledge of the global expert group.
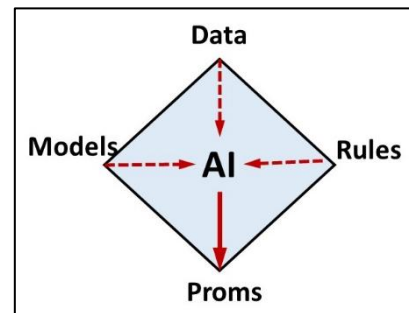
The prompts represent the models of interacting with Artificial Intelligence. The initial triangle of process elements, data, models, and decision rules is extended by the models of approaching artificial intelligence, the prompts. It will be the challenge of the coming years to develop prompt models in a similar way, mathematical models had been developed earlier.

More reading

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