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Foundation Model Use for Technology Diffusion Monitoring

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Foundation models (FMs) challenge our assumptions about how organizations can develop and use machine learning (ML) technologies in their business activities. Foundation models are trained on broad data sets and can be adapted to a variety of new tasks (Bommasani et al., 2022). While these types of models do not present technological novelty, they exhibit novel properties and capabilities from the sociotechnical perspective that make them particularly interesting for IS scholars and practitioners. Considering the development and leveraging of FMs from the user perspective constitutes a virtually untapped IS research area with high practical relevance. In this TREO talk we present a research project exploring this perspective and which is currently in a design phase.

FMs are trained on massive datasets because they do not require manual annotation or labelling. Instead, a self-supervised learning approach is used. In the natural language processing context, the typical ML training approach is to use masked language modeling task, where the algorithm “tries” to predict a word that has been masked (hidden) in a given sentence. Once trained, FM can be either fine-tuned to a specific task using a relatively small data set that has been labeled or queried directly using so called prompt. Prompting involves providing a description of the task in the form of natural language. Such a description necessarily provides context for the new task. This allows FMs to leverage the patterns in the initial training dataset to formulate a continuation of the prompt. Thus, performing tasks for which FMs were not explicitly trained constitutes their emerging property. Triggered by these advances and highly publicized results from models such as GPT-3, DALL-E, Stable Diffusion, and BLOOM, organizations are now increasing trying to incorporate FMs into their operations. This, however, creates new challenges, which we explore in our study.

Given the novelty of the research topic, the proposed study relies on autoethnographic approach to investigate the process of developing and leveraging a capability enabled by an FM. In the proposed study we select a common task in digital strategizing, technology diffusion monitoring, as the study setting. We form a dyad consisting of a researcher and a research assistant, where they jointly develop a solution for monitoring commercial diffusion of technologies based on a FM, GPT-3 in this case. Such dyad and task resemble organization settings, where a manager with business domain understanding is working with a junior colleague, who has limited domain expertise, but higher competence in ML technology development. The focal dyad approaches the task through prompt engineering, as well as model fine-tuning. Through our autoethnographic approach we intend to study the process experienced by the dyad, while they develop and use GPT-3 for a highly scalable monitoring of technology diffusion based on text analysis.

References

Bommasani, R., Hudson, D.A., Adeli, E., Altman, R., Arora, S., von Arx, S., Bernstein, M.S., *et al.* (2022), “On the Opportunities and Risks of Foundation Models”, arXiv.