

rigidly adheres to the prescriptive interpretation and enactment of a predefined BP model, ABPMSs must simultaneously take into account multiple (potentially conflicting) constraints regulating strict and/or flexible aspects of a BP execution in a procedural or declarative way. Among these constraints, there could be a partial BP execution that needs to be completed, violating the frame with the minimum cost.

Regarding autonomy within the frame, an ABPMS can proactively reframe itself as it acquires new knowledge during adaptation, improvement, or explanation phases. Alternatively, it can be restricted by the designer, determining which parts of the frame it can modify independently and which require human intervention. Furthermore, the ABPMS's autonomy depends on its knowledge of the environment: the more information it has about the process' context and constraints, the more it can make informed decisions and act accordingly. Besides, the ABPMS should ask its human agent for additional information whenever needed.

Indeed, despite the autonomous nature of ABPMSs, human involvement remains essential [3], particularly for maintaining trust and a sense of control within the workforce, a known barrier to the adoption of automated technologies in Information Systems [4]. To address these concerns while minimizing human effort, an ABPMS should be *conversationally actionable*, engaging with users through natural language when the constraints of the frame cannot be met. Effective communication with humans is crucial for the ABPMS not only for responding to queries but also for initiating conversations about the BP progression, making recommendations for interventions, and discussing with them the benefits and drawbacks of actions.

This research proposal explores how *Conversational AI* can support the framed autonomy of ABPMSs. The conversational interface should function as a Decision Support System (DSS), providing explanations for the ABPMS's choices and suggestions when constraints are violated. Additionally, Conversational AI can facilitate *what-if BP analysis*, explaining the implications of violating particular constraints and helping to find the optimal trade-off that minimizes violation costs while allowing the process to progress.

Differently from traditional user interfaces (UIs) for DSSs, a Conversational AI-based interface in ABPMSs enables intelligent and insightful interactions with users. To better illustrate this, we examine a healthcare scenario involving the treatment of hip fractures [5]. The frame includes procedural clinical guidelines and declarative constraints representing basic medical knowledge. During the process enactment, violations of these constraints may occur, and the ABPMS must find the near-optimal frame, namely the right trade-off for such violations, through intelligent interactions with clinicians to discuss with them the nature and severity of the violations.

For instance, if a patient has a high body temperature, he cannot immediately undergo surgery but an X-ray check must be performed. In this case, the ABPMS should converse with the doctor to determine whether to book an X-ray check. However, the doctor, leveraging his expertise, may decide to proceed with the surgery to prevent further damage to the patient's hip mobility in cases of extremely severe fractures. Another example involves the patient showing post-operative delirium. The ABPMS notifies the doctor, who requests a what-if analysis to explore the consequences of delaying physiotherapy. The ABPMS might explain that delaying physiotherapy could slow down recovery but help prevent complications from delirium, whereas starting physiotherapy could worsen the delirium. Hence, the doctor might choose to violate the conventional guideline of initiating physiotherapy within 24 hours, opting to wait an additional 12 hours to monitor and reassess the patient's condition before making a final decision.

This healthcare scenario exemplifies how Conversational AI can enable the effective collaboration between the ABPMS and the doctors in a trustworthy manner to manage violations of the initial constraints by dynamically aligning the execution to the novel frame. Thus, building on the previous considerations, the following research questions (RQs) can be drawn:

RQ1: *What conversational techniques have been developed to enable actionable conversations?*

RQ2: *How can Conversational AI support framed autonomy in ABPMSs?*

RQ3: *How does Conversational AI impact human trust and influence the adoption of ABPMSs?*

2. Related Work

In recent years, there has been significant interest in DSSs due to their ability to aid humans in making high-quality decisions based on domain-specific information [6]. Since the foundational work in [7], various studies have focused on developing recommendation services to guide decision-making during process execution by suggesting possible next steps. Other research has employed Markov Decision Processes to determine optimal decisions based on probability distributions of all potential ones [8, 9]. Novel advancements in AI models have fostered the evolution of DSSs, allowing for the prediction of decisions and explanation of factors influencing them [10, 11]. Additionally, emerging Large Language Models (LLMs) technologies have been explored to improve DSSs by transforming business questions and hypotheses written in natural language into executable specifications that generate relevant reports for stakeholders [12, 13].

A related area to this research proposal is *What-if analysis*, which involves building digital process twins of the BP (i.e., simulation models) to evaluate the outcomes of their execution based on the specified constraints [14]. Conversational approaches for assisting this analysis have focused on enabling the specification of what-if simulation scenarios through natural language, facilitating the comparison of the BP performance against a standard reference [15, 16].

Moreover, *Prescriptive process monitoring* focuses on optimizing BPs by recommending interventions in real-time to prevent negative outcomes or address poorly performing cases [17] and explored the combination of conversational methodologies with recommendation systems [18].

Unlike the existing literature, this research proposal aims to leverage of Conversational AI to assist the framed autonomy of ABPMSs by providing a holistic approach that includes process-aware decision support, monitoring, and what-if analysis, thereby enhancing their functionality and trustworthiness.

3. Methodology

In this section, we examine in detail the RQs and explain how conversational AI can address them. We present the results achieved, highlight open challenges, and propose potential solutions.

3.1. RQ1: What conversational techniques have been developed to enable actionable conversations?

RQ1 requires an extensive and structured review of the state-of-the-art approaches facilitating actionable conversations to back framed autonomy in ABPMSs. Thus, we developed a survey

Future work includes extending these techniques to fully leverage what-if analysis for anticipating the consequences of frame violations in ABPMSs. For instance, the integration with prescriptive process monitoring can provide more accurate what-if scenarios, improving the quality of natural language responses. Moreover, LLMs suffer from poor explainability and hallucinations [31]: we posit that integrating Symbolic AI reasoners can enhance the reliability and transparency of the conversational DSS, making its reasoning more human-understandable. Another avenue involves implementing techniques for continuous process monitoring that utilize real-time data streams to detect frame deviations and proactively propose adjustments.

3.3. RQ3: How does Conversational AI impact human trust and influence the adoption of ABPMSs?

RQ3 investigates how Conversational AI can boost human trust in ABPMSs, thereby encouraging their wider adoption. Indeed, it plays a crucial role in framed autonomy since, instead of merely presenting actions to select for the human agent as in traditional UIs, it supports decision-making intelligently by providing useful insights into the choices. Nevertheless, the ABPMS's decisions in sensitive contexts, e.g., in our healthcare example, might not be trusted by patients who fear for their health and safety. Thus, the human agent (e.g., a doctor) remains essential for trust. Additionally, users of ABPMSs themselves may not trust the system's decisions.

For this reason, in [32], inspired by established principles for trustworthy AI, we explored factors that foster human trust in these systems. We developed and validated a classification framework to assess the trustworthiness of ABPMSs, linking specific trust principles to each step of the system. Adopting this framework can lead to the implementation of more transparent, reliable, and accountable ABPMSs, capable of handling modern BP complexities.

Future research will address the lack of standardized metrics for evaluating the trustworthiness of ABPMSs and the impact Conversational AI has on them. A potential solution is to develop comprehensive metrics that include both qualitative and quantitative aspects, such as user satisfaction surveys, adherence to ethical guidelines, and performance benchmarks. Moreover, users may distrust ABPMS decisions if they do not understand the reasoning behind them. Implementing explainable AI to provide clear and understandable explanations for decisions is crucial, along with user-friendly interfaces that visualize decision pathways. Furthermore, the dynamics of human-AI collaboration in decision-making processes, particularly in high-stakes environments, are not well understood. Hence, we plan to conduct empirical studies to explore human and conversational DSS interactions in various scenarios. Insights from these studies will inform the design of interaction protocols with the ABPMS to improve efficiency and trust.

4. Outlook

Our research proposal investigates the application of Conversational AI to support framed autonomy in ABPMSs. This research endeavor will improve decision support, what-if analysis, and real-time monitoring within ABPMSs. Indeed, our initial results show a promising boost in the system's ability to provide intelligent, context-aware answers and foster human trust.

Thus, enhancing the framed autonomy and trustworthiness of ABPMSs, we hope to lay the ground for their broader adoption and more effective application across various industries.

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