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Intelligent Process Automation Using Artificial Intelligence to Create Human Assistant

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ABSTRACT

This paper presents a systematic literature review on Intelligent Process Automation (IPA), focusing on its role in modernizing business operations. It explores the integration of AI, including machine learning and robotic process automation, and their combined impact on improving efficiency and supporting human-centric tasks. The review examines the synergy between AI and human expertise, highlighting how this collaboration enhances decision-making, reduces errors, and speeds up task execution. It also investigates how digital assistants within the IPA framework redefine operational processes, supported by case studies and empirical research. The paper addresses challenges and ethical concerns related to AI integration, offering insights on risk management and ethical AI use. In conclusion, it emphasizes the paradigm shift created by AI-driven IPA, optimizing business processes and focusing on cognitive tasks, and contributing to the ongoing discussion about AI's transformative impact on human-machine collaboration.

KEYWORDS

Requirements Engineering, Requirements Classification, Machine Learning, Classification

1. INTRODUCTION

Working in an integrated environment which involves collaboration between human and an Artificial Intelligence (AI) required a confidence on the presented system which is itself autonomous and is guided to perform near to actual tasks. To work and produce higher results, a digital assistant system should monitor the human performance closely in order to anticipate the level of accuracy it can produce (Chen, M. et al., 2020). While working in daily routines, a human interacts which different entities. They're come instances where a secondary assistance is required to complete a derived task.

Mostly, human collaborate with digital libraries such as online help to seek outcomes or coordinate with stakeholders which are proficient in that domain. Interacting and taking assistance with different entities can be a time-consuming effort also prone to different problem. Thus, a real time help is not present at the very moment which serves the human need in performing. In this research paper, we

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discuss different approaches used in past and present in the domain of human computer interaction and aim to present a new system which can serve human needs in real time. A capable human robot collaboration at work environment implies robotic system process and monitor human-actions to predict plans. This observance is mostly based on body language to increase the productivity in workplaces. The decision making of this robotic system is highly based on the adaptation of various human behaviours. With the help of this, we can establish a well synchronized collaboration between human and robotic system (Görür et al., 2023).

Recent studies have indicated that human-AI collaboration can significantly enhance decision-making, efficiency, and innovation across various domains (Fragiadakis et al., 2024). AI-based digital assistants are increasingly becoming common in workplaces, enhancing human task performance with higher interactivity and intelligence (Maedche et al., 2019). Moreover, the integration of robots has revolutionized industrial automation, increasing productivity and safety (Fragiadakis et al., 2024). The field of human-computer interaction research is constantly advancing, with emphasis on developing interactive and user-friendly interfaces that can enhance user satisfaction and efficiency (Jannach et al., 2022). Moreover, AI can be applied to monitor and predict human actions for the identification of potential errors and timely interventions that can reduce the chances of making mistakes and increase overall performance (Montini et al., 2024). In addition, advanced HCI techniques have allowed for more natural and intuitive human-machine interactions. This includes multimodal interfaces that combine visual, auditory, and tactile inputs to create a more immersive and engaging user experience (Karahasanović et al., 2022). These advancements are crucial for ensuring that AI systems are not only effective but also user-friendly and accessible to a wide range of users.

2. LITERATURE REVIEW

Earlier studies conducted to create AI based collaborator explain the necessity for co-bots (A human-robot collaborator) to adapt short-term and sustained human behavior. It emphasizes the importance of social co-bots that can coordinate well with human partners, adapting to individual differences and long-lasting personal habits, trust, and preferences. One of the model focuses on Anticipatory Decision-Making Component which deals with unanticipated human behavior and their changing preferences during real-time collaboration tasks.

Another model introduces Adaptive Policy Selection Component which involves selecting the most suitable policies from a library to adapt to change characteristics for collaboration (Görür et al., 2023). Working on human subjects were also performed in a research using data analysis with SPSS which is a standard tool in statistical analysis in social sciences research (Murugesan et al., 2023). Another research discusses various machine learning approaches like reinforcement, supervised and unsupervised learning. This paper includes aspects like human effort, human intention, human motion, object of interest and robot decision making and task recognition. It also uses sensors (physical hardware) where it involves the use of vision to gain information.

With the help of such algorithms, a robot was implemented which successfully executed several tasks like predicting human next movement such as picking up an object. In another scenario, a robot positioned adjacent to a human could pick an object from the opposite end of the table and hand it over to the human. This system exhibited exceptional optimization in recognizing tools from human assessment. Some limitations as highlighted during the practical the ML algorithms such as reinforcement, supervised and unsupervised learning might have overlaps. It may lack in-depth analysis of specific case studies, which could provide more practical insights into the application of these techniques (Semeraro et al., 2023).

According to Magbool et al. (2024), RIS can integrate sensing, communication, and wireless power transfer (WPT) to create a multi-functional network that supports various applications simultaneously. The integration of sensing, communication, and powering (ISCAP) within RIS provides an efficient way to enable data transmission, radar sensing, and WPT concurrently. This