

# Robotics–Integrating RPA with AI–Enhancing Decision Making Process

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**Abstract—** The convergence of Artificial Intelligence (AI) and Robotic Process Automation (RPA) is transforming business operations by enhancing efficiency and decision-making through automation and advanced algorithms. Integrating AI with RPA allows for more intelligent, adaptive processes, leading to significant improvements in problem-solving, while a Hybrid Intelligence Systems (HIS) approach combines human expertise with these technologies to tackle complex challenges and drive innovation

**Keywords—** Digital Transformation, Machine Learning (ML) Robotic Process Automation (RPA)

This is an era of digital transformation caused by rapid technological advancement with 2 technological forces emerging as the key to reshaping the modern businesses landscape - Artificial Intelligence (AI) and Robotic Process Automation (RPA). Once believed to be separate domains, these technologies are now converging to create a synergy that is driving innovation and efficiency in the corporate world to an altogether new level that had hitherto remained unattained [1]. This article explores how the decision-making process and operational outcomes can be improved through the integration of RPA with AI technologies.

AI refers to the simulation of human intelligence in machines and is designed for mimicking human thinking and actions. These AI systems incorporate comprehension of languages, perception, and problem-solving, besides learning and reasoning. RPA encompasses application of software robots, popularly known as ‘bots’ for automation of monotonous, tedious, rule-based repetitive tasks, typically carried out by human workers while interacting with digital systems and software for business processes execution [1]. Because of its human-like intelligence and the ability to mimic human activities and make decisions, AI is revolutionizing the ways in which contemporary businesses interact with data to extract necessary information and generate useful insights. AI-driven Algorithms when combined with RPA bots will ensure steady, uniform, and error-free execution of tasks, thus lessening rework and data entry discrepancies and inconsistent task processing. AI enhances capabilities in decision making alongside risks mitigation [2].

Due to very nature of the businesses in the financial services industry transactions are information-intensive and experience rich data flows. Hence Process Automation (PA) can potentially be significantly helpful for such organizations and their businesses. Robotic Process Automation (RPA) has been most helpful in achieving operational efficiencies in these businesses and made decision making not only better but

faster too. However, higher levels of complexity of the Machine Learning (ML) algorithms have heightened the possibilities of integrating classic RPA with AI, ushering in Robotics 2.0 [3]. RPA, also known as Software Robotics, refers to using a novel class of software for automating business processes. The biggest advantage is that the cost is just a fraction of the cost incurred in implementing traditional solutions and there is no need for changing the present IT systems.

RPA works through the replication of contemporary human activities, while accessing websites, making use of the existing core applications, and manipulating the available data from spreadsheets, documents, and email for completing tasks. RPA can achieve a minimum of 25-50% reduction in manual operations costs while improving service and compliance, and generates return on investment (RoI) within a year. “Intelligent Robotics” involves application of AI and ML in RPA which allows automated processes to self-adjust and get better, and makes way for subjective decision-making besides following simple rules. This not only helps in faster yet superior decision-making driven by data but also enlarges the scope for automation of larger number of manual works [4].

However, the transition from RPA to Robotics 2.0 has challenges that must be handled to confirm adequate realization of benefits from modern technologies. Businesses can automate more sophisticated tasks that needed human perception and judgment, with the help of AI, through the integration of RPA with such cognitive technologies as ML, speech recognition, and natural language processing [3]. A good statistical or ML optimization approach is difficult to design. What is more difficult is designing and supervising an approach that conforms to the existing legal, ethical, and regulatory standards [4]. In terms of emotions, at present, intelligent solutions are yet to reach human capabilities, as is evident from everyday experiences with voice solutions [5].

Till date, RPA remains the software solution capable of performing regular, repetitive and elementary tasks that work on unambiguous rules. According to past researches, RPA is beginning to get “smart” applying AI and ML technologies, which helps to include intelligent features [6]. Evolutions in AI and RPA technologies have driven an exemplary shift in problem-solving methodologies. Conventionally complex problem-solving invariably required human expertise and intervention exploiting critical thinking, creativity, and domain knowledge and other cognitive skills.

The arrival of AI and RPA has revolutionized the technical world, endowing machines with amazing capabilities in terms

of data processing, pattern recognition, and automation, transforming the arena of problem-solving. AI and RPA do extremely well in routine tasks, repetitive processes and computational jobs, but often demonstrate the dearth of understanding of nuances, absence of intuition, and of contextual awareness [7]. These attributes are inherent in human intelligence. This complementarity has pushed the researchers and practitioners to focus increasingly on the integration of human expertise with AI and RPA technologies for synergize the strengths of both domains [1].

Routine tasks are easy to automat. Problems occur with complex exploratory tasks, such as solving new problems, creating the need for a hybrid approach to combine human intelligence with AI [8] which is achieved through a Hybrid Intelligence Systems (HIS). It integrates human proficiency with AI/RPA technologies representing a conceptual transformation in problem-solving methodologies. Organizations can use HIS to handle complex challenges, propel innovation, and attain sustainable solutions through the collaboration of human cognition with machine intelligence.

HIS promotes innovation and efficiency, thus improving precision of decision-making. RPA systems powered by AI algorithms provide computational power and process automation capabilities to generate data-driven insights but the domain knowledge, contextual understanding, and ethical reasoning remain human contributions. Organizations can navigate complexities, optimize resource utilization, and achieve optimal outcomes in problem-solving endeavors exploiting this collaborative synergy. HIS has transformed financial risk management, trading strategies, and domain expertise of financial analysts in fraud detection thus enhancing accuracy of credit scoring and reducing default rates. This collaboration demonstrates the transformative capacity of HIS in optimizing intricate decision-making processes [7].

Some scholars believe problem-solving using AI can augment humans as it allows distant organizational searches [9, 10], while others caution about possible interference of AI could with human behavior like forcing formal rationality [11] aggravating shortsighted and prejudiced organizational learning [12]. Regardless of difficulties and ethical considerations, techno-human integration in HIS represents a vital transformation in problem-solving approaches. More and better seamless collaboration between humans and AI-enhanced RPA systems are in store. This alliance will focus on perfecting strategic thinking and human creativity by exploiting accuracy and efficiency of AI-RPA systems.

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