

Empowering Healthcare Administration by Embedding Robotic Process Automation

Menachem Domb¹, Sujata Joshi² and Akanksha Singh²

¹Ashkelon Academy College, 12 Ben Zvi Street, Ashkelon, Department of Computer Science, Israel.

²Symbiosis Institute of Digital & Telecom Management, Symbiosis International (Deemed University), Pune, India.

*Correspondence:

Menachem Domb, Ashkelon Academy College, 12 Ben Zvi Street, Ashkelon, Department of Computer Science, Israel.

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ABSTRACT

The healthcare market involves intensive administration activities generating vast patient records, time-consuming data entries, appointment scheduling, and administrative duties records. Robotic Process Automation (RPA) automates tasks that are currently done manually, enforces compliance with regulations, minimizes mistakes, and frees up employees' time for more important tasks. It can also help control infections by managing patient flow and inventory, monitoring patients' health records and tracking their care plans, and assisting the respective staff based on data generated. Some research has been done in this area. Thus, this paper aims to expose the role and applications of RPA in the healthcare sector. Our analysis revealed that RPA can be applied to various healthcare administrative tasks, such as appointment scheduling, data entry, Billing, and claims handling. By automating these tasks, healthcare organizations can reduce costs, improve efficiency, and enhance patient care. However, challenges such as data privacy and security, resistance to change, and technical complexity may delay the adoption and implementation of RPA in Healthcare.

Keywords

Robotics, Automation, RPA, Healthcare administration.

Introduction

Robotic Process Automation is a tool that uses a particular software to manage the workflow of tasks and then uses robots to execute the process. The software tools include Blue Prism, LINX, UiPath, Automation Anywhere, and many more. RPA in Healthcare helps streamline processing, improve efficiencies, and reduce costs. The main healthcare challenge is maintaining, managing, and processing patient information and details. The workers put a lot of effort and time into tasks such as enrollment application, Billing, scheduling appointments, Etc. These services are leading to long patient waiting times and slower productivity of the staff and workers. Here comes RPA, i.e., Robotic process automation in the picture. RPA is an automation system that uses IDP to mix APIs and user interfaces [1,2]. Using pre-established rules and functions, RPA usually automates decisions using structured data and logic. According to Deloitte Insights, by 2040 [3], the market will shift from "healthcare" to "health," in which many healthcare

services will shift to virtual settings.

RPA is increasingly integrated with AI and machine learning technologies to provide advanced analytics and decision-making capabilities. This integration can help healthcare organizations to understand patient data better and make informed decisions about patient care. RPA enables compliance (92%), greater quality, and accuracy (90%), lowering operating expenses by 45 percent and boosting customer satisfaction by 18 percent [3].

Clinical processes can also be effective using RPA bots, which use role-based access, making the process easier and streamlining the entire supply chain from physician to patient. With the help of RPA, Healthcare is also moving towards its goals of attaining privacy and healthcare data [2].

The adoption of RPA in Healthcare has increased rapidly in recent years. Figure 1 captures the use of RPA in various areas of healthcare. Grand View Research projects - that the worldwide healthcare RPA market will grow to USD 1.5 billion by 2028

[4]. This growth is due to the demand for operational efficiency, rising healthcare costs, and the growing demand for quality patient care. According to Gartner's 2020 CIO survey [5], even before the COVID-19 outbreak, 41% of healthcare providers fell short of medical funding. Nearly 90% of the 3.3 million dollars spent on Healthcare in the US goes into treating mental health and maintaining chronic diseases and illnesses. As per Gartner's study, nearly 20% of the patients' interactions will incorporate some AI technologies by 2023, which will be more than 4% today [5]. We propose analyzing cases and RPA's capacity to create value in the healthcare sector by carrying out a predictive analysis on a dataset containing patient records and the survey we conducted, as well as analyzing the reports of Gartner and Forester with different case studies. From hands-free check-in to reduced waiting times, rapid test results, and improved integration of service providers and cost units to direct-to-patient services, RPA is moving quickly by providing patients with personalized healthcare services. When software robots, in the COVID-19 period, send a fillable report to the pharmaceutical industry, which in turn is updated with the missing parts of reports in the master file, it serves as a big use of RPA. Again, RPA here is to stay and develop over time. The need for more existing studies suggests much room for exploration and deeper investigation into the potential benefits and challenges of RPA within Healthcare. Hence, this paper aims to study the role of Robotic process automation in the Healthcare Industry. Overall, this research provides valuable insights into the role of RPA in the healthcare industry and offers guidance for healthcare organizations looking to implement this technology to improve their operational efficiency and patient care. The tools of RPA are software programs that automate rule-based, repetitive operations by simulating human-digital interactions [6].

captures the workflow of a typical RPA bot. RPA implementation starts with determining the processes that can be automated. RPA development platforms generate software robots or bots once specified [7]. The bots are programmed to perform specific tasks within target processes. They interact with the user, miming a human operator, and can read, enter, and modify data as needed. Once the bots are set up, they can run autonomously or be triggered manually by users or predefined schedules.

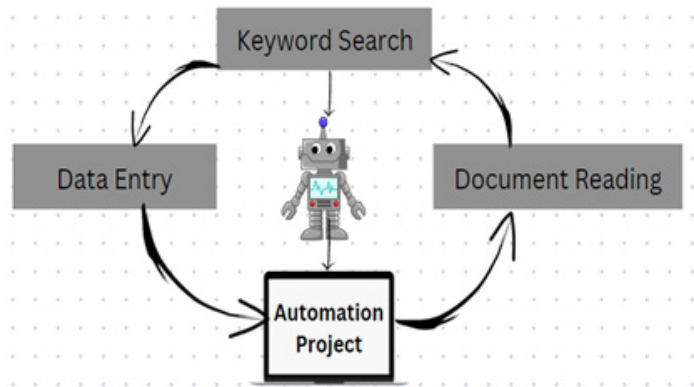


Figure 2: The flow of working of an RPA Bot.

Literature Review

Rao D. [8] discusses how, during the downtime of the economy by COVID-19, RPA made it convenient for any machine to handle tasks. Innovative ideas become real when combining artificial intelligence and robotic process automation (RPA). Ratia [2] and Tan H [1] discuss that RPA in Healthcare has been emerging to meet the increasing demands of the sector's performance. The paper also shows the use of multi-aging robotic systems to automate the sterilization process at hospitals and how each robot, considered an independent agent, performs the task at its capabilities. Nirmal et al. [9], Shan et al. [10], and Sasikumar et al. [11] explore the applications of an RPA in the field of health care. Natsheh Essam et al. [12], Chakraborty et al. [13], and Lokman et al. [14] in their respective papers discuss how RPA can be advantageous for the healthcare sector by decreasing operational expenses and improving the promptness and excellence of healthcare services. The papers also offer an overview of various components, including text processing, response creation, machine learning model, and RPA knowledge area.

The two case studies referred to "Helse Vest that deploys RPA to reduce administration costs and burden on its doctors" and "How to jolt improvised insurance claims to increase productivity and lower the errors caused by doing things manually," wherein in one of them a company in the US was struggling in increasing its productivity and reducing the errors done manually by humans. It needed to streamline its insurance claims. The company is a hand therapy company that has 200 outpatient centers all over the world. To reduce the dependency on humans and to increase automation, it developed a series of 9 automation solutions within 12 weeks, which increased their client's eligibility checked to 5500+, an approximate \$570,000 savings in 2020. Similarly, a company in

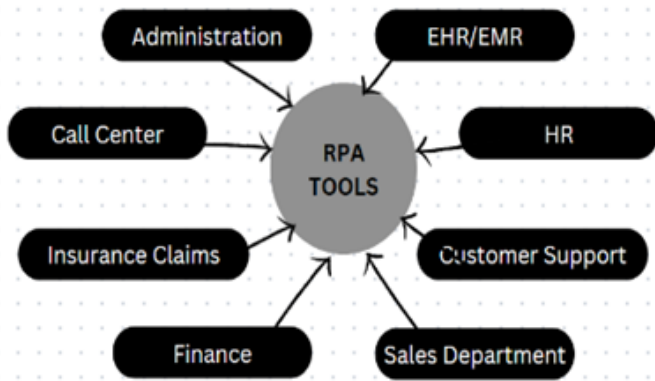


Figure 1: The use of RPA in Healthcare.

Literature Review

Working of RPA concept

RPA technology uses software robots (or "bots") to automate repetitive and rule-based business-process tasks. These bots are not physical robots but software programs that can interact with and manipulate data and applications like a human user. Figure 2

the southwestern region of Norway provides healthcare services. The company wants to increase productivity by reducing the time taken on documentation and data entry and reducing the double or triple entries by the staff. For this, RPA leads Celie Lovslett et al. designed an automation tool called "Robbie Vest," which decreased the time of cancer registrations by 80%, reduced the working time of nurses and doctors, and approx. \$550,000 was saved in 2020.

Boston Medical Centre automated updating patient data across systems by implementing Robotic Process Automation (RPA). As a result, there were fewer data entry errors, and staff members could devote more time to patient care. BMC estimates that RPA will save them over 2,000 worker hours in six months. Apollo Hospitals, a healthcare institute in India, uses RPA to automate the time-consuming and prone-to-error human process of updating patient information. RPA reduced the time required for record updates by 80%, improving accuracy and efficiency in patient record keeping. Also, RPA was used by NHS Shared Business Services, which works with the National Health Service in the UK to handle supplier invoicing automatically. RPA increased productivity and decreased expenses by 40% by cutting the time needed to process invoices. Building upon previous research findings, our model seeks to provide the role of RPA in Healthcare and how authentication helps reduce administrative burdens and operational costs, allowing healthcare professionals to allocate more time to patient care.

Research Methodology

The research methodology acts as the study's road map, outlining the methodical procedure used to collect, examine, and interpret data. Therefore, this research paper is a qualitative analysis of the role of RPA in the healthcare industry.

Semi-structured survey research was employed to collect qualitative data, yielding valuable insights into participants' perspectives. Figure 3 captures the research methodology adopted for this study. To begin with, we conducted a literature review of the existing literature, including white papers and case studies, to help identify research gaps and areas where further investigations are needed. To understand all the places where Robotic process automation is currently used and the areas where there is a need to implement the process, we conducted qualitative survey research by interviewing employees and staff at a private hospital and research center located in Pune, wherein a questionnaire was designed and distributed across the healthcare organizations that have or are about to implement RPA which is attached in the results and conclusion of this paper. We took a sample size of 30 people, including males and females, which is recommended by many methodologists [15,16]. To identify areas where RPA is currently implemented and needs to be included and understand what difficulties hospital staff face while doing things manually, the questionnaire contains questions such as: What are the common tasks performed while handling a patient? Which tasks are tedious and time-consuming? How much time is spent on billing and payment processing? How often do errors occur while performing these tasks?



Figure 3: Steps adopted in our research methodology.

Data Analysis

From the data collected by the survey research, it was found that 43 percent of responses were from females and 56 percent were from males.

Most of the data collected was from staff working at the hospital. Thus, this analysis serves as a qualitative analysis of open-ended survey questions to identify and explore where it can be implemented and the role of RPA in the healthcare industry. Through this approach, the research aimed to provide a holistic understanding of robotic process automation in the industry and the areas where the research needs to be done.

Result and Discussion

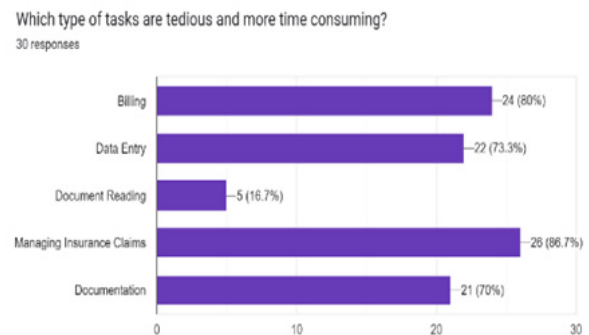


Figure 4: Graphical analysis of which type of tasks are more tedious and time-consuming.

Figure 4 captures the analysis of the question, "Which type of tasks are more tedious and time-consuming?". From the survey, the tasks that are most tedious and consume the most time came out to be Managing insurance claims and Billing as the healthcare industry processes a large volume of claims daily, which can lead to delays and backlogs in the system. Healthcare claims are often rejected or denied due to errors in Billing or coding. Healthcare billing and coding systems are complex and involve significant documentation and record-keeping.

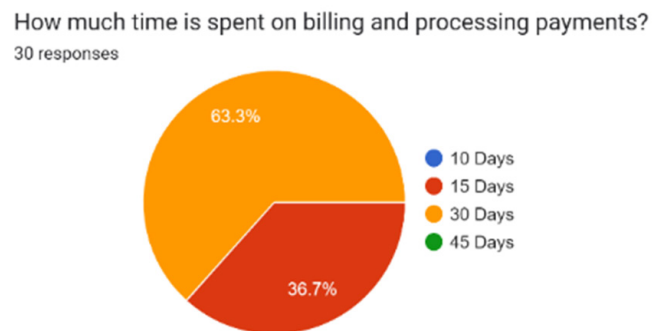


Figure 5: Graphical analysis of how much time is being spent on the processes.

Figure 5 captures the graphical analysis of the question, "How much time is spent on the processes?". According to the survey, the average time spent on each billing and payment processing is 10-15 days. Hospitals may rely on manual billing and payment processing processes, such as manual data entry or paper-based systems. These processes are prone to errors and are time-consuming.

How often errors occur while doing these tasks?
30 responses

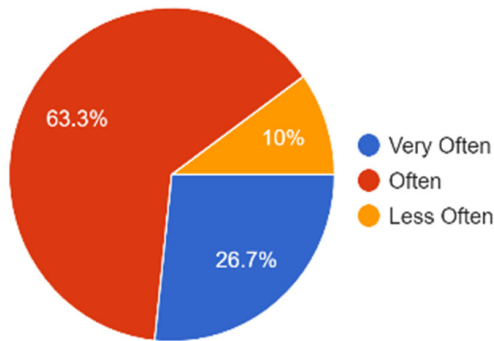


Figure 6: Graphical analysis of how often errors occur while performing these tasks.

Figure 6 captures a graphical analysis of "how often errors occur while performing these tasks." Even errors occurring while performing these tasks must be corrected, such as patient information, billing codes, or insurance information. These errors can lead to rejections or denials of claims, which require additional time to correct and resubmit.

In which type of tasks, you feel like having an assistance that will increase the work efficiency?
30 responses

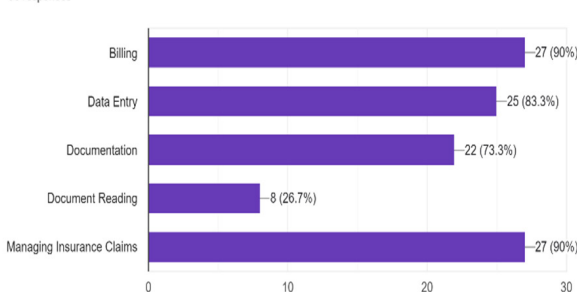


Figure 7: Graphical analysis of which type of tasks needs assistance to improve work efficiency.

Figure 7 captures a graphical analysis of "Which type of tasks needs assistance to improve the work efficiency?". When we surveyed the employees and staff, the tasks requiring more assistance and increasing the work's efficiency became more common tasks, such as Billing, documentation, managing insurance claims, and data entry.

Conclusion

In conclusion, this research paper explored the areas where RPA is being used to automate processes and time-consuming and repetitive tasks and how it is helping the healthcare industry to

streamline its operations and reduce costs. This identification of the areas was done by conducting an expert interview, where we got 30 responses from different employees and staff working at the hospital SUHRC. The potential cases found where the RPA application should be used or is being used after analyzing the responses are Billing, Data Entry, Documentation, Insurance claims, and Document reading. Further, the survey responses and the case studies reviewed were analyzed, and the importance of robotic process automation for the healthcare industry was discussed. It has become increasingly important in the healthcare industry because of its capacity to automate time-consuming and repetitive operations, lower mistake rates, and boost overall efficiency in recent years. As healthcare organizations face growing demands for services and resources, RPA can help them keep up with these demands while improving patient care. Based on current research, RPA improves the efficiency and quality of healthcare services. The automation of routine tasks can free resources; RPA can help them keep up with these demands while improving patient care, allowing healthcare professionals to focus on higher-level tasks, such as patient care and complex data analysis. However, the implementation of RPA in Healthcare comes with its own set of challenges. For example, concerns over data privacy and security, the need for technical expertise and training, and the potential for job displacement are all factors that must be carefully considered and addressed.

Scope for Future Work

In this research paper, the role of RPA in the healthcare industry was discussed and analyzed, keeping aside the fact that it does come with its own set of challenges and concerns over data privacy and security. RPA technology involves using software robots that access and process large volumes of data. These robots may be susceptible to cyberattacks compromising medical information and causing data breaches. RPA can be programmed to access sensitive healthcare data, such as patient medical records and personal information [8,17]. Healthcare organizations must adhere to HIPAA, GDPR, and other regulations to protect patient data.

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