RPA progression throughout years and futuristic aspects of RPA

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ORIGINAL RESEARCH PAPER

ABSTRACT

This paper robotic process automation is highlighted in modern business environments to understand about the progression of robotic process automation and how robotic process automation has brought changes to the world of business. Adoption of robotic process automation tools has raised lots of questions, but their deployment in a business has changed the outcome of the return on investment in a business by reducing cost and time taken on repetitive tasks. The paper is differentiating robotic process automation bot from artificial intelligence and robotics for the better understanding of lay audience. The paper also gives an insight about futuristic aspects of robotic process automation and robotic process automation 2.0.

1. INTRODUCTION

This section of research paper explains the automation process, types of automation and Robotic Process Automation (RPA) in detail.

1.1. Automation

Automation is the use of technology, software or any robot to perform and achieve ultimate goal in a business process with the minimum or no use of human effort. Automation is the technology, which deals with the appliance of machines and computers to the assembly of products and services. This helps in getting work through with little or no human assistance. The usage of robots was the most gained prominence in job automation, and the supply of robotic systems has soared in recent years. Nowadays more and more companies change from the manual assembly to the automated one [1]. If portion of a workflow is programmed to avoid human intervention i.e., developing a list management software, where a step is programmed in order that no more human intervention is required, it is called automation.

As the technology is progressing, so do the companies as they are shifting from manual assembly towards automated ones where industrial robots are being programmed for the automation [2]. The use of automation in a business process increasing exponentially as all the giant businesses are automated, these firms are preferring the use of computer software's for the tasks, which were done manually, and many business software's are being deployed frequently for maintaining large number of archives in their databases. Different software tools are deployed to assist and manage businesses effectively. In a research conducted in Hungary the results are somewhat disturbing as well. As for Hungary, according to analysis based on corporate surveys and focusing on jobs are being eliminated by automation, about 500 thousand jobs are estimated to be lost in near future [3]. Let's take an example of Business Process Management (BPM) tools in which people and a computer software works
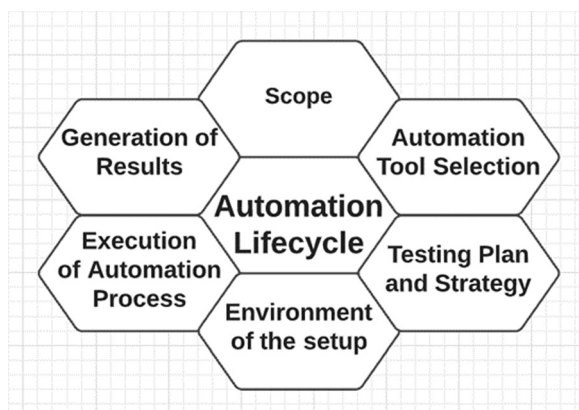
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Fig. 1. Automation lifecycle
(*Source*: Ahsan Ghouse)

Fig. 2. RPA flowchart
(*Source*: Ahsan Ghouse)

together in an enterprise to provide operational excellence and business agility. Figure 1 reflects the automation lifecycle for better understanding.

1.2. Introduction to RPA

RPA stands for robotic process automation. Robotic process automation excludes the involvement of physical robots to perform automation but software, which is used to imitate human actions and that software, is developed to perform certain actions in accordance with the developer's instructions. It will perform duties, which a developer wants it to implement and interact in a way a human can interact by performing those duties. Basically RPA is software, which will perform duties just like a human being to achieve goal efficiently and effectively. To explain RPA let's take an example of a data entry job where an employee will be working on entering different data into a spreadsheet on daily basis, for the same task a software is developed to do these duties. This will reduce the salary and other expenses for an organization as data entry work is being performed by the software instead of an employee.

RPA performs typing, reading, copying data from on file and pasting that data into another file or copying files and pasting them into another designated folder; it performs different mathematical calculations as well.

RPA is a technology, which uses software to perform large volume tasks, which are repetitive, and time consuming to implement them and execute a business process. For example analyzing large data sets and implementing those data sets into a business process require large amount of time, this time-consuming utilizes a lot of resources. RPA simplifies by performing those tasks efficiently as it drops down cost and saves resources of an organization as software works till the completion of the task. Deployment of this software amplifies efficiency.

RPA and its applications can be elaborated to lay audience that a bot is a software/computer program, which will work like a human by performing certain task, which is programmed by a developer, it can be achieved by algorithm. The bot code is written by a developer to perform these duties. By using the algorithms, a bot can perform the task effectively and efficiently.
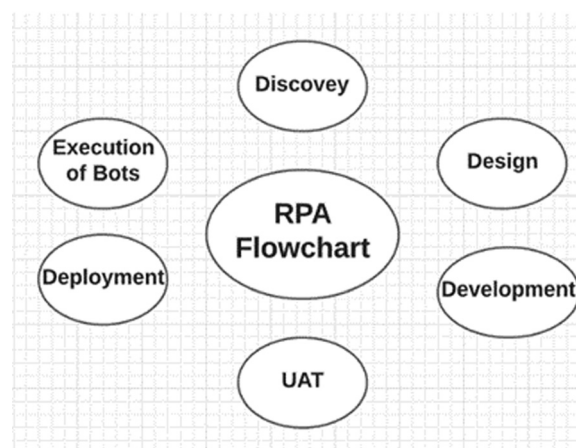
1.3. RPA lifecycle

Robotic process automation lifecycle consists of five stages, in addition to these stages there is another stage, which is known as execution of bots. All these stages combine to complete the lifecycle of an RPA as shown in Fig. 2.

1.3.1. Discovery. In the discovery phase of the RPA explains the requirements and analyze it. In this phase client's requirements are gathered and distinguished either these requirements are measurable and realistic or not. Discovery phase works in a following way.

- *Gather and analyze the requirements of the client*: The process of the gathering and analyzing client's requirements is carried out by the requirement engineer. The requirement engineer takes the input and records it, then explain the requirements to the client for further verification. The client gives feedback and process ignites;
- *Measuring of complexities*: The next step is analyzing the complexities, where all the dependencies are checked. The process architect analyzes the client's requirement and decides whether these requirements can be automatable or not, keeping in mind that every process cannot be atomized based on feasibility;
- *Providing confirmation about process automation*: After analyzing the data and process, the process architect inform client know whether they will be able to progress with the automation or not. If they fail to automate then the process architect informs the client that automation of the process is not possible because of valid reasons, which process architect will articulates them in the report.

1.3.2. Design. In this phase automation design is carried out. A process automation document is produced by solution architect and technical architect, which is called process definition document. The process definition document contains all the necessary details about the project highlighting process flow. The next step is allocation of resources i.e., number of people working on it, budget of process

automation and time that each task will take. In design phase a tool for automating the process is selected, namely UiPath, Automation Anywhere, and Blue Prism, client's requirements help the RPA development team to choose the suitable RPA tool.

1.3.3. Development. In developmental phase of RPA, the automation developer creates a script by referring it to the process definition document [4]. The developer will develop script by choosing RPA tool. As in automation development there is no use of a programming language for automation, but it can change as per the demand the customer. In this phase bots are developed for various tasks.

1.3.4. User acceptance testing. User Acceptance Testing (UAT) of automation is carried out by process engineer where they can test the working of bot. The compilation of developed bot is carried out for quality control analysis and unit testing. It is similar to any other testing lifecycle or Software Development Life Cycle (SDLC). In UAT phase the whole testing process is carried out on the developed bot.

1.3.5. Deployment phase of RPA. After UAT phase, the next step is deployment of the bot into the production environment, so that the organization will be able to use it [5]. There is a chance where the bot after deployment does not work according to the user's demands. In that scenario the bot returns to development and testing phase where the relevant corrections are made. Multiple test cases are generated after the implementation of the corrections to facilitate the accuracy and preciseness.

1.3.6. Bots' execution. In the bot execution phase automation is carried out to perform the tasks and to produce expected output after processing i.e., to generate meaningful required results.

For example: Let us consider a bot, which takes data of employee salary from database. The bot will copy all the data of the employees whose salary is greater than $10,000 and store the data of those employees in a separate data base. In this way high salaried employees are separated from the rest of the staff and further used to analyze on the different parameters. Figure 3 presents example of the execution flow of the bot.

2. RPA BOT

Bot is a developed software application, which performs different activities based on the algorithm. RPA bot is an intelligent software-based robot. It is not a physical robot, and it performs repetitive actions just like humans. The general understanding among the lay audience is that it is a physical robot which is a misconception.

During automation techniques, one robot can automate another robot. This means a robot can manage all the activities of another robot-like process; scheduling, and so on [6].
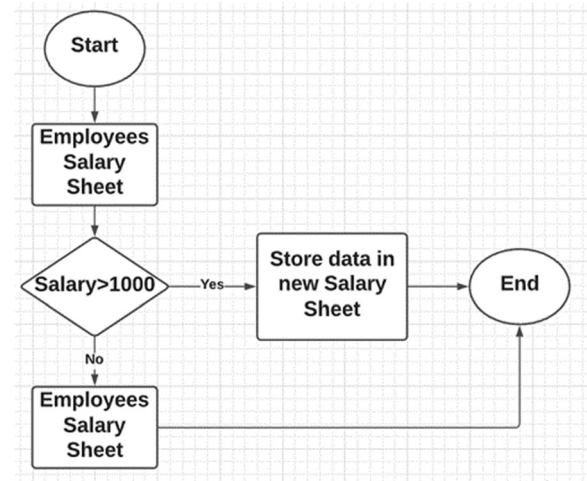

Fig. 3. Salary bot process flowchart
(*Source*: Ahsan Ghouse)

There are two types of RPA bots: unattended RPA bot and attended RPA bot.

2.1. Unattended RPA bot

Unattended RPA bots execute tasks and interact with applications without human interaction. Unattended bots are often triggered by events and sometimes scheduled. In unattended bots the return on investment can observed simultaneously as they replace the existing employee who was working on the tasks, instead of having someone to perform these duties, a bot can do the task.

2.2. Attended RPA bot

The attended bots are useful when the whole end-to-end process cannot be automated. RPA bots can work along with humans to deliver attended automation. The actions of RPA bots can still be triggered by system-level events, which exchange data with human workers, i.e., an email bot and its process flowchart are presented in Fig. 4.

3. RPA TOOLS

3.1. Tools

Robotic process tools are very essential for automation of the repetitive back-office processes. In a corporation, (organization) there will be many tasks that are repetitive and consume lots of time. Whereas when these types of tasks are performed, the possibility for error increases because of repetitive nature. Hence, to avoid those errors and save time, there are many RPA tools in the market to deploy them in the workforce.

3.2. Widely used RPA tools

Following are the widely used RPA tools in the market: Blue Prism, UiPath, and Automation Anywhere.
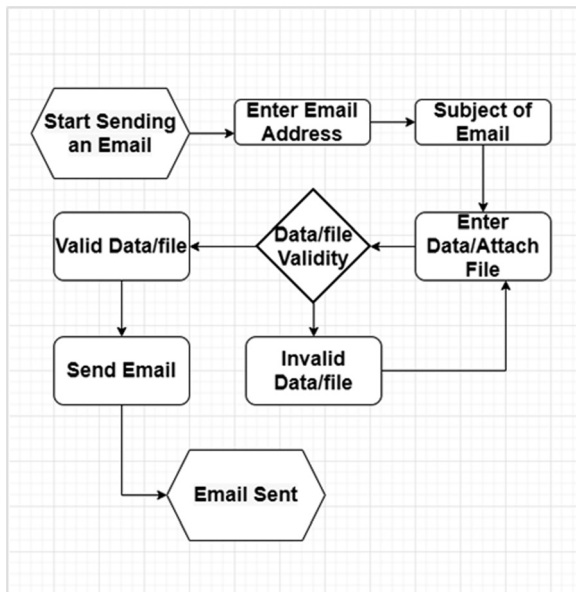
Fig. 4. Email bot flowchart
(*Source*: Ahsan Ghouse)

3.2.1. *Blue prism.* RPA tools that assist the business process to be prompt and price effective by automating, manual, rule-based back repetitive office processes. The tool provides a flow chart, sort of a design with drag and drops feature to automate numerous business processes. Blue prism works on all platforms with any application.

Features of Blue Prism are:

- It supports multi-environment deployment model;
- Security implemented for network and software credentials;
- Its platform independent, which can be implemented on every operating system;
- Efficiently implementable with in short span of time ranging in 4 to 6 weeks;
- Robust and feature-rich analytics suite and real-time feedback;
- The tool does not need programming skills to implement;
- Develop profoundly efficient and automatic end-to-end business processes.

3.2.2. *UiPath.* UiPath contains all core applications and is quite user-friendly, RPA tool [7]. It can manage complex processes and this tool is suitable for any size of business. It is a profoundly extensible RPA tool for automating any desktop or web apps. It enables global enterprises to style; deploy a robotic workforce in industry.

Features of UiPath are:

- UiPath are often hosted in implicit terminals or cloud environments;
- Provide support for a high range of applications to figure out which can mix web and desktop applications. Auto-login features to run the bots;
- Scraping best possible solution, which serves with Net, Java, Flash, PDF, Legacy, SAP, with perfect accuracy;

- It implements security by managing credentials, rendering encryption and access controls support the task;
- It can automate faster rate, 8 to 10 times faster automation through Citrix.

3.2.3. *Automation anywhere.* Automation anywhere implements all core capabilities. It provides on-premise and cloud services. This user-friendly tool is right for medium and enormous organizations. RPA tool combines standard RPA with intelligent elements like language understanding and addressing any unstructured data.

Features of Automation Anywhere:

- It provides security through authentication, encryption, and credentials;
- Real-time reports and analytics. It provides platform independence;
- Smart automation for business and information technology operations;
- Rapidly automates complex and sophisticated tasks;
- Distribute tasks to multiple computers. It allows for script less automation.

4. RFQ AUTOMATION

Request for quotation method is used to elicit costs for specific products or services. An automated Request For Quotation (RFQ), or a procurement order management system, streamlines and standardizes the tactic, permitting firms to maximize their time and resources. Automating the RFQ method will facilitate an organization by optimizing process and efficient response times, a bonus each for prospective customers. For example, World Health Organization (WHO) can receive data much faster rate than any suppliers, WHO will generate and answer a lot of RFQs.

Basically, the RFQ automation will decrease the processing time for the customers as they enter their demands in formed based software. This will access the databases gathered from suppliers by the company and will compare customers entered inputs with the database columns and then by gathering all the data from databases, then after comparing the data will come up with the calculated budget estimation. This quotation is provided to the customer via email or other desired medium [8]. So, the processing time, which is taken for sending a request to the supplier and waiting for the supplier response is eliminated and the results are shown or sent to the customers directly. Thus, the time taken in Request for a quotation can be minimized. Automation not only streamlines processes but provides output from the gathered huge amount of knowledge. When companies use this data intelligently, they will learn more about consumer behavior, buying patterns, and organizational efficiencies. This, in turn, can cause making strategic decisions supported actual, real-world data and taking advantage of all opportunities to grow the business as soon as they arise. Figure 5 visually presents RFQ automation.
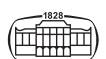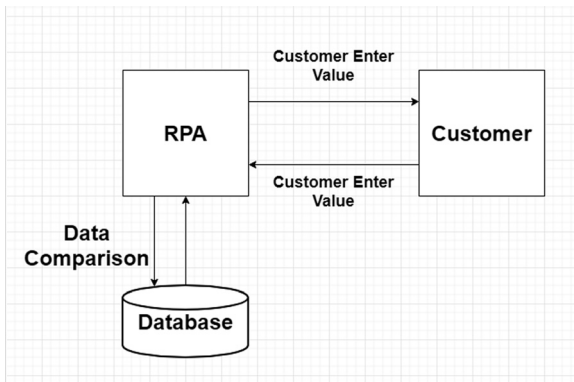
Fig. 5. Request for quotation
(*Source*: Ahsan Ghouse)

5. FUTURISTIC ASPECTS OF RPA

The future of RPA technologies suggest that RPA will keep on growing. There are many possibilities which are being discussed about RPA future. In current economic state RPA adoption becomes easier. As the emergence of machine learning and artificial intelligence is rapidly increasing, these things suggest that robotic process automation will become the main ingredient for companies. Thus, it makes it even easier for companies to adopt RPA. In the current scenario paperwork is reducing rapidly as all big enterprises are focusing on RPA because it is data driven automation approach, which helps an enterprise to perform repetitive tasks more easily and efficiently because it reduces time consume in these type of activities as well as minimizing error. In many reports it is being suggested that automation industry will prefer easy to deploy RPA model with built in functionalities for process automation, which will heavy reduce work force and paperwork [9]. One thing is for sure by looking at the developments RPA has achieved that this technology is maturing itself and growing. Following are the things which are expected from RPA in near future: Increase of RPA use in data analysis, data entry, data rekeying and data analysis jobs will be done by RPA tools. Business processes automation will require less people and instead of it, RPA tools will be deployed. So here is some more advancement, which can happen in coming future.

5.1. RPA will have more impact within organizations

More companies are implementing RPA, and the impact of RPA will become broader. Within organizations, RPA is going to be utilized in more ways and across more processes than it is today. For instance, incoming email classification is one area where smart robots offer huge productivity gains. This suggests that in terms of overall business, the impact RPA on a company went on to be greater. Part of this may happen when RPA implementations start to maneuver from pilots and proof of concepts to real production. While many if not most organizations have tested RPA, it is truly proven its usefulness in many situations, so more organizations will take RPA to subsequent level.

5.2. Many more tools will be integrated in RPA

It will become ever more common to ascertain RPA used alongside other sorts of technologies. This is often because companies are realizing that automation tools do not function best as stand-alone systems but should instead be integrated with other tools to urge the foremost out of them. Consider RPA as an enormous, powerful, and versatile tool in a toolbox. The user will be able to do a lot of work with this one tool, but really, it will enable the business firm to get the simplest result from deploying a combination of tools when building something.

5.3. Introduction of AI in RPA 2.0

AI and self-learning capabilities are subsequent step for the RPA market. As in the RPA 2.0 technology, RPA itself will develop, and AI will not appear to be this futuristic technology. Now a days AI is being used in gas detection when temperature rises more than 75% an alarm will start ringing [10]. RPA itself will move beyond being a rule-based technology and can start to integrate aspects of AI. How and to what extent will largely be supported the requirements of every individual organization.

5.4. RPA technologies becoming cheap

With the introduction of Microsoft in RPA ecosystem, leaders of RPA companies are seeing increased commoditization of RPA. A capability that was offered by a couple of vendors just a couple of years ago is now offered by almost hundred companies as of 2020. It is becoming less expensive to create a competitive RPA solution. The demand for open-source RPA software is predicted to extend. With all things being equal, enterprises favor open-source solutions since they provide more transparency and tend to be cheaper as enterprises only got to buy services. These developments favor open-source RPA. If a company can build a competitive RPA product, it could claim a big portion of the RPA market.

5.5. Paperwork elimination from the market

Robotic process automation is a data-driven automation process, helping enterprises specialize in managing repetitive tasks, activities, and mundane time-consuming duties performed by humans. Since automation is rapidly maturing, the digital workforce (robots) has the potential to reskill and arm the human workforce in an efficient and effective way. According to some reports, by 2025 the automation market is going to be flooded with easy-to-deploy RPA models with pre-built functionalities for automating an array of paperwork in an enterprise. The usage of robots has been the most apparent evidence of work automation, and the global supply of industrial robots has accelerated in recent years [11].

6. CONCLUSION

RPA is one of the rapidly growing technology and not only growing but evolving itself as well. Market trends are

referring to its growth and adaption becoming easier for companies. In current economic state RPA adoption has become easier. As the emergence of machine learning and artificial intelligence is rapid, these things suggest that automation of processes will become easy by adoption of RPA tools and robotic process automation will become the main ingredient for the companies. Thus, it makes it even easier for businesses to adopt RPA.

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