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Robotic Process Automation: The Virtual Workforce

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Abstract - The use of artificial intelligence is developing very rapidly and has already affected the lives of thousands of people. The increasing use of automation in our daily lives have changed our lives completely. From our homes to our offices everything is automated, we have bought automation to almost every static operation possible. Now, with the help of RPA we can bring automation to various dynamic operations as well. RPA is able to interact with the environment and take decisions based on that. Earlier the thing which differentiated humans from machines was the out of the box thinking, and the ability to take decisions based on environment, but this no longer holds true. Robotic Process Automation has automated the automation. Earlier the technologies were focusing on increasing labour efficiency, but now the focus has shifted to labour elimination. In order to cope up with the fast pace of automation industry we need to have a better understanding of RPA and learn how it helps to increase the efficiency and decrease costs. In this paper we have discussed about RPA and how it can affect our daily lives. This paper is aimed to provide a systematic study of RPA with an example of its use is e-commerce industry.

Keyword: *Robotic Process Automation, UI Path, E-commerce Automation, Artificial Intelligence, Orchestrator, Data Scrapping, Screen Scraping.*

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I. Introduction

In the beginning execution of non-repeatable tasks were done manually. Then came scripting, the linear repeatable tasks were done with the help of scripts. After that came Orchestration where scripting of scripts was done and complex, standard, multi-scripted activities were performed. Then came Autonomics where Dynamic, non-standard, contextual processed were handled by machine observation. Then came machine learning in which systems were made self aware, predictive, self learning and self healing which focused on future state. The traditional automation was rule based and was used to perform repeatable tasks, RPA has combined automation with adaptability.

Robotic Process Automation Technology is neither an application to work on nor does it provide solution to any business problem rather it is a technology which is used in place of human beings. Robotic Process Automation is a technology which eliminates human presence in all business models and automated their tasks and performs them with better efficiency.

RPA advancement goes hand in hand with the revolution of IT, HR, and manufacturing industries. Acceptance of automation has become very advanced in our daily lives—namely with apps such as Alexa and SIRI which provides personal assistance through our smart phones—that the next upcoming wave of RPA adoption is ready to infiltrate some of our most skilled workforces, completing data, image recognition and diagnoses reports thereby ultimately bringing change in the face of healthcare and legal practice. This paper throws light particularly on this next upcoming wave of RPA adoption.[4]

In this paper we have discussed about Robotic Process Automation and its implemented it using UiPath. In section 2 we have defined the details of the related work from which we have taken reference. We have briefly described the four papers. In section 3 we have defined Robotic Process Automation and its benefits. Robotic Process Automation holds an important place in the future of Artificial Intelligence and will become the virtual workforce minimizing human intervention. Further we have described the involvement of RPA in various workplaces and the demand of providing workers with soft skills and engineering background in the implementation of RPA. Section 4 provides the details of various tool which implement Robotic Process Automation. Further in section 5 we have described the problem and its implementation using one of the RPA tools. Section 5 and 6 discuss about the used algorithm and the result obtained after the implementation of that algorithm. Further in the next section we have discussed the conclusion and the future use of RPA.

II. Related work

Aleksandre Asatiani et al in their paper “turning robotic process automation into commercial success— case

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OpusCapita" presented the challenges faced by Mr. Petri Karjalainen, Senior Vice President at OpusCapita Group, while he was gathering the ways to bring RPA to the market and provide benefits to its new and also to its existing customers[1]. Robotic Process Automation (RPA) is a sharp technology residing in the business process automation game. This paper further raises various questions like— for the technology, what kind of business model would be better? Customer values to be provided by the OpusCapita to their customers in the long run? With these questions running in his mind he arrives at few conclusions and turns to you for guidance.

Helge Jalonen et al in their research work "assessing robotic process automation potential" [2] covered 3 companies out of which 2 are RPA clients and 1 is RPA vendor. Then for the preliminary examination their models were looked upon, and after that the data which was gathered. Once the data was acquired it was complemented with interviews with key personnel of the preliminary assessment process. Results generated were analysed with AHP. Further it is depicted that if we tend to focus on creating a model that pays importance to what company's goal is would be a tedious task and also will cause the RPA market to take more time to mature. The technical aspects strongly are dependent on the target systems itself. Assessment of their RPA capabilities should be done beforehand ,even previous to finding out whether to automate a certain process or not.

Richard Hull et al in their paper "Rethinking BPM in a Cognitive World: Transforming How We Learn and Perform Business Processes" showed how the BPM would face transformations brought in by the advances in the Cognitive Computing. Here the major focus is set on 3 of the most significant features of this transformation, namely: (a) enabling of knowledge acquisition at scale by cognitive computing thereby causing a change in Knowledge-intensive Processes (KiP's); (b) We predict that a new process meta-model will take hold t focussing mainly around a "Plan-Act-Learn" cycle; and (c learning about the processes from the provided implicit descriptions will be enabled by cognitive computing bringing good opportunities for new levels of automation and business process support.[3] As we move further the paper presents a conceptual framework for cognitive BPM, a small survey of state of the art in emerging areas of Cognitive BPM, and discussion of key instructions for further research.

In the paper by Blitz Learning Technologies titled as "Robotic Process Automation - Automating the Automation" the main focus is kept on the fact that Robotic process Automation (RPA) is the next step forward towards minimisation of human intervention. It consists of what is called as "smart software". Not only automation is given to the processes that require human effort but also automation is provided to the processes that needs human judgement. Further knowledge is imparted regarding the evolution of RPA. Various advantages of RPA, few of them being versatility, accuracy, efficiency are discussed. Finally the future of RPA and how it is going to change the way services are provided in their speed, accuracy and behaviour is presented.

III. Robotic Process Automation

The name itself comprises of three words, Robotic : robot is an entity which can be programmed to mimic human action. A robot can replicate everything which a human can do. A robot is capable of being performed by a computer for doing complex tasks. Process: A Process is a sequence of steps that lead to a meaningful activity or task. In case of RPA it is to mimic human action. Automation: It means when a tasks happens automatically without human interaction. Therefore Robotic Process Automation means mimicking human action to do a process without human interaction.

Robotic Process Automation is a Technology that allows people to configure and program computer software or a robot to do all the work like process information, screen scraping, data scrapping , response triggering and sending and receiving data with various other digital systems that can be done by humans to be done automatically without human intervention.

Artificial Intelligence and its applications has been taken to another level by Robotic Process Automation. With this type of technology robots can take real time decisions without the help of humans.[5] RPA has made automation dynamic and has minimised the involvement of human in the business models in various companies.

Robotic process Automation is suitable for every organisation which involves completion of various easy and complex tasks with the help of computer systems. RPA finds its ideal application in various industries including banking, finance, insurance, marketing, healthcare, FMCG, and IT.

Earlier the companies which were heavily dependent on outsourcing are now inclines towards RPA because it offers the same services at lower costs and a increase in productivity. Machines or Robots perform the same the tasks done by humans without any mistakes.

3.1 Upsides of RPA

Reduction of the costs of operation

In the past few decades we have seen a shift of labour from onshore to offshore. Outsourcing became a major tool for decreasing the operational costs. Many large companies used this tool to cut the costs and increase the profits. But now, there is a shift from outsourcing towards the Robotic Process Automation.[1] The same work which was done offshore is now being done on the same place using software or more precisely robots. For example

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earlier the onshore labour used to charge $100 per year for the particular work, the same work was being done offshore with a cost of $38 per year, now the work is being done by Robotic Process Automation with an operational cost of $13 per year. The difference between the costs is worth of making an impact in the company profits [5].

Improvement in the Analysis of Data

Production of data by the tasks being performed by robots, creates a scope of analysis of data. With the help of RPA tools we can perform data scrapping and screen scrapping in a much easier and faster way. The automation of this process improves the decision making at both macro and micro level. The tracing of information at each stage creates a room for analysis of areas where the efficiency can be increases and optimization can be brought at each and every step.

Increased Efficiency

Humans need time off while working, they are not working when sick or when they are on vacation. This is not the case with robots, it can work 365 days every year. The work which is being done by 5-6 full time employees can easily be done by a single robot. The same amount of work which was earlier taking more time can now be completed in a lesser amount of time, therefore making the company more efficient.

Improved Accuracy

Humans generally make mistakes but robots don't. One of the features of Robotic Process Automation is to eliminate errors. Optimizations of all the process are done automatically and there is no room for processing errors.

Increased Customer Satisfaction

Robots can do the same work in less time thereby making the employees available for customer interaction. While robots are doing the work with a higher efficiency, customers can be delighted by offering the services and the employees can maintain the relationship by offering the customers their time.

3.2 RPA changing workplaces

Technology trend is facing a huge domination and is highly influenced by the threat of RPA technology replacing human workers, leaving them unemployed. The development of RPA workforce would face a huge demand in providing workers with soft skills and engineering background.

Humans were, humans are and humans will always be the whole soul element in analysing and discovering more about data that is compiled by computer. In coming years as soon as RPA sets its foot, there will be a high increase in the demand of majors of liberal arts as compared to previous years.[6]

Change management is a non negotiable and a mandatory step in providing a peaceful and a secure workforce during development of a software. Human employees act as the one the greatest indicator of whether RPA would see a rise or fall in a company. We should at every meeting, every workshop and at every panel session should discuss how to develop a strategy with a "people plan" in order to introduce RPA technology.

In order to create a workforce the digitalisation of the IT department of an organisation will play an important and instrumental role in heading change management. As we already know that RPA is a business-made decision—as merits and projects bearing low cost have been clearly highlighted—the final decision whether a role can be automated or not will be made according to the algorithm and its skills to analyse and interpret data. Before implementing the technology it should be first harnessed for further testing of software and establishment of excellence centres of RPA.

Various examples exists of growth in demand for a new and a changed workforce by RPA.[4] The launch of RPA tools not only saves money of the employers as proved by use cases, thereby bringing rise in the productivity, security of employee, and in certain cases, it has even drawn new helpful opportunities for many workers who are highly skilled and apprentices in their various respective industries.

After the latest addition to the industry of health care the hospitals will experience a powerful boost in their IT infrastructure hence increasing a similar boost in their capacity. This could result in a pool of data that could automate traditional roles across CT scans and MRI. The one which is at the verge of risk are the roles of MD's particularly pathologists, dermatologists, and radiologists in image representation .Also RPA will see a widespread in the field of medicine as long as RPA software continues to main its sophistications.

The new development would make legal tasks an easy job for our lawyers. This will thereby help the lawyers to focus on helping their clients for the sake of solving complex business issues.

When RPA software will be programmatically introduced, there are chances that it will displace some healthcare professionals but at the same time it will add a lot of value to the business by helping the doctors to develop and maintain a tighter bond with their patients.[6]

The key-point in the establishment of RPA in an organisation is that while on one hand it may cause redundancy in few roles but on the other hand it may create a situation where an economic value of a task may only be completed by the involvement of a human, which will in turn increase the demand for workers in these key industries.

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IV. RPA Tools

Robotic Process Automation can be implemented by various tools like Ui Path, Blue Prism and Automation Anywhere.

Blue Prism was developed using .NET technology. All sorts of applications are automated using blue prism. Digital Workforce of Blue prism is managed by the users of technology in its enterprise addition. Automation Anywhere is another Robotic Process Automation tool which is available in its enterprise edition. Complete end to end business processes are deployed using software bots with automation anywhere.

UiPath is a RPA tool which is freely available in its community edition, but community edition is strictly for personal use. Community Edition is made for the sole purpose of learning and once we are acquitted with it and to use it in production we need to buy the Enterprise Edition.

In UiPath we can create various types of projects. In a Blank project we can create an empty application where we have to write the whole program from the beginning. In a simple process we can model a process as a flowchart diagram. In Agent Process Improvement we can trigger an automation activity in response to a mouse or user keyboard event. In Robotic Enterprise Framework we can create a business process that follows best practices for large scale deployment.

In UiPath we have various activities for UI Automation, User Events, Orchestrator, Microsoft, App Integration, System, Programming, and Workflow. With the help of these activities we can perform any task that a human can with the same computing capabilities. If the work to be done by robot can be done in a few steps then we can create the workflow with the help of the given activities by inserting them according to the need. If the work to be performed is having large number of steps then in place of inserting the activities we can directly record the steps by performing them and the activities will automatically be inserted. The option of recording all the steps makes our work easy and reduces the work load.

V. Problem description and implementation

We have explained Robotic Process Automation by taking an example of e-commerce site – Flipkart. In our day to day life we often waste a lot of time searching for products and their various specifications. With the modern user interface it sometimes becomes difficult to see all the details in one go and we have to invest a lot of time. Sometimes when our grandparents or the people who are not that familiar with technology face problems in accessing these sites and get all the details of the products that they want to.

We have solved this problem with the help of Robotic Process Automation. We have used Gmail as a medium to receive the name of object to be searched and send back the excel file which contains the details of the searched object to the same email from which the mail was received.

V.1 Algorithm Used :

1. Insert the Sequence Activity
   i. Create a variable mail which contains your mail id.
   ii. Create a variable pass which contains your password.
2. Insert Get IMAP Mail Messages Activity
   i. Change Port number to 993.
   ii. Change Server to “imap.gmail.com”.
   iii. Insert mail in Email.
   iv. Insert pass in Password.
3. Insert For Each Activity.
4. Insert Open Browser Activity
   i. Change URL to "https://www.flipkart.com/search?q=" + mail.Subject + "&as=on&as-show=on&otracker=start&as-pos=1_q_iph"
5. Do Data Scrapping.
6. Insert Write CSV Activity.
   i. Change File Path to current directory.
   ii. Change DataTable to ExtractDataTable.
7. Insert Send SMTP Mail Message Activity
   i. Change Port to 465
   ii. Change Server to “smtp.gmail.com”.
   iii. Insert mail in Email.
   iv. Insert pass in Password
   v. Insert mail in To.
   vi. Insert mail in From.
   vii. Insert the current directory location in attach files.
8. Click on Run.

VI. Result

If we send a mail having “ Nokia%20Mobiles “ as its subject, we will receive an excel file having the details of all the Nokia mobiles which are present on Flipkart. Data Scrapping will be performed on the web site provided in the URL of Open Browser Activity. After Opening the website “Nokia Mobile “will be searched all the details (Item name, Price, ROM, Camera), which were selected will be returned. These details then be copied in an Excel sheet and the excel file will be mailed to the respective mail id using Send SMTP Mail Message Activity.

Similarly we can perform the same task on various websites. We can also perform this on different websites and then compare their results and find the optimum product based on the specified specifications that we want. This is just a basic example on how we can use Robotic Process Automation in our daily lives. It has various applications in many large industries.

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Item Name	Price	ROM	Camera
Nokia 6 (Matte Black, 64 GB)	₹16,999	4 GB RAM | 64 GB ROM | Expandable Upto 128 GB	16MP Rear Camera | 8MP Front Camera
Nokia 6 (Silver, 32 GB)	₹14,199	3 GB RAM | 32 GB ROM | Expandable Upto 128 GB	16MP Rear Camera | 8MP Front Camera
Nokia 6 (Matte Black, 32 GB)	₹13,945	3 GB RAM | 32 GB ROM | Expandable Upto 128 GB	16MP Rear Camera | 8MP Front Camera
Nokia 105 Dual Sim 2017	₹1,148	4 MB RAM | 4 MB ROM |	800 mAh Battery
Nokia 105	₹1,033	4 MB RAM | 4 MB ROM |	800 mAh Battery
Nokia 105 Single Sim 2017	₹999	4 MB RAM | 4 MB ROM |	800 mAh Battery
Nokia 105	₹1,064	4 MB RAM | 4 MB ROM |	800 mAh Battery
Nokia 2 (Pewter / Copper, 8 GB)	₹6,445	1 GB RAM | 8 GB ROM |	8MP Rear Camera | 5MP Front Camera
Nokia 105 SS	₹1,097	4 MB RAM | 4 MB ROM |	800 mAh Battery
Nokia 3310 DS	₹3,343	16 MB ROM | Expandable Upto 32 GB	2MP Rear Camera
Nokia 3310 DS	₹3,350	16 MB ROM | Expandable Upto 32 GB	2MP Rear Camera
Nokia 3310 DS	₹3,490	16 MB ROM | Expandable Upto 32 GB	2MP Rear Camera
Nokia 150	₹1,990	4 MB RAM | 4 MB ROM | Expandable Upto 32 GB	0.3MP Rear Camera
Nokia 216	₹2,649	16 MB ROM | Expandable Upto 32 GB	0.3MP Rear Camera | 0.3MP Front Camera
Nokia 3 (Matte Black, 16 GB)	₹7,999	2 GB RAM | 16 GB ROM | Expandable Upto 128	8MP Rear Camera | 8MP Front Camera
Nokia 3 (Silver White, 16 GB)	₹8,390	2 GB RAM | 16 GB ROM | Expandable Upto 128	8MP Rear Camera | 8MP Front Camera
Nokia 105 DS	₹1,319	4 MB RAM | 4 MB ROM |	0MP Rear Camera
Nokia 3310 DS	₹3,315	16 MB ROM | Expandable Upto 32 GB	2MP Rear Camera
Nokia 230 Dual SIM	₹3,999	16 MB RAM | Expandable Upto 32 GB	2MP Rear Camera
Nokia 216	₹2,595	16 MB RAM | 16 MB ROM |	0.3MP Rear Camera
Nokia 216	₹2,425	NA ROM | Expandable Upto 32 GB	0.3MP Rear Camera | 0.3MP Front Camera
Nokia 105 DS	₹1,236	4 MB RAM | 4 MB ROM |	0MP Rear Camera
Nokia 5 (Matte Black, 16 GB)	₹11,499	3 GB RAM | 16 GB ROM | Expandable Upto 128 GB	13MP Rear Camera | 8MP Front Camera
Nokia 5 (Tempered Blue, 16 GB)	₹11,499	3 GB RAM | 16 GB ROM | Expandable Upto 128 GB	13MP Rear Camera | 8MP Front Camera

Fig 1: Screenshot of excel sheet received

VII. Conclusion

Almost all industries can exploit Robotic Process Automation, its ability to replace the boring, tedious tasks across various functions, with easy implementation is a powerful attraction for organisations. With the increase in number of organisations implementing Robotic Process Automation, the use of RPA may vary vastly depending upon the requirement and the scope of organization.

In future the combination of traditional automation algorithms with Robotic Process Automation may replace the complete human workforce, if not replace then reduce it by a considerable amount. With the increase in the number of applications of Robotic Process Automation there is a huge potential for the acceleration in the adoption of Robotic Process Automation.

References :

[1]. Asatiani, A., & Penttinen, E. (2016). Turning robotic process automation into commercial success Case OpusCapita. Journal of Information Technology Teaching Cases, 6 (2), 67–74.z

[2]. Devanney, P., Quilliam, W., & DuVal, C. W. (2016). Professional Services Automation: Exploration of Benefits for Organizations. In International Conference on Accounting and Finance (AT). Proceedings (p. 79). Global Science and Technology Forum.

[3]. Hull, R., & Nezhad, H. R. M. (2016). Rethinking BPM in a Cognitive World: Transforming How We Learn and Perform Business Processes. In International Conference on Business Process Management (pp. 3–19). Springer

[4]. Wessel, David. "Big U.S. Firms Shift Hiring Abroad." The Wall Street Journal. Dow Jones & Company, 19 Apr. 2011. Web. 7 July 2014.

[5]. "BPOs: Time Is Now to Build Your Virtual Back Office." Robotic Process Automation for Business Process Outsourcers. Virtual Operations. Web. 7 July 2014.

[6]. "RPA in ACTION: Top Insurance Company in US Deploys a Customized Cloud in Under 120 Days." Case study created by the Institute for Robotic Process Automation.