



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume 4, Issue 5)

Available online at: www.ijariit.com

Robotic Process Automation— An expert technology assistant to a busy manager

Sindhu Prasanti Dasu

chradhakumari@sssihl.edu.in

Sri Sathya Sai Institute of Higher Learning, Anantapur,
Andhra Pradesh

Ch. Radhakumari

radhakumari_c@yahoo.com

Sri Sathya Sai Institute of Higher Learning, Anantapur,
Andhra Pradesh

ABSTRACT

Robotic Process Automation (RPA) is an emerging form of business process automation technology based on the notion of software robots or Artificial Intelligence (AI) workers. RPA is a technology developed on software robots to perform certain repetitive tasks that allow them to control applications, collect data, feed them to other applications and manipulate data. In the context of the benefits that RPA deployment can confer in different scenarios, there is an urgent need to find more applications of RPA in the area of management; and hence this research is undertaken. The current research work shows through a managerial use case, how RPA can be engaged as an intimate and reliable assistant by a busy manager of the current corporate world, to perform the repetitive human tasks more competently and effectively. With 'bot' taking over the task of human assistant in sending routine replies to emails, the study proves that RPA can be a better substitute to a human being as an assistant to a manager which can perform tasks done on a routine basis, more productively.

Keywords—Robotic Process Automation, Artificial Intelligence, BOT, Software, Applications

1. INTRODUCTION

Robotic process automation (RPA) is an emerging form of business process automation technology based on the notion of software robots or Artificial Intelligence (AI) workers. RPA is a technology developed on software robots to perform certain repetitive tasks that allow them to control applications, collect data, feed them to other applications and manipulate data. The term RPA can be split as Robotic representing an entity which is capable of being programmed by a computer for doing computer tasks, known as a robot; Process signifying the sequence of actions taken in a logical order to achieve a particular end; and Automation suggesting the accomplishment of tasks without any human intervention. All this implies that RPA mimics human behavior to execute an action without human intervention.

In RPA, bots are software programs which automate the routine tasks, and mimic human behavior with no change to the existing infrastructure; and eliminate inefficiencies. An RPA automation results in time-saving, cost-effectiveness and an overall increase in efficiency. It can handle tasks that are rule-based, repetitive and that rely on structured data. RPA can also work on scalable tasks and also find an efficient way to do a task by learning iteratively.

In the context of the benefits that RPA deployment can confer in different scenarios, there is an urgent need to find more applications of RPA in the area of management; and hence this research is undertaken.

2. REVIEW OF LITERATURE

RPA is that technology that helps the organization's to have a competitive edge and is geared up to transform the logistics industry (Bhaskar, 2017). The author mentioned the use cases where RPA can help logistics automate the process of repetitive nature namely billing in trucking companies, tracking of shipments and automating inventory management. He also stated about the importance of combining RPA with Artificial Intelligence (AI), which is known as 'Cognitive Automation' so that predictions and support decision-making was facilitated. The author referred to a study conducted by Global tech research firm's Info Services Group in 2017 which states that by 2019, 72% of companies use RPA to minimize cost, reduce transaction time, increase productivity in addition to improvement in levels of compliance. He concluded that RPA is preferred by enterprises as it proposes an immediate, low-cost approach to automate basic, rule-based processes without re-engineering them and there is no trade-off between quality and efficiency. The applications of RPA range from Healthcare, HR, banking to Finance and many more. (RPA at Work: Focus on Manufacturing, 2018) discusses the application of RPA in the field of Finance and Accounting. This case talks about the automation of a routine process called "Global Finance Audit Delivery in "Global Professional Services and Audit Company", which was a client of UiPath. This recurring process of auditing the financial reports had several fill-in processes,

which included cross-footing, re-calculation of balance sheets etc. The case describes that UiPath has provided a solution to this challenge by standardizing the business process logic and automating forty-five percentage of the audit process, which resulted in saving 54,000 hours of work annually. (RPA at Work: Focus on Health Care, 2018) confers on the successful implementation of RPA in a leading US healthcare service provider. The case describes the automation of the manual process, which involved exporting daily reports from an application by deploying a robot using UiPath. The case further states that the automation had resulted in the elimination of human error and attaining an accuracy rate of 100% in processing.

(RPA at Work: Focus on Health Care, 2018) explains the effective implementation of RPA by UiPath in a global manufacturing company for automating the process of vendor management. The case also describes the challenges faced by the company namely high cost of operation and propensity to errors. It discusses the solution provided by UiPath, which was automating the entire vendor management process of creating a vendor, VAT validation for European and Non-European countries by deploying a robot. This automation brought out an increased efficiency, reduction in manual errors leading to improvement in operational performance.

Although a lot has been said about RPA at the enterprise level many companies are still in the post –experimentation phase while others are still discovering how projects perform implementing it (Deckard, 2018). The author also mentions that there is a need for good product support, easy access to training and the right partnership to progress towards more AI. The author substantiates the above argument by discussing the research conducted by Everest Group, which surveyed 72 enterprises and found security, scalability and software richness to be the most important characteristics.

In the light of the current requirement for finding an alternative technological solution for efficiently and effectively automating the routine manual processes, the current research relating to the application of RPA is undertaken.

3. THE SIGNIFICANCE OF THE STUDY

Decision making is one of the most complex and essential days to day activities managers encounter in every field of administration. Management decisions involve uncertainty, ambiguity and are highly time-consuming, cost enhancing and require expertise. So a time has come for organizations to retain their competitive advantage by focusing on significant events which affect the business. This calls for the managers of current times to focus more on strategic decisions rather than routine planning. RPA is that one technology that helps the managers to retain their competitive advantage by using **bots** as technology assistants replacing human assistants for getting support in performing the routine tasks of repetitive nature.

The present research paper highlights the managerial use case of RPA by bringing to focus how a busy manager in the corporate world can engage RPA as an assistant in the place of a human being for more productive, efficient and effective results.

4. OBJECTIVES OF THE STUDY

The current research aims at showing, through a managerial use case with special reference to the healthcare sector, how RPA can be engaged as an intimate and reliable assistant by a busy manager of the current corporate world, to perform the repetitive human tasks more competently and effectively. With ‘bot’ taking over the task of human assistant and sending routine replies to emails, the study aims at proving that RPA can be a better substitute to a human being as an assistant to a manager which can perform tasks done on a routine basis more successfully. The study also aims at measuring the productivity of the bot’s work in comparison with manual work considering Transaction time, Accuracy, Throughput, Productivity, and Compliance.

5. THE METHODOLOGY FOLLOWED FOR ACHIEVING THE SET OBJECTIVE

The study adopted the following methodology to achieve the set objectives:

In RPA there are two types of bots for 3 different categories of tasks. An attended bot executes its automation on the user’s local workstation and needs a human to trigger or schedule them. These are called Front Office Robots (FOR). An unattended Bot that runs on a virtual machine and executes automation that doesn’t require user interaction. They can be triggered by a server. They are called Back Office Robots (BOR).

5.1 RPA development methodology: Using FORs the steps involved in the typical automation process are described below:

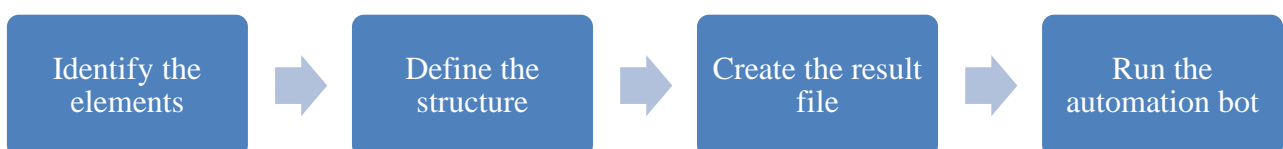


Fig. 1: RPA development methodology

Any RPA development project should follow a structured stage-wise procedure. A typical RPA development has the following four phases:



Fig. 2: RPA development phases

Asses phase begins with the investigation of the process that could be automated. Stage concludes by drawing the feasibility of the RPA project in more detail. Approve phase starts with the approval of the process which is to be automated. It is followed by a detailed investigation and documentation of the process. After documentation, the future robotic process will be designed. The stage generally ends with a business case being presented to the management team. Design phases commence by looking at which software best fulfills the criteria outlined in the business case. During this phase, the robot will be designed with the exact process. With agile iterations, the robot will be programmed to scale the level of automation. The stage ends with the testing of the robot. In the implementation phase, the robot is deployed into a working environment, mimicking the behavior of an employee. The business side monitors the robot and handles any exception. If there are any changes in the process, the robots have to be programmed again and it will be done by the business side themselves. Exceptions that occur when dealing with software program should be handled appropriately. If the exception is left unhandled, it could drastically impair RPA functionality. The two types of exceptions that occur are business exceptions and system exceptions. Business exceptions occur when established rules are broken. They are handled by re-routing the processes that encounter business exceptions for alternative processing. System exceptions occur in response to technical situations like application crashes or application not responding. These exceptions can be monitored by abandoning the existing case. Configuring business automation brings a risk of exploiting security flaws or committing human errors. To prevent security flaws, RPA tools provide the means to limit the user action based on roles. Role-based access permits an organization to maintain access privileges in the team and the activities by unauthorized roles are restricted. Different RPA tools available are UiPath, Blue Prism, Pega Systems, Automation Anywhere, Work Fusion etc. The primary checklist consists of Scalability, Analytics, Architecture, Exception handling, Integration, interface, Configuration, features, Deployment features, Technology, Management; Documentation and Security, for selecting the best tool to meet the business requirement. The applications of RPA range from Healthcare, HR, banking to Finance and many more. The functioning of an organization at different stages, right from planning to control is affected by various factors such as psychological, economic, social, environmental and technological. The current research project was undertaken to identify the real-time application of RPA in managerial administration and is worked upon, by using UiPath software. **UiPath** is a Graphic User Interface related tool for Robotic Process Automation. It delivers a complete solution for application integration, automating applications, administrative and business IT tasks and processes. UiPath platform consists of three main components namely UiPath Studio, UiPath Orchestrator and UiPath Robot. The UiPath Studio helps the user to design automation process in a visual mode using the drag and drop functionality. The heart of RPA is the UiPath Robot that works in the background and executes the processes built in the studio just like humans. UiPath Orchestrator is a web application that manages and monitors all processes and robots. According to the requirement of the business, one of the two available versions of the UiPath Studio can be used. They are RPA Platform and Community Edition. The RPA Platform is integrated with UiPath orchestrator and includes the professional support and is used for large enterprises that are looking to buy UiPath. The community edition is completely free and is optional for self-paced learning and comprises of community forum for support. In this project, the community edition of UiPath Studio is used. UiPath is a leading RPA tool and is user-friendly and has a free community edition. A manager working in a healthcare organization has the repetitive chore of replying to the innumerable emails sent by the patients to seek an appointment for treatment. Depending upon the problems stated by the patients in the mail and the treatment facilities available in the healthcare organization, the emails sent are classified into three categories namely 'Appointment for Screening and Registration', 'Consult Elsewhere' and 'Waiting List'. The routine task of a manager involves the process of reading the emails and saving them into drafts with a subject line in accordance with the category in which the mail falls. He then copies the canned text that is available for a particular category of mail and pastes it in the body of the mail and sends. This entire process of replying to the patients is tedious and time-consuming and hence the process can be automated. Using UiPath, a front office robot is created which would first mark all the emails as read and depending on the subject category from the draft saved it then copies the scanned text in the body of the mail and sends it, thereby making it easy for the manager to concentrate on more important tasks. The creation of an automation project requires the following steps:

Step 1: Open UiPath community edition software as shown below:



Fig. 3: UiPath software window

Step 2: Create Blank Project

A window will appear asking for project name as shown below. Provide a name and to the project and also the description of the project and click on create, a project will be created, as shown below.

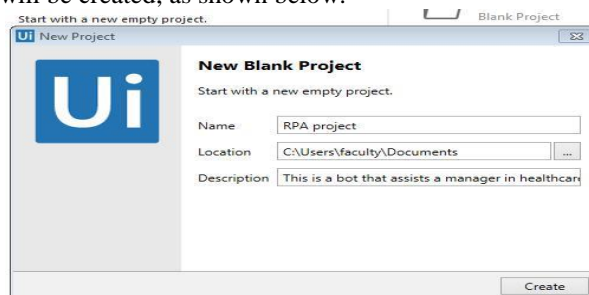


Fig. 4: Blank project window

Step 3: Selection of New Sequence

On the design tab, in the File Group, select New Sequence. The New Sequence Diagram window is displayed. Give a name to the Sequence as 'Open Outlook mail', as shown below:

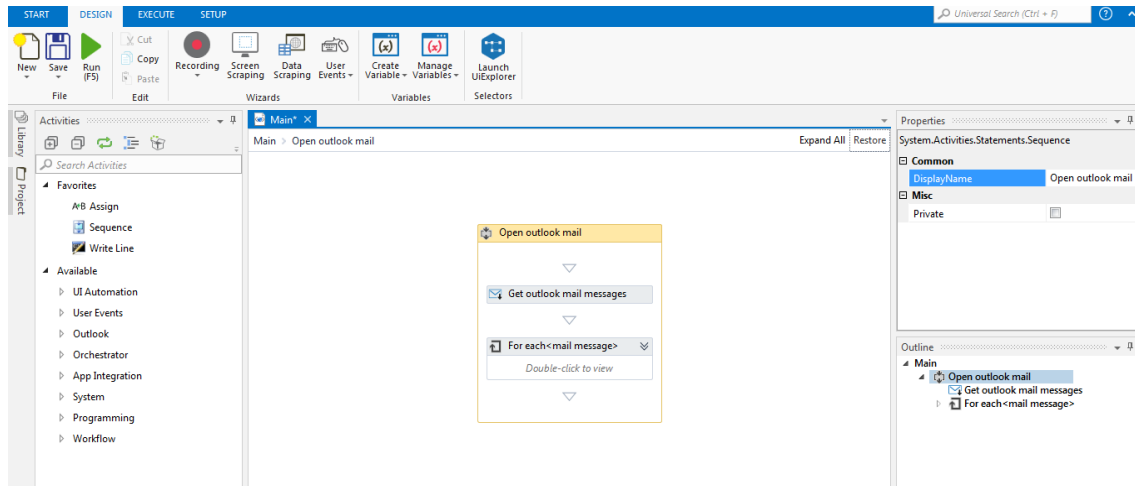


Fig. 5: Outlook mail window

Step 4: Declaring the variables as shown below:

Name	Variable type	Scope	Default
GetMailMessages	List<MailMessage>	Open outlook mail	Enter a VB expression
StrSubject	String	Open outlook mail	Enter a VB expression
Create Variable			

Fig. 6: Variable declaration window

Step 5: Setting the input and output for "Get Outlook mail message activity"

Give the account name and set the mail folder as a draft in the properties window of 'Get Outlook Mail Message' activity, as shown below:

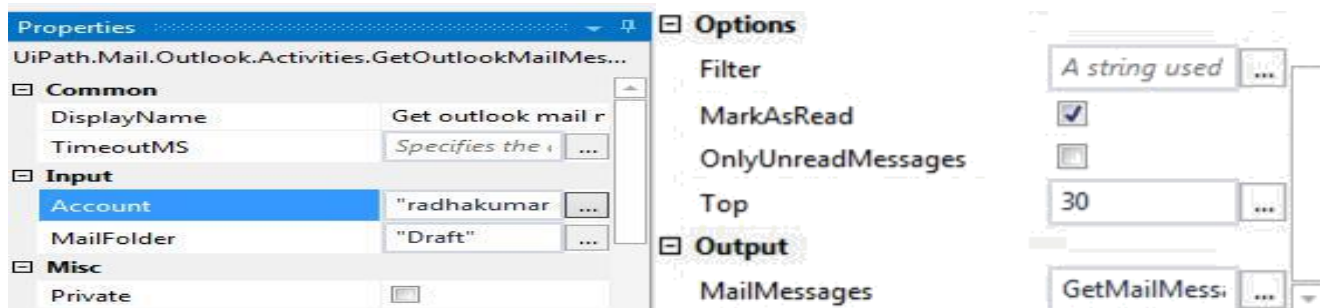


Fig. 7: Properties window

Step 6: Creation of 'if condition'

Add for each mail activity inside the get outlook mail message and insert and if the condition for category 'Appointment for Screening and Registration' of the subject as shown below.

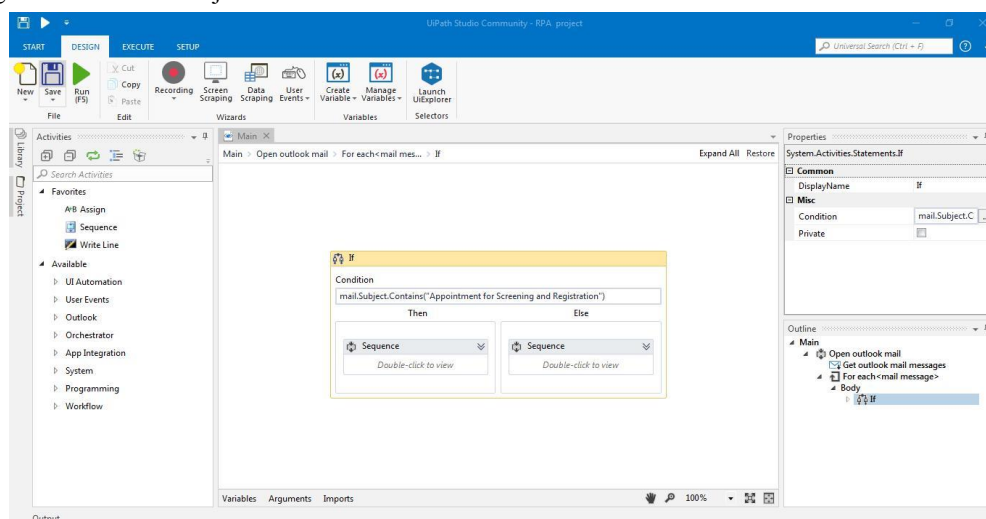


Fig. 8: 'If' condition creation

Step 7: Execution of 'if condition sequence'

Inside the if condition, in the then sequence, inserts set to clipboard activity, get to clipboard activity, send hotkey activity, and a click button for category 'Appointment for Screening and Registration', as shown below:

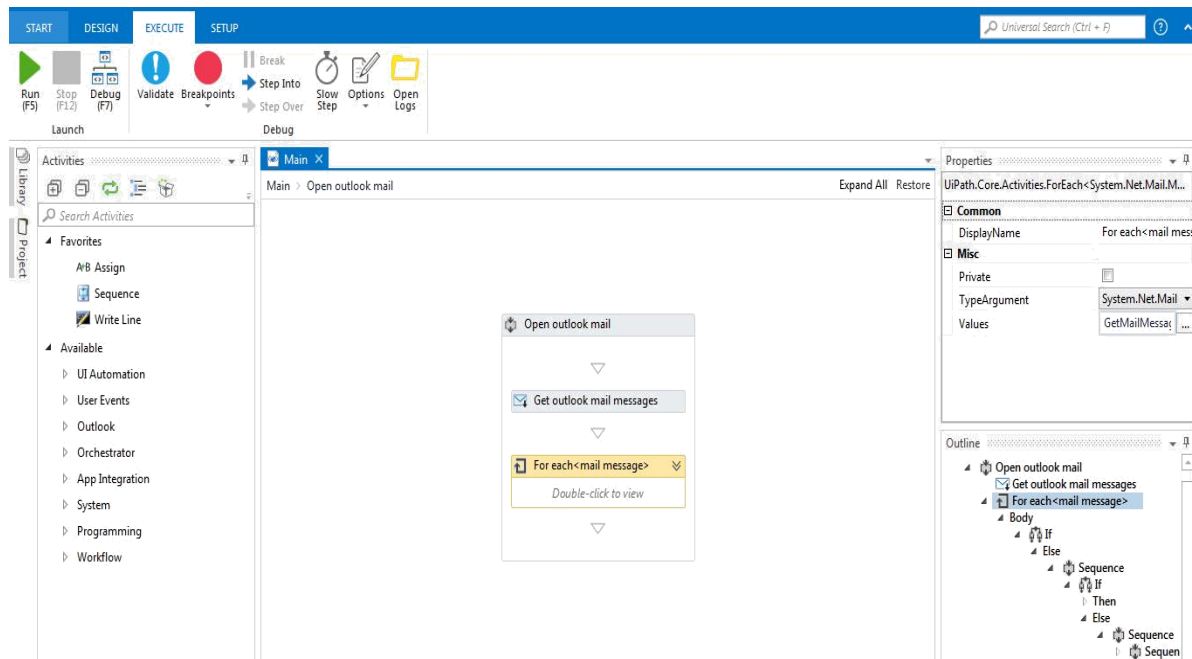


Fig. 9: 'If condition sequence' execution

Step 8: Declaring the variables

Declare the variable for setting the text to the clipboard and to retrieve the text in the properties window give the variable name.

Name	Variable type	Scope	Default
obj	GenericValue	Sequence	Enter a VB expression
GetMailMessages	List<MailMessage>	Open outlook mail	Enter a VB expression
StrSubject	String	Open outlook mail	Enter a VB expression
Create Variable			

Fig. 10: Variable declaration window

Step 9: Execution of process

Click on the execute button to run the bot and execute the process of automation.

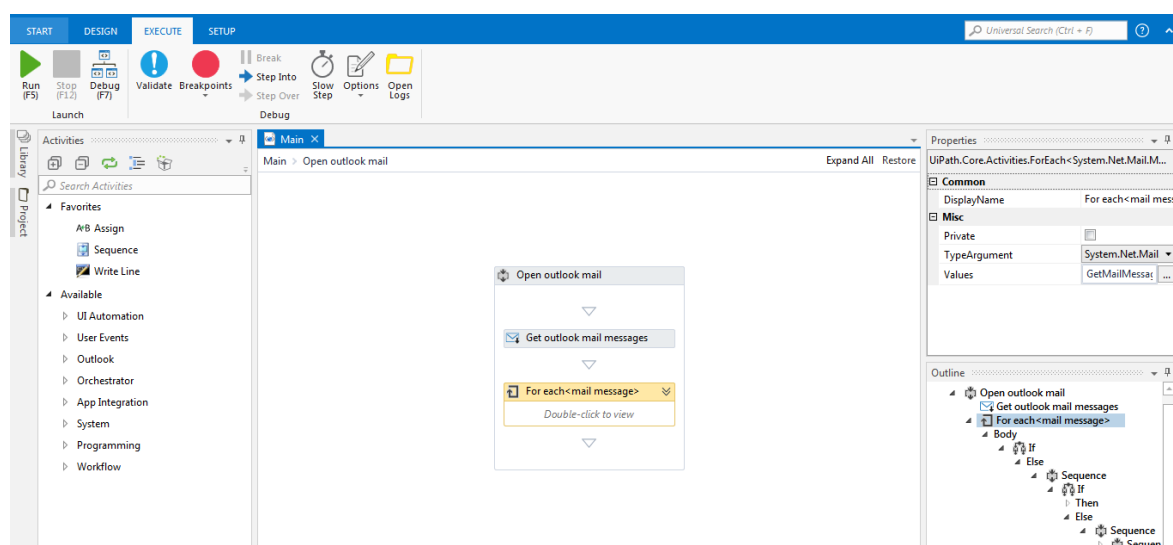


Fig. 11: Execution of process window

A similar procedure is followed for the other categories of the subject line of mail namely "Consult Elsewhere" and "Waiting List".

5.2 The outcome of the study

The outcome of the research work undertaken encompasses the comparison between the manual processes of sending the emails and automating the whole process by implementing RPA. The RPA implementation is carried out by integrating the email account

of the manager and the Microsoft Outlook application. The outcome of the research is presented in three parts. The first part depicts the process followed for sending emails manually. The second part deals with the depiction of the process of email automation using RPA. The third part of the paper deals with the measure of the value created by implementation of RPA against the key performance indicators such as Transaction time, Accuracy, Quality measure, throughput, Productivity and compliance as per the chosen benchmarks.

5.3 Before the Implementation of RPA

The manual process of sending the emails involves the following procedure. The manager of an organization first reads the emails and then saves them into drafts with a subject line in accordance to the category in which the mail falls namely 'Appointment for Screening and Registration', 'Consult Elsewhere' and 'Waiting List'. He is equipped with canned texts for each of the three categories namely 'Appointment for Screening and Registration', 'Consult Elsewhere' and 'Waiting List'. He then copies the canned text that is available for a particular category of mail and pastes it in the body of the mail and sends it. This whole process is tedious and ends up in burning the manager's time which he could otherwise use for critical activities.

5.4 After the Implementation of RPA

The automation of the process of replying to the emails is as follows:

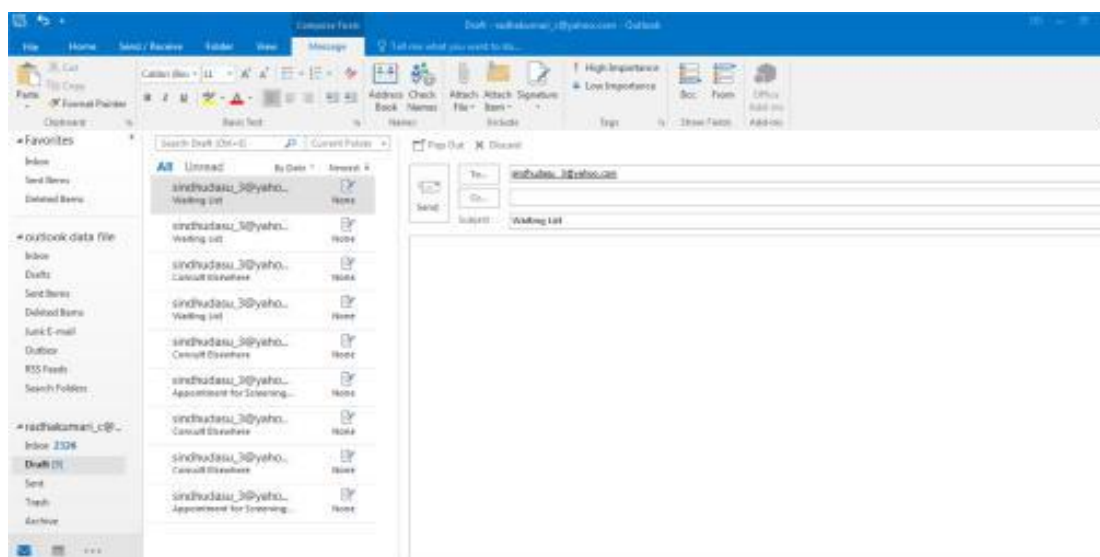


Fig. 12: Automation of the process of replying to the emails

Before using the UiPath platform, the mail account of the manager on behalf of which he wants to send the mail is integrated with Outlook application as UiPath studio is compatible with Outlook app integration and facilitates the process of automation. Then the automation process built in the UiPath Studio will be executed by the software bot so as to make sure that all the drafts of the mail are read. The canned text that is to be pasted for each of the categories is set to the clipboard using **Set to Clipboard** activity of the UiPath platform. A hotkey is sent to the robot using **Send Hotkey** activity of the UiPath studio, which tells that it should paste the scanned text in the body of the mail and using the **Click Activity** the bot sends the mail to the respective recipient. The robot first marks all the drafts as read and the subject line of the mail is dimmed as shown below. It then pastes the respective canned text depending upon the category to which the subject line falls. This entire process of automation is shown below with the help of screenshots. The process of bot reading the drafts and marking them as reading is shown below:

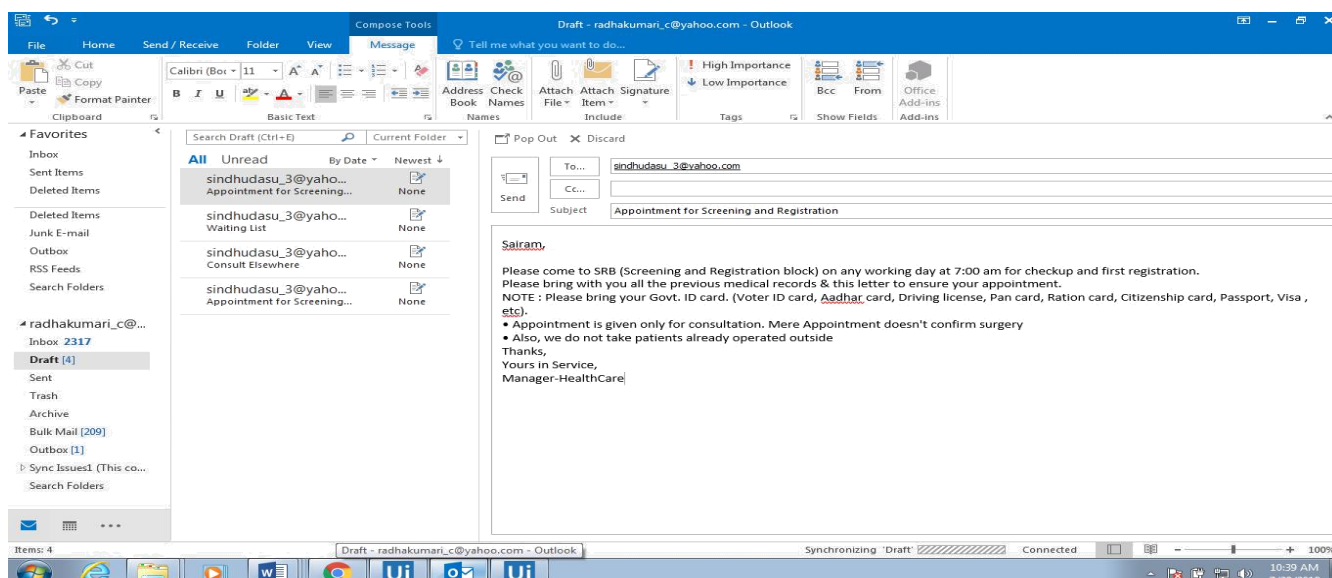


Fig. 13: The process of bot automatically replying to the mail for subject line 'Appointment for Screening and Registration'

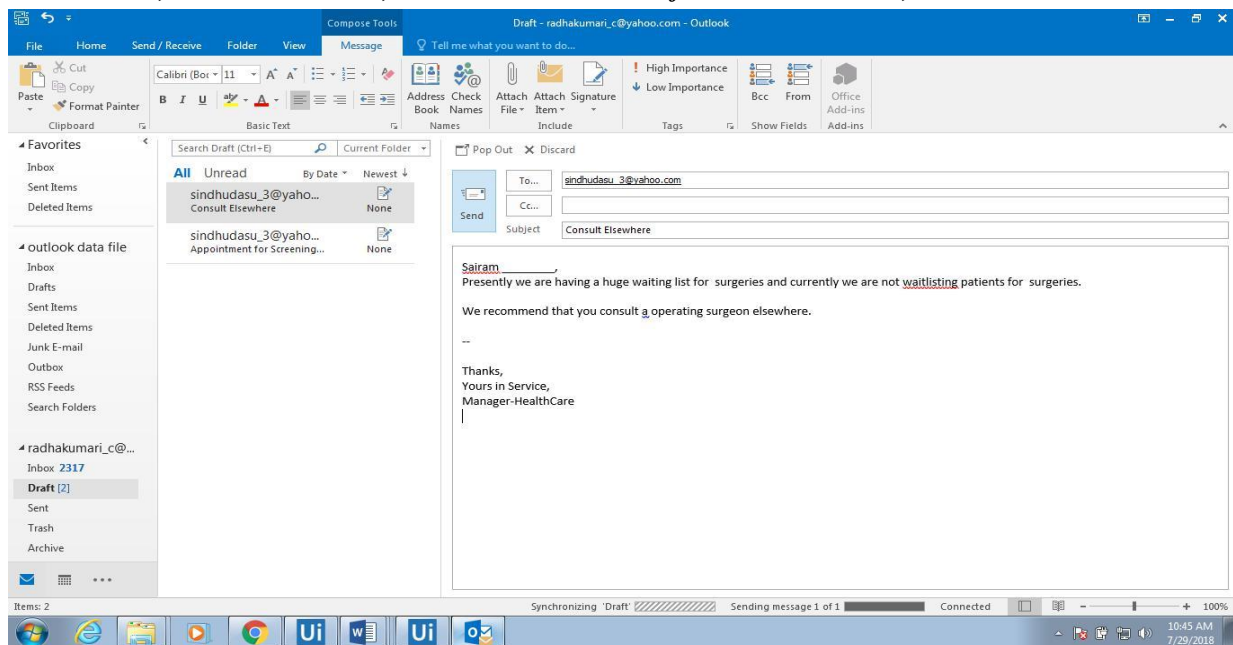


Fig. 14: The process of bot automatically replying to the mail for the subject line 'Consult Elsewhere'

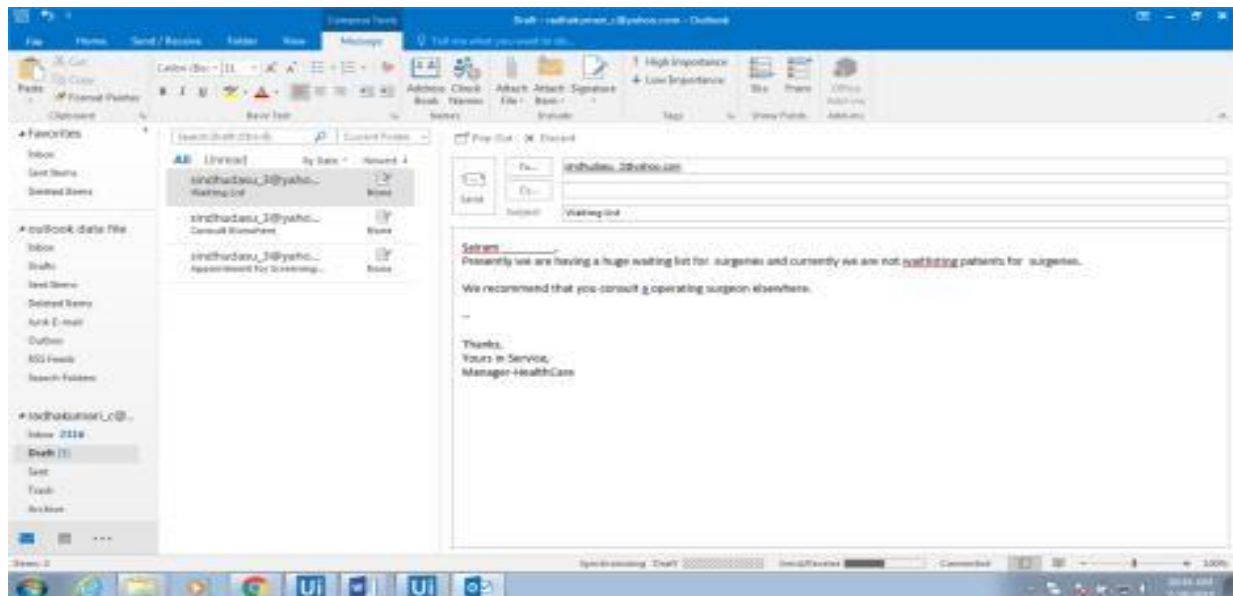


Fig. 15: The process of bot automatically replying to the mail for subject line 'Waiting List'

The above automated process of sending emails can be scheduled with the help of UiPath Orchestrator wherein there is no need for the bot to execute it. The UiPath Orchestrator is a web application that enables the manager not only to deploy, schedule the process of replying the mail on an hourly, daily, weekly or even a monthly basis but also to monitor and manage the bots. In this project, the trial version of UiPath Orchestrator is used. As the orchestrator is a web application the manager is expected to have net connectivity. The processes built in the UiPath Studio are deployed into the orchestrator and a schedule is created to run the bots so that there is no need for the manager to waste his time on tedious jobs. The procedure of deploying the automation process into the UiPath Orchestrator is shown in the screenshots below:

Step 1: Login to the Orchestrator webpage by navigating to <https://demo.uipath.com> by providing the required credentials as shown below:

Fig. 16: Login window

Step 2: Creation of robot: Select the robots tab and create a robot by clicking on the “+” button. Provide a name for the robot as ‘Robot’ as shown below:

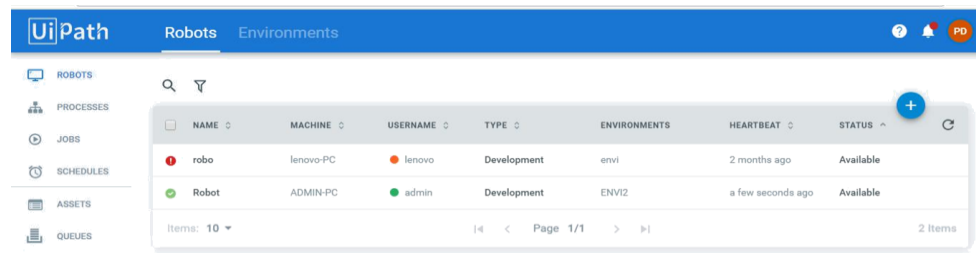


Fig. 17: Creation of robot

Step 3: Creation of an environment: Create an environment for the robot to work on by providing the name as ENVI 2 and types a development environment as shown below:

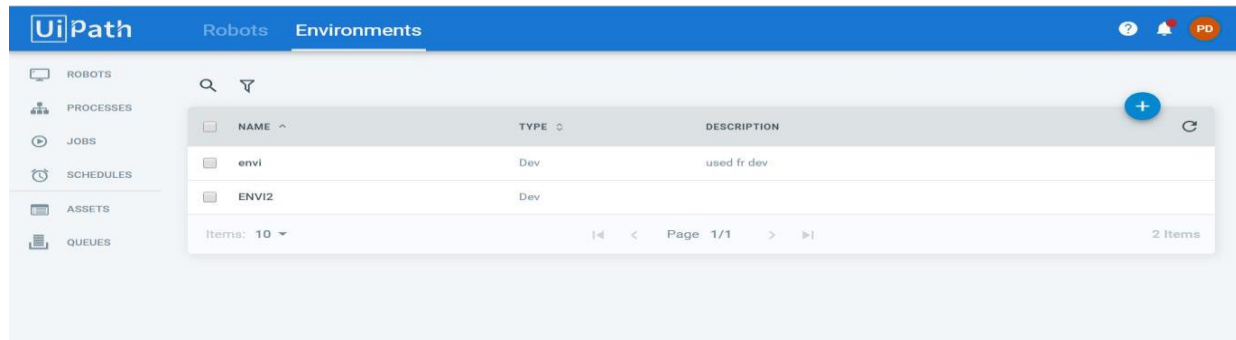


Fig 18: Creation of an environment

Step 4: Connecting UiPath Studio with Robot: Click on the UiPath Robot icon and connect the processes to the UiPath orchestrator. After the robot is connected, publish the process to the orchestrator from UiPath Studio as shown below:

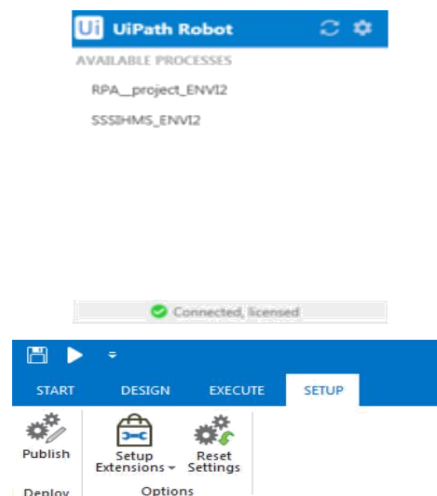


Fig. 19: Connecting UiPath Studio with Robot

Step 5: Rollout of the process into the orchestrator: After publishing the process, it will be rolled into the orchestrator and the name of the process and the latest version will be shown. The process that is published in this project is RPA_Project is shown below:

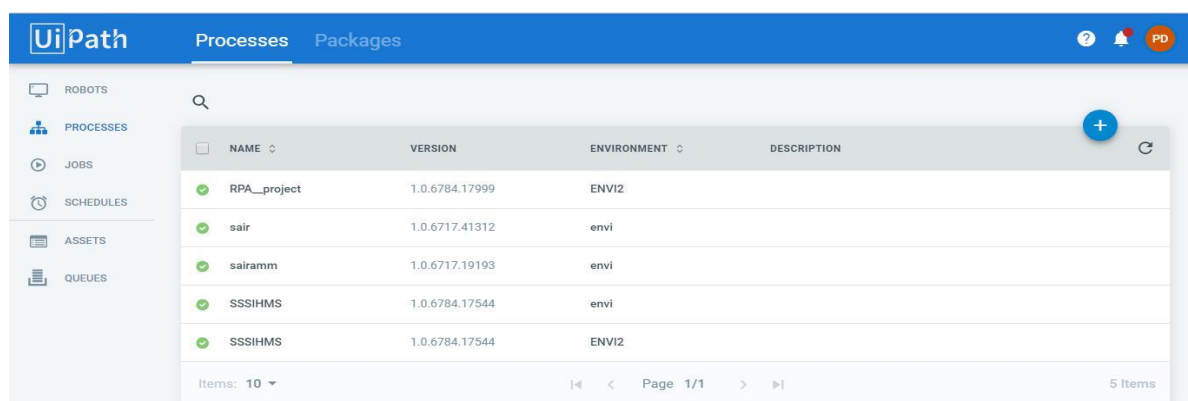


Fig. 20: Rollout of the process into the orchestrator

Step 6: Execution of jobs: On the jobs section of the page, the state of the job is shown “Successful” upon the successful execution of the process as shown below.

PROCESS	ROBOT	ENVIRONMENT	STATE	STARTED	ENDED	SOURCE
SSSIHMS	robo	envi	Stopped	2 hours ago	2 hours ago	Manual
RPA_project	Robot	ENVI2	Successful	2 hours ago	2 hours ago	Manual
RPA_project	Robot	ENVI2	Successful	2 hours ago	an hour ago	schedule
RPA_project	Robot	ENVI2	Successful	an hour ago	an hour ago	schedule

Fig. 21: Execution of the job

Step 7: Scheduling the jobs: The jobs are scheduled on an hourly basis wherein the robot is triggered to execute the process. Provide a name for the schedule as ‘schedule’ and upload the process and trigger the process for every hour.

Fig. 22: Scheduling the jobs

6. HARDWARE AND SOFTWARE INFRASTRUCTURE REQUIREMENTS

The system of the user should include the following configuration:

CPU

Minimum Requirement: 1.4 GHz 32-bit

Recommended: Dual Core 1.8GHz 64-bit

Operating System: Windows 7/Windows server 2008R2/Windows 10/Windows server 2016

RAM: 4GB

7. MEASURING THE IMPACT OF AN RPA PROJECT

Measuring the impact of RPA project, however, remains a challenge due to the absence of a definite metrics. *Parameters such as transaction time, Accuracy, Throughput, Qualitative indicators, and compliance are considered for measuring the impact of RPA implementation.* Metrics need to be created and tracked to define automation as a success or failure. The metrics used to measure the value/ROI of this RPA automation project deployment are depicted in the table below. These metrics as a basis are taken from articles namely ‘**Key Performance Indicators to Consider When Measuring an RPA’s Project ROI**’ by Angela Polania and ‘**Four-ways-to-measure the ROI of an RPA deployment**’ by Sutherland global.

The first metric namely reduction in the transaction time and reaching more no. of patients can be measured by determining the no. of emails sent on a timely basis. According to the *Statistics Report, 2014-2018* published by **THE RADICATI GROUP, INC.**, the average no. of business emails sent by a person in a business day of 8 hours were 43 in 2018, which results to 5 business emails per hour. When the outlook mail is open, the no. of emails sent by robot were 31 emails in a minute which sums up to 1860 emails per hour. Throughput is the rate at which an output is delivered at a given time. In an hour the no. of emails sent manually are 5 whereas after implementing RPA the delivery increased to 1860 emails per hour thereby increase in throughput of 37100%. Productivity is the measure of how long the human workers spent on a task and how swiftly robots accomplish that same task. It takes 1 hour for an average person to send 43 emails whereas the same 43 emails can be sent by a scheduled robot in 1.38 min thereby resulting in productivity of 97.7%. Qualitative indicators are those benefits which cannot be measured but has a constructive effect on the organization like the increased morale of the employees, flexibility, and scalability. The other metric taken is accuracy which results in 100% when the RPA rules are correctly implemented. Compliance is another metric considered to measure the value of this RPA project. After deployment of the RPA project, the robots will not send the mail unless

specifically set compliance criteria for each of the subject are met, eliminating human error. The impact of the implementation of RPA which is measured by metrics is shown in the following table below.

8. COMPETITIVE ADVANTAGE

RPA is a robust platform that elevates artificial intelligence and expert systems to the next level. The competitive advantage of RPA over the traditional automation is its ability to be aware of and adapt to changing circumstances or new situations. RPA eliminates the human intervention and gels well with any industry with defined, recurred, and rules-based processes. The benefit of RPA is that it can be personalized to every user and the rollout of RPA is very quick. RPA deals with process automation whereas the conventional automation deals with the automating the tasks. Adopting RPA technology as a digital strategy helps the enterprises to focus more on their core competencies rather than on monotonous tasks. The benefits include enhanced customer experience, reduction in process execution time, improved productivity of the organization and also qualitative advantages like better compliance, scalability, and replicability enable the managers to focus on more value adding activities of the organization.

9. CONCLUSION

In the present study, the power of RPA is unleashed through a managerial use case. It focused on how a busy manager in the corporate world can engage RPA as an assistant in the place of a human being for sending repetitive emails which are categorized into three different subjects and delivering more productive, efficient and effective results. The value of deploying the RPA project has been measured for different key performance indicators namely Transaction time, Accuracy, Qualitative Indicators, Throughput, Productivity and Compliance which illustrate the potential of RPA over traditional automation by enhancing customer value and business value thereby empowering competitive advantage.

10. REFERENCES

- [1] Bhaskar, W., 2017. /RPA robot process automation is the cheapest investment with highest returns that any logistics company should do. Available at: <http://dreamorbit.com>
- [2] Deckard, M., 2018. Enterprise RPA 2018 Research Everest. Available at <https://www.uipath.com>
- [3] Editorial, S., 2017. Our thinking four ways to measure the ROI of an RPA deployment. Available at: <https://www.sutherlandglobal.com>
- [4] Polania, A., 2018. Key performance indicators to consider when measuring an RPAS project ROI. Available at: <https://www.elevateconsult.com/>
- [5] Radicati, S., 2014. Email Statistics Report, 2014-2018, Palo Alto: The Radicati Group, Inc.
- [6] RPA at Focus: Finance and Accounting (2018) UiPath.
- [7] RPA at Work: Focus on Health Care (2018) UiPath.
- [8] RPA at Work: Focus on Manufacturing (2018) UiPath.