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An Intelligent Agent to Automate HR Process

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***Abstract*— This study seeks to increase the effectiveness of human resource procedures with the automation of repetitive time consuming tasks. To assist HR workers and streamline contact with employees, a software robot that uses UiPath to automate HR duties has been created. The recruitment process, onboarding, and work distribution are just a few of the HR duties that the robot is intended to automate. To determine its impact, the robot is being hosted by a respected company. According to the study's findings, these jobs now take 80% less time and effort to do on average, and they also cost 60% less money.**

Keywords*— *Automation, RPA, Human Resources, Software Agent, Intelligent automation, UiPath

I. INTRODUCTION

In today's hectic business environment, organizations are seeking for ways to improve efficiency and optimize processes. One industry that can tremendously benefit from automation is human resources (HR). Several HR-related procedures are time-consuming, labor-intensive, and prone to error, which can reduce productivity and increase costs. The robotic process automation (RPA) initiative for human resources intends to solve these issues by automating HR-related tasks using UiPath, a popular RPA platform. Automating several HR procedures, like processing and managing employee data, will receive a lot of attention in the plan. The project can be begin by looking for areas that could be automated in the present HR operations. It can be vital to work closely with HR teams to understand their workflows, issues, and goals in order to achieve this. Based on the findings, the team will develop and assess UiPath workflows to automate the identified HR tasks.

One of the project's main focus areas can be onboarding new employees. UiPath workflows can be used to automate the process of acquiring new employee data, adding new employees to HR systems, and commencing the necessary approvals and notifications. The time and effort required for onboarding can be significantly reduced by doing this, enabling a quicker and more efficient onboarding process for new employees. The modern web development framework Flask is excellent. There are primarily two theories regarding frames. These are minimal micro frameworks or libraries that offer an ecosystem of parts that can be combined and matched as necessary.

The UiPath Orchestrator's Queue Storage function makes it possible to automate HR operations by letting them handle enormous quantities of items in FIFO (first-in, first-out) queues. The many HR-related items that can be stored in this queue. such as employee data, leave requests, and application materials. HR automation operations are made more dependable and effective by the queue storage feature of UiPath Orchestrator, which provides a central area to manage and prioritize HR-related issues. Automation processes can carry out the required tasks, such as updating employee data or sending an automated email answer to a job applicant. Administrators may track the progress of the automation process, examine the status of each item in the queue, and receive notifications when a specific item is processed or encounters an error. This feature of queue storage also makes it simple to monitor and track HR-related items.

Overall, the queue storage feature of UiPath Orchestrator is a powerful tool for HR automation, easing HR-related chores and improving the efficacy and accuracy of HR operations. The objective of the paper is to build an web application which invokes the automated system and it will help HR to do task easier without much time consuming. The abstract, which provides a brief summary of the research article, is where the paper is organized. The Introduction follows, providing an overview of the suggested system and the main technologies employed. The second half of the study, which is a literature review, provides a full grasp of numerous applications. The main body of the paper outlining the suggested system appears in the next section. The next section provides an explanation of the system's numerous algorithms. The section titled Results and Discussions that follows speaks about the many research projects done on the suggested system. The final section, entitled Conclusion, brings the whole essay to a close.

II. LITERATURE SURVEY

Syaiful et.al. [1] explains that Human Resources (HR) should make sure to adapt and practice its implementation as automation technology is altering and transforming innovation into the industrial landscape in order to realize its benefits quickly and for cost savings. Robotic Process Automation (RPA) installation in HR can help to provide better service to verify that the procedures follow the set standards and regulations. RPA is a type of software that controls software robots to mimic human interaction with digital platforms. RPA is a method that could do repetitive tasks to replace jobs done by people. A robot, however, is regarded to be valuable to complement driving procedures rather than being able to replace the HR. The goal of the study is to demonstrate RPA's efficiency and efficacy in the HRMS when compared to a manual procedure carried out by a human. Based on the data measurement throughout the

deployment process, many types of components and features were identified for using RPA in HRMS. In order to complete the desired procedure, this study constructs and develops an HRMS model using RPA tools. The model was created using a case study of an RPA model already in use in HRMS from the IT consulting sector. The model employs an application that focuses on the requirements of gathering, storing, and accessing employee information from other modules in the HR process. Finally, the HRMS's shortcomings in terms of increasing productivity are assessed and explained.

Jung Ho Lee et.al [13] says that the growing interest in digital transformation and innovations has led to the rise of robotic process automation (RPA) as a trend in a number of industries. RPA has been widely used in the financial and service sectors, and the capacity to incorporate artificial intelligence (AI) technology has led businesses in various sectors to employ RPA to improve the effectiveness of their business processes. . Based on the RPA application cases from LG CNS, the purpose of this study is to ascertain how businesses use RPA. Several case studies were employed as part of a collective case study methodology. In order to achieve this, this study analyzed and arranged numerous cases illustrating the use of RPA in LG CNS for a variety of tasks, including data reconciliation, simple information verification, the verification of outside information from unrelated systems, and input jobs for the system. RPA standardizes corporate processes, automates minor repetitive operations, and boosts the effectiveness of administrative procedures. RPA ought to be approved for usage in administrative activities at public institutions as a result. Yet, there are restrictions and factors to take into account in terms of application procedures, legal concerns, and governance. For these reasons, before RPA technology is widely adopted, further study on it as well as case studies in related fields are required

Pratiksha Ved et.al. [11] clearly explained that The future of organizational procedures is automation. The answer to software automation in a variety of industries, including IT, finance and accounting, supply chain, and more, is robotic process automation (RPA). In this article, we provide an RPA solution for the field of education. This article demonstrates the automated procedure for emailing student test results to parents using an RPA bot, which can save faculty a lot of time. The automated mechanism receives as input the subject-specific marks from an excel file and sends the sum of the grades to the student's parents. Using the UiPath tool, we automated this input file. Our findings demonstrate that all effort is free of mistakes. Also, this analysis takes far less time than manual analysis does by humans.

Mohammed Alfandi et.al. [8] defines that the group of emerging technologies known as robotic process automation (RPA) aim to automate commercial activities. This is accomplished by modelling how a person would carry out the targeted process. We couldn't find any academic reviews of the quantitative outcomes, despite the fact that RPA and other related performance metrics have been proved to save time and money in a variety of scenarios. To demonstrate the quantitative advantages of RPA in various business areas, a thorough analysis is needed. This essay offers a well-organized evaluation of the literature based on several business sectors. Analysis of the financial advantages of robotic process automation was the goal (RPA). We are using case studies and in-depth RPA processes in each industry to demonstrate the potentials of RPA. Although implementing RPA has enormous quantitative advantages, the study finds that only a small number of firms in each industry reported their quantitative outcomes. Angel R. Otero [7] proposed that business process automation is in greater demand, which continues to fuel growth for robotic software and artificial intelligence. RPA is one instance of an emerging technology in the field of automation that is currently in use and having an impact on numerous commercial enterprises.

RPA does not particularly relate to a physical robot; rather, it refers to a type of programmable software, sometimes known as "softbots," that completes assigned tasks and replaces low-value, monotonous, and tedious work typically carried out by people. RPA offers numerous benefits, but it also has drawbacks that must be overcome in order to realize its full potential. This is true of many other new technologies as well. The purpose is to highlight RPA's challenges and issues that have been noted in the literature but may have an impact on present corporate organizations. The literature mentions the advantages of RPA while also emphasizing the difficulties that may harm corporate organizations if the crucial controls, procedures, and processes required to ensure its proper deployment and efficient operation are not there.

Antonios Kaniadakis et.al. [14] derived that A tremendous amount of excitement has recently been surrounding robotic process automation (RPA). Despite extensive studies on hype and expectations around technical innovation, little is known about how hype affects firms from the view of adopters. We attempted to address the following questions: How does RPA technology hype reach the shores of organizations? What adoption behavior and decision-making does it drive? through an inductive multi-case study of five organizations from the banking, financial services, and insurance (BFSI) sector that have adopted RPA over the past five years. Results show that senior management plays a crucial role in adoption and legitimation, a role that extends beyond that of sponsorship as defined by current theory. The findings also show that interdisciplinary teams' "search" for use cases, which reveals persistent operational issues while also providing chances for organizational learning, is what propels the adoption of RPA.

III. PROPOSED SYSTEM

The hiring phase and the onboarding phase are the two phases. Recruitment is one of the areas where using RPA-based solutions has the most promise. Many of the time-consuming, repetitive operations needed for this field's processes still need direct human labor. In order to be considered for available positions, candidates must submit resumes and applications, which takes a lot of time to analyze. Software robots that quickly collect applications and compare all of the information to a list of precise job requirements might greatly simplify this procedure. Candidates for a position in an HR scan their documents and send them to HR for processing. Most of the time the documents sent by the candidates are in pdf format. These include diplomas, identity cards, certificates, CVs, letters of intent, etc.

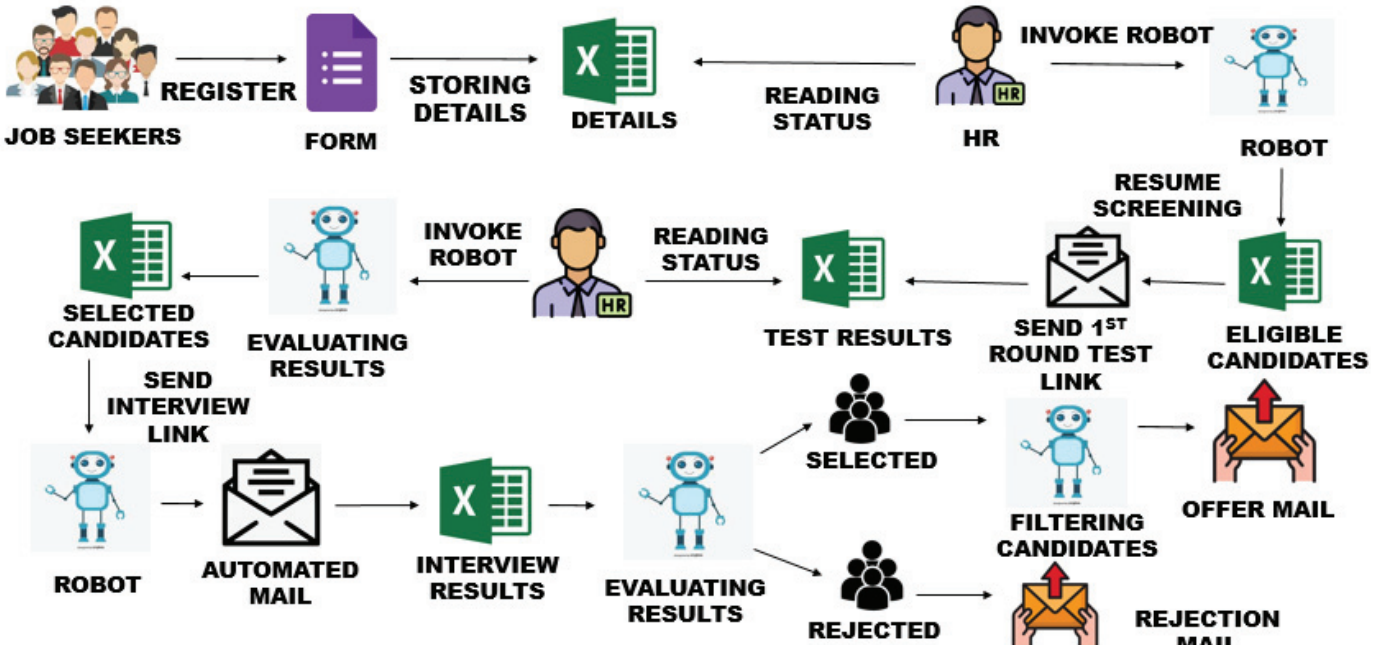

Fig. 1. Architectural diagram of the recruitment phase

Recruitment involves a lot of paperwork and operations. To overcome the above problems automated systems are used. The actions involved in hiring are as follows: sending job applicants a link to an application form; screening of resumes, send candidates a link to the test, assessing test outcomes, creating the candidate report and the offer letters. The processes used to integrate new employees into the firm are referred to as "onboarding." It includes exercises that help recent hires complete their orientation process and become familiar with the organization's structure, culture, vision, mission, and values. It involves using automation to make onboarding-related processes more efficient. Its implementation entails the use of a platform that can monitor for a predefined business occurrence and, when it happens, initiate actions that can affect all of your apps, data, and teams. Operations involved in Onboarding Process are making the offer, offer acceptance, waiting period and joining date, training and orientation.

Three sections make up the project. They receive training in applicant shortlisting and resume screening (module 1), evaluation of interview outcomes and creation of offer letters (module 2), and onboarding of new hires (module 3). MODULE 1 is a process involved in screening the resume which is sent from the candidates who applied for a job. In this process, different people applied for different job positions and different departments. So screening the candidates and screening their resumes are tedious process because it needs a lot of paperwork and a lot of time.

If the list of candidates who applied, a little period of time is sufficient. But, if the list is lengthy, it will take a lot of time and paperwork. Thus, employing an automated system can reduce the amount of time required for paperwork. Software robots that accept input from humans or from the spreadsheet make up an automated system (.xlsx files). To fill unfilled positions, you no longer have to ask your staff to spend a lot of time reviewing several resumes and application forms. **Software robots** can quickly compile all of the documents and compare the data to the list of job requirements.

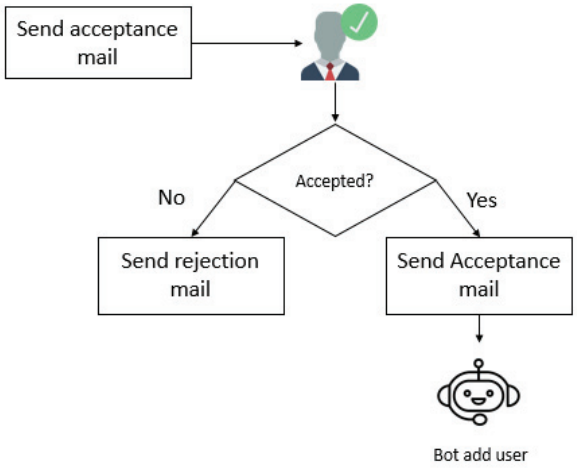

Fig. 2. Architectural diagram of the Onboarding phase

MODULE 2 is implemented the test link is sent to candidates who are eligible candidates will again fill in the details like mail, name, and department for cross-verification. After filling that candidates will start to fill in the answers. Candidates will submit the form once all the answers have been entered. The Excel sheet is used to store the candidates' results. The bot will receive that Excel document to evaluate the outcomes. The contestant is not permitted to go to the next round if his score falls below the cut-off point. The candidates can participate in the next round of the procedure if they pass the initial round. Finally, the offer letter can be generated by a bot and sent to the candidate through mail or through a way of communication.

MODULE 3 is implemented when a new colleague joins the team, data from several systems must be coordinated in order to create a new user account, email address, access

rights for applications, IT equipment, etc. To identify agreement between the employee's profile and preferences and customary business practices, data integration capability is required. The user account can automatically activate a certain template for the onboarding workflow using robotic process automation, which speeds up the entire procedure.

IV. ALGORITHM

1. Display available job positions
2. If applicant clicks register button:
   a. Display registration form
   b. Applicant fills in name, email, DOB, marks, and skills
   c. Save applicant information to a database
   d. Display confirmation message
3. When registration closes:
   a. Retrieve all applicant information from the database and store in an excel sheet
   b. For each applicant:
      i. Create a candidate profile based on their details in the excel sheet
      ii. Screen the candidate based on their marks, skills, CGPA, and department
      iii. Determine whether the candidate is eligible or not
      iv. Store the eligible candidate's information in a separate excel file
      v. Send an email to eligible candidates informing them they are selected for an interview
   c. Generate a list of non-eligible candidates and send an email informing them they were not selected
4. For eligible candidates:
   a. Send a test link for the interview or test link can be sent to the candidate who is eligible.

The above algorithm for module 1 which explains how to implement module 1. The diagram illustrates the working process of resume screening and candidate shortlisting, which is shown in Fig.3. This algorithm retrieves the resume from the mail or from the excel sheet. Based on organization criteria the resume and candidate can be selected for the next round. If the candidate is eligible for next then selected candidate will receive eligible mail. If not selected, they will receive rejection mail.

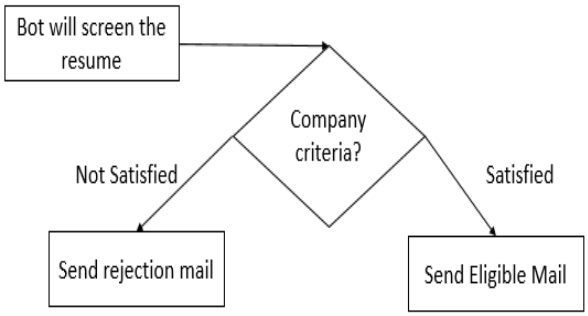

Fig. 3. Module 1 Algorithm

Read status files from email/shared location

2. FOR each status file DO
   a. Parse the file to extract candidate details and evaluation result
   b. IF evaluation result is 'passed' THEN
      i. Add candidate details to a list of passed candidates
   END IF

END FOR

3. Filter the list of passed candidates

4. FOR each passed candidate DO
   a. Generate an offer letter using the company template and candidate details
   b. Save the offer letter as a PDF file
   c. Attach the offer letter PDF to an email
   d. Send the email to the candidate's email address

END FOR

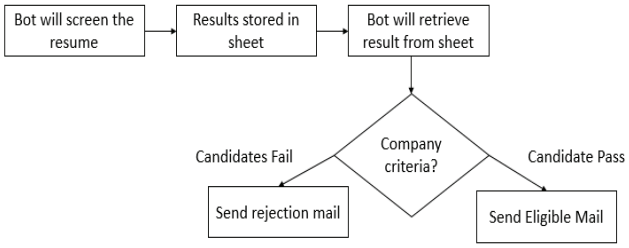

Fig. 4. Module 2 Algorithm

The diagram illustrates the working process of evaluating interview results and generating offer letters. The test link can be sent to candidates who are eligible candidates will again fill in the details like mail, name, and department for cross-verification. After filling that candidates will start to fill in the answers. After filling in all the answers candidates will submit the form.

The results of the candidates can be stored in the Excel sheet. That Excel sheet can be sent to the bot for evaluating of the results. If the candidate scores below a cut-off mark, then he is not eligible to attend further rounds. If the candidates get passed in the round, then they can take part in further process.

1. Making the Offer
    a) Generate offer letter
    b) Attach PDF to email
    c) Send email to candidate

2. Offer Acceptance
    1. Wait for candidate response
    2. IF accepted THEN
        a. Send confirmation email
        b. Proceed to next step
    3. IF declined THEN
        a. Determine reason for decline
        b.Consider other candidates for the position if necessary

3. Waiting Period and Joining
    1. Specify joining date
    2. Communicate information to candidate
    3. Monitor progress
    4. Prepare for arrival

4. Training and orientation
    1. Schedule sessions
    2. Provide necessary training and resources
    3. Monitor progress
    4. Provide feedback and support.

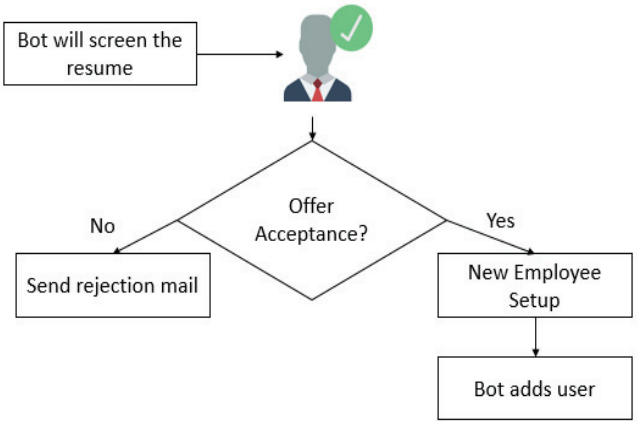

Fig. 5. Module 3 Algorithm

The above diagram illustrates when a new colleague joins the team, data from several systems must be coordinated in order to create a new user account, email address, access rights for applications, IT equipment, etc. Data integration capacity is necessary in order to find agreement between the employee's profile and preferences, and typical company procedures. With **robotic process automation**, the user account can automatically activate a particular template for the onboarding workflow, and this streamlines the whole process.

V. RESULTS AND DISCUSSIONS

In Fig. 6. the responsibilities provide an overview of the hiring process, which begins with determining the hiring need and creating a recruitment strategy. To draw in qualified individuals, it is essential to write a clear and thorough job description. Moreover, advertising the post through the proper channels can help to attract a larger pool of candidates. After reviewing applications, recruiters perform a preliminary screening to reduce the pool of potential prospects. Recruiters can analyze a candidate's suitability for the role through interviews and applicant evaluations. Background checks can be carried out to confirm the information given by candidates and make sure they satisfy the standards. Finally, a choice is made, and the chosen applicant is given a job offer.

In Fig. 7. says the key steps in the employee onboarding process are outlined in these tasks. You can find qualified candidates for the role by gathering information about the employee and the position. To guarantee a smooth transition into the organization, it's imperative to create and deliver a job offer, provision the new hire, and ensure offer and policy acceptance. Making a first-day schedule and introducing the new employee to the workplace culture can go a long way towards making them feel at home and connected. To make sure that the new employee is living up to expectations, getting the help they need, and improving their performance, it's crucial to stay on top of probation management. Last but not least, making sure professional development options are accessible can assist the new worker improve and succeed in their position.

A. Comparison Table for Automation

TABLE I. COMPARISON OF PROPOSED AUTOMATION SYSTEM, PAGEUP, EBSHR

Features	Proposed System	Page up	EBSHR
Customization	The high degree of customization provided by RPA enables HR professionals to modify automation processes to meet their unique requirements	Numerous customization choices, including scripting and coding capabilities, are offered by Automation Anywhere.	Advanced customization choices are available including the capacity to write original code modules.
Target User	HR and recruiters	HR and recruiters	HR and recruiters
Compatibility	It is simple to integrate RPA with current software because it is compatible with a broad variety of systems and applications frequently used in HR.	Several popular HR systems and applications are compatible with, but extra integration steps might be necessary.	It is compatible with a wide range of programs and hardware, but extra integration steps might be necessary.
Ease of use	RPA provides a visual, drag-and-drop interface, making it simple for HR	The drag-and-drop designer in user-friendly UI is simple to use.	It has a higher learning curve for consumers and does require some programming experience.
Accuracy	Relatively high compared to other systems	Low Accuracy	High Accuracy
Scalability	When necessary, RPA is greatly extended or modified	With its high scalability and ability to manage both large data volumes and intricate processes,.	High scalability, handling massive amounts of data and intricate processes might call for extra infrastructure.

B. *Assessing and evaluating the Proposed System*

Fig. 6. Onboarding time

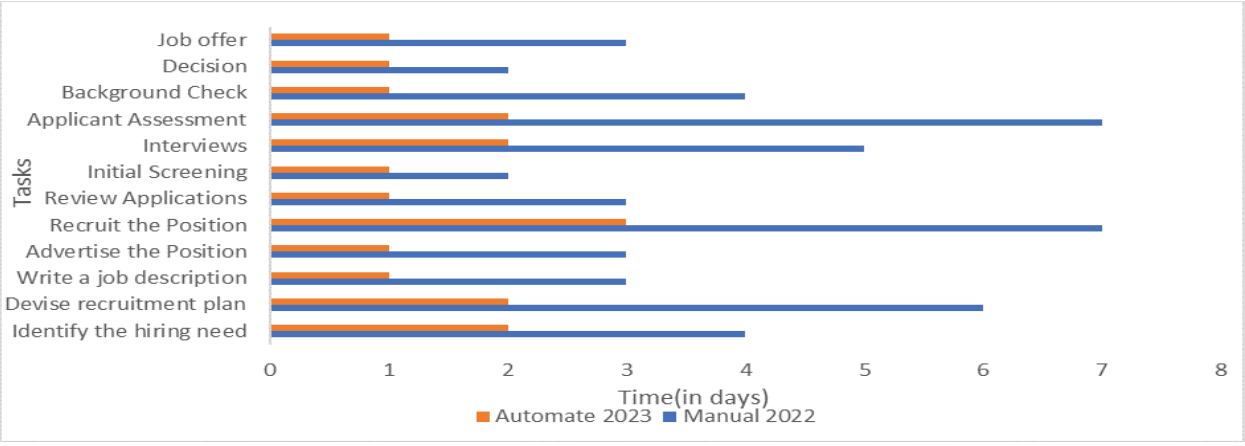

Fig. 7. Recruitment time

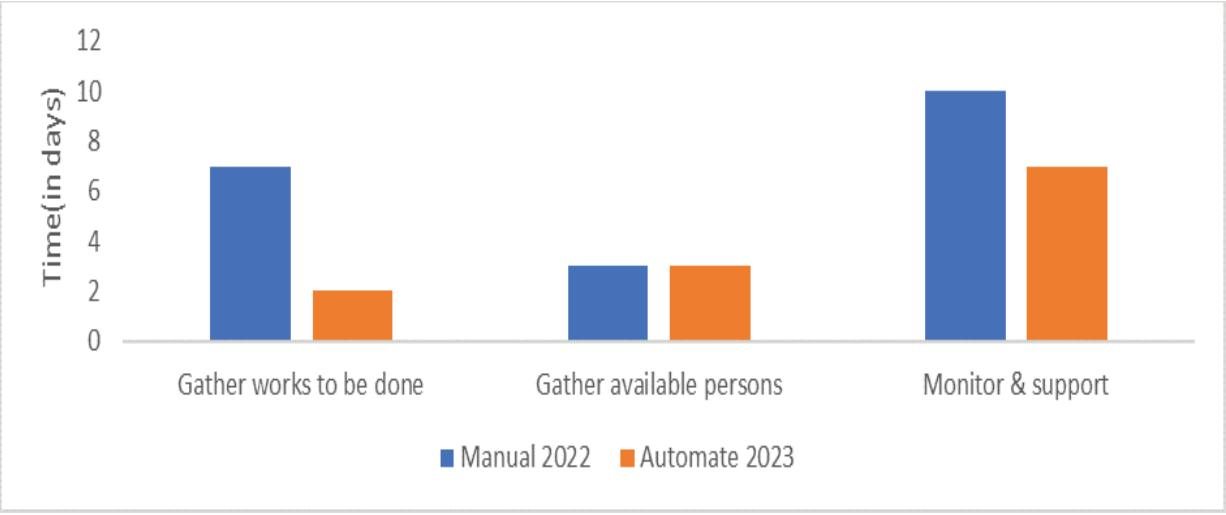

Fig. 8. Work Allocation time

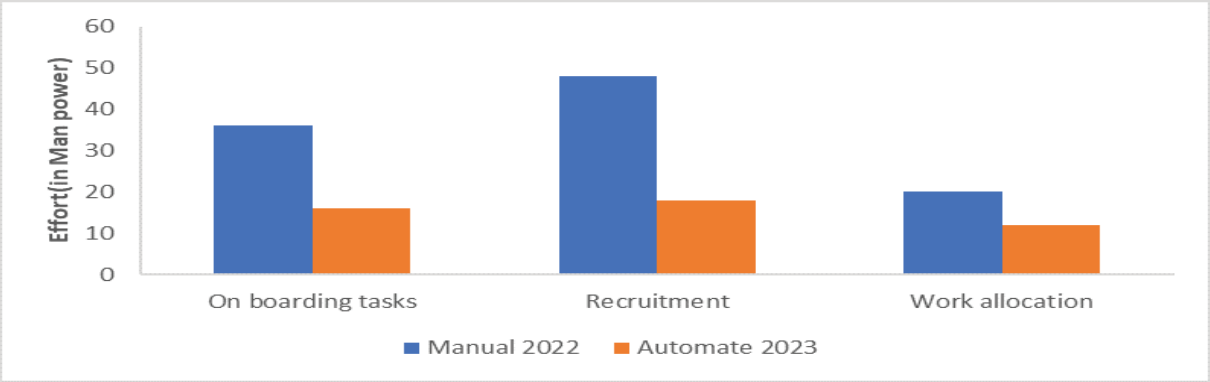

Fig. 9. Need of Man power

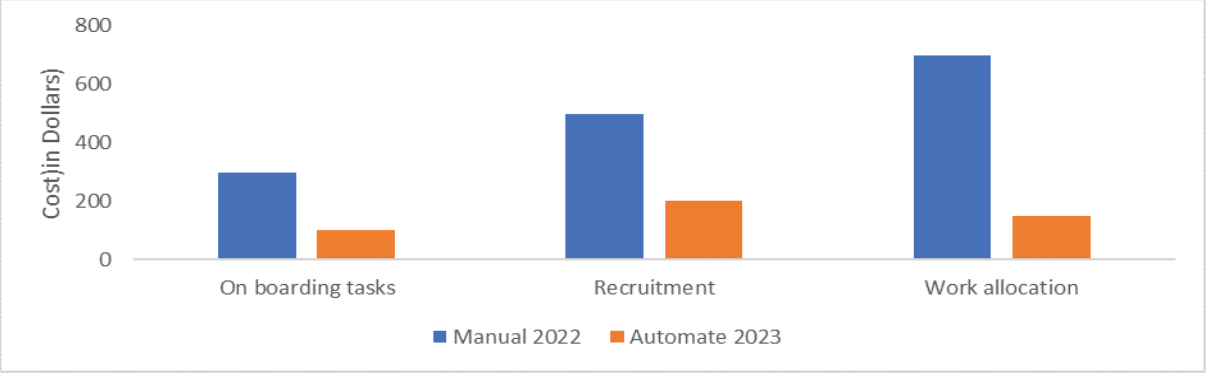

Fig. 10. Cost Allocation

In Fig. 8. activities describe how to supervise and assist a team in order to complete a particular project or task. The process of gathering the work to be done entails determining the project's scope, decomposing it into discrete tasks, and developing a timeframe and schedule for completion. Identifying the team members who will be in charge of accomplishing each work and making sure they have the knowledge and tools necessary to do so are both parts of gathering available people. Once the project has begun, it is crucial to routinely check its status to make sure the team is on pace to achieve the deadlines and that any problems or obstacles are dealt with right away. Monitoring and supporting a team also involves giving members assistance and direction. This may involve supplying resources and tools to make their job more productive as well as coaching and feedback to help team members overcome obstacles and enhance their performance. Also, it entails establishing a climate at work that is friendly and conducive to teamwork and collaboration.

Below are the feedback questions asked to HR of startups. The question are

- How simple was the automation technology to use and learn?
- Has the time and effort needed to accomplish HR tasks been reduced by the automation system?
- Did the automation system make HR data and procedures more accurate and high-quality?

- When using the automated system, were there any difficulties or problems?
- Would you generally advise others to use this management system?

Above figures are based on the analysis of manual HR activities in 2022, and with training and feedback, these HR activities will be automated in 2023

VI. CONCLUSION

In conclusion, using RPA to execute HR automation has a number of benefits over using manual HR procedures. Organizations have experienced an increase in efficiency, accuracy, and cost savings as a result of the automation of tasks like applicant screening, data entry, and interview scheduling. With features like process recording and development, automatic data validation, and machine learning capabilities, RPA offers a strong and adaptable tool for automating HR duties. RPA has been proven to provide HR automation with greater accuracy and speed than other automation tools. Automation has decreased human error, and real-time data processing has sped up decision-making and enhanced the applicant experience. A more streamlined and effective HR process has also resulted from the merging of HR automation with other systems, such as payroll and onboarding.

Overall, RPA-based HR automation has shown to be a useful instrument for streamlining HR procedures, lowering errors, and enhancing the candidate experience. It is a good candidate for adoption in businesses seeking to enhance their HR operations due to its advantages over manual HR processes and other automation tools.

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