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Effectiveness of Robotic Process Automation for data mining using UiPath

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***Abstract*—With recent trends of digitization, many corporations are focusing on automation to digitize their non digital information. Robotic process automation, or software robot technology is gaining a lot of attention from corporates for its capability of efficient automation and scalability. Software bots are faster, cheaper, and precise therefore can be utilized by these organizations easily. Software bots can process both structured and unstructured data, for modern and/or legacy systems irrespective of size of organization. There is a lot of research conducted on robotic process automation during recent years. This research proposes method to collect data more efficiently with very high accuracy. This proposed method utilizes the nature of RPA to collect data from source. This method will be beneficial to small scale organizations due to its very easy implementation and ease of exportation of data in required format.**

***Index Terms*—Data mining, Robotic Process Automation(RPA), Automation, Business process automation, Software robots, Digitisation, UiPath, Information systems(IS), Web automation**

I. Introduction

Recent industry research found out that most business processes, which are time consuming and repetitive, can be eliminated with help of automation. This software automation process requires capture of data and transfer of data, however some businesses are using systems that aren't compatible with standard API and SFTP batch entry. To solve this problem RPA technology can be utilized. RPA or Robotic Process Automation (RPA) refers to specialized software that can simulate actual human interaction with the Information System (IS) to carry out business processes. So instead of having human employees, software bot will "manually" enter that data into the system.

Many RPA tools allow users to create virtual workforce without any prior coding experience. This virtual workforce can observe human digital actions to learn and mimic human behaviour, then execute repetitive tasks in rule-based structured business processes. Software bots also work faster than human employees and are able to work around the clock, nonstop if business policies allow it, while providing constant throughput. The software bots are extremely efficient and 100% reliable and precise while performing repetitive tasks.

The objective of this work is to demonstrate effectiveness of Robotic Process Automation for data mining and collection process, to accomplish this RPA tool UiPath is used. A software bot is created and programmed to follow predefined flowchart with help of RPA tool. This data mining technique is capable of collecting data from various sources and formats, even from systems which do not support API.

The organization of this paper is as follows. Section II, presents literature review of recent work done in field of RPA. Section III, presents details of our proposed method. Section IV, describes implementation of proposed method and key findings. Finally, Section IV concludes the work with summary and description of future work.

II. Literature Review

Software robots are tools to automate business processes\tasks\jobs for organisations. In recent years robotic process automation has become a major research topic. Academic as well as industrial organizations are researching robotic process automation for its efficiency in automation.

Nowadays growing competition forces businesses to complete business processes efficiently. These processes include high volume of repetitive tasks. There is tremendous need for simple, non-disruptive yet efficient automation to complete these tasks. And as software bots work well within rule driven strict and standardised business environments, RPA is preferred by both employers and experts alike. Therefore many researchers have proposed various RPA techniques for business automation. Enríquez et al. in [2], conducted a study on the current state of RPA based on 54 research papers published between 2012 and 2019. According to the result of study in [2], a high amount of research is focused on theoretical study and software platforms for RPA solution. Authors also suggested that just above 50% of solutions are validated, and 67.74% of those validated solutions are in academic context.

Enríquez et al. in [2], concludes that there is rapid growth of interest in RPA technology and many market solutions are already available for RPA. There are many digital libraries created for phases of RPA, except for analysis phase due to lack of interest in industries.

Gupta et al. [12], shows there is great demand in RPA solutions in the market. Gupta et al. suggested that the reason for such a high demand is scalability and faster implementation

of RPA in business processes. R. Syed et al. [10] also suggested that software bots are extremely scalable. Authors also concluded that software bots can work continuously without any breaks while maintaining high accuracy. The high accuracy of software bots is also advocated in [1], [6], [9], [13]. Studies [3], [6], [14] shows that software bots can handle high volume repetitive tasks. Sutipitakwong et al. [3], also show that software bots have very small margins of errors while doing high volume repetitive tasks. However, Sutipitakwong et al. [3], concluded that software bots are not able to handle complex tasks independently and need human assistance.

P. Vasireddy [8], suggested that data collection from RPA users can be used to improve the process. RPA technology itself can be used for detailed data capturing with steps recording as expressed by [1]. Simplicity of RPA technology is an important factor for its implementation in business processes. S. Aguirre et al. [14], hints that RPA technology can be used with minimal programming skills. The implementation of RPA is a rapid process and it does not require re-engineering of existing business processes as implied in [15].

In [4], Martins et al. proposed a method of automation using convolutional neural networks to detect objects and classify application software interfaces in real-time. Proposed method successfully passed almost all real-life tests conducted by authors. Proposed method had difficulties to act like humans during login and registration actions, Martins et al. [4], suggested the reason for difficulties is lack of available dataset. Few studies suggested that combination of RPA with AI would greatly improve performance of business processes [3], [5]. This is known as cognitive automation which can be achieved with help of various AI technologies such as OCR, Pattern recognition [12]. Ortiz et al. [5], concluded that up to 80% of time reduction is achieved in repetitive tasks with help of RPA. Jimenez-Ramirez et al. [11], conducted case study to observe effects of RPA on business. For this study Jimenez-Ramirez et al. classified employees in two groups one with RPA and other without RPA. Apart from similar average time for each case (mean case duration), Jimenez-Ramirez et al. observed significant performance improvement in RPA groups compared to non-RPA groups. P. Hoffmann et al. [7], suggested that RPA should be used strategically while focusing on its long term influence in the process.

III. Design

RPA system in this paper constructed with help of UiPath, this tool provides RPA services. UiPath mainly focuses on user experience. It allows users to create a workflow with a drag and drop method. The users can edit workflow according to their needs. UiPath also provides integration with open source libraries as per user need.

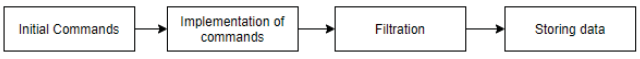

Fig. 1. Architecture of RPA workflow.

Figure 1, shows the architecture of RPA workflow. It shows the algorithm to mine data with RPA. Proposed method creates initial commands as per user need and implement them to gather data from source. This collected data is filtered and stored as per user need.

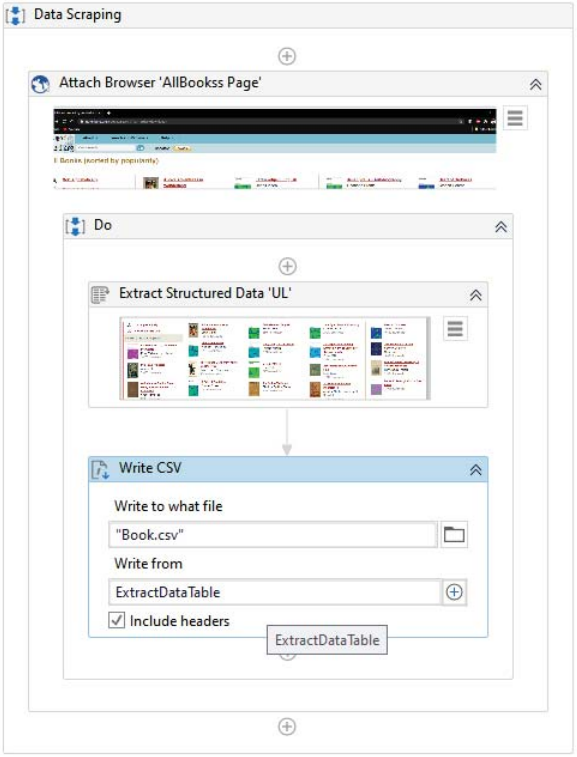

Fig. 2. Initial commands of RPA workflow.

Figure 2, shows the design of RPA workflow. It illustrates how simple and easy it is to set up an effective workflow for complex tasks with the help of RPA tools.

This design has proven to be effective to automate complex tasks while maintaining simplicity for users. The workflow created can be further edited for specific use cases. With proposed method user with no prior programming experience can mine data effectively with help of UiPaths drag and drop model system. Proposed method also support collection of data from systems that does not support API.

IV. Implementation And Testing

In this test the RPA is used for data mining. The goal of the test is to collect data from the Gutenberg website shown in Figure 3, and store collected data in csv file format. In this particular test 3 data fields are collected and stored.

The Figure 4, shows the preview of data to be collected from the first page of the website. As we can see in Figure 4, collected sample data have some impurities. The RPA filter shown in Figure 5, is applied. The applied filter is directly integrated into the current workflow to automate the whole process. The whole process is started with single click from

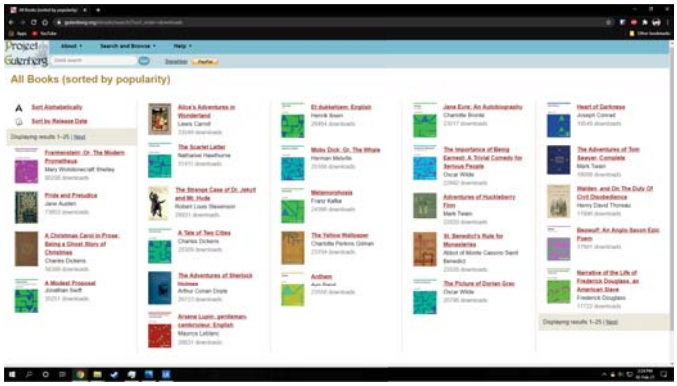

Fig. 3. Project Gutenberg book catalogue.

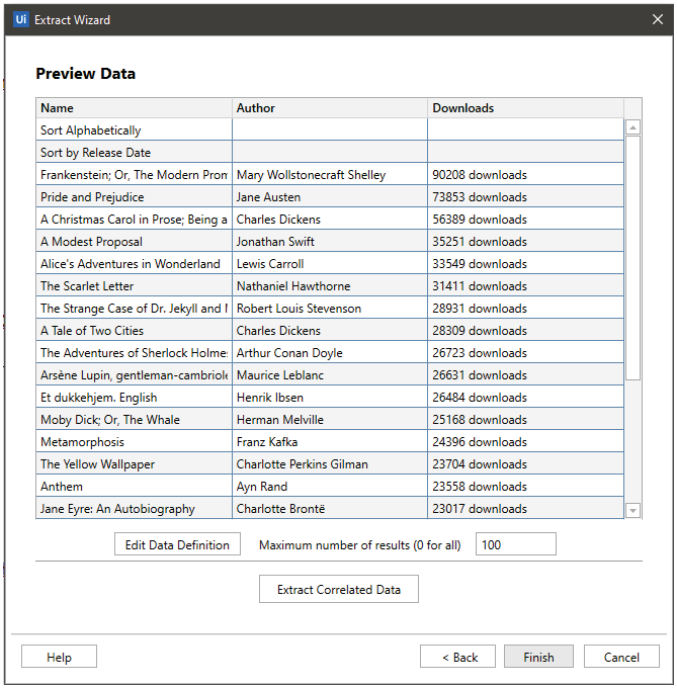

Fig. 4. Data collected from Gutenberg website

user. Collected data is stored into a csv file. This test provided satisfactory results.

A. Key Findings

- RPA is proven effective in completing repetitive tasks with minimal error compared to humans.
- RPA does not need API integration hence can be used in older legacy systems.
- With help of tools like UiPath, RPA can be constructed and used by regular users with no programming experience.
- RPA technology is very adaptable and scalable due to its simple construction process.
- RPA technology can handle complex tasks with proper implementation.

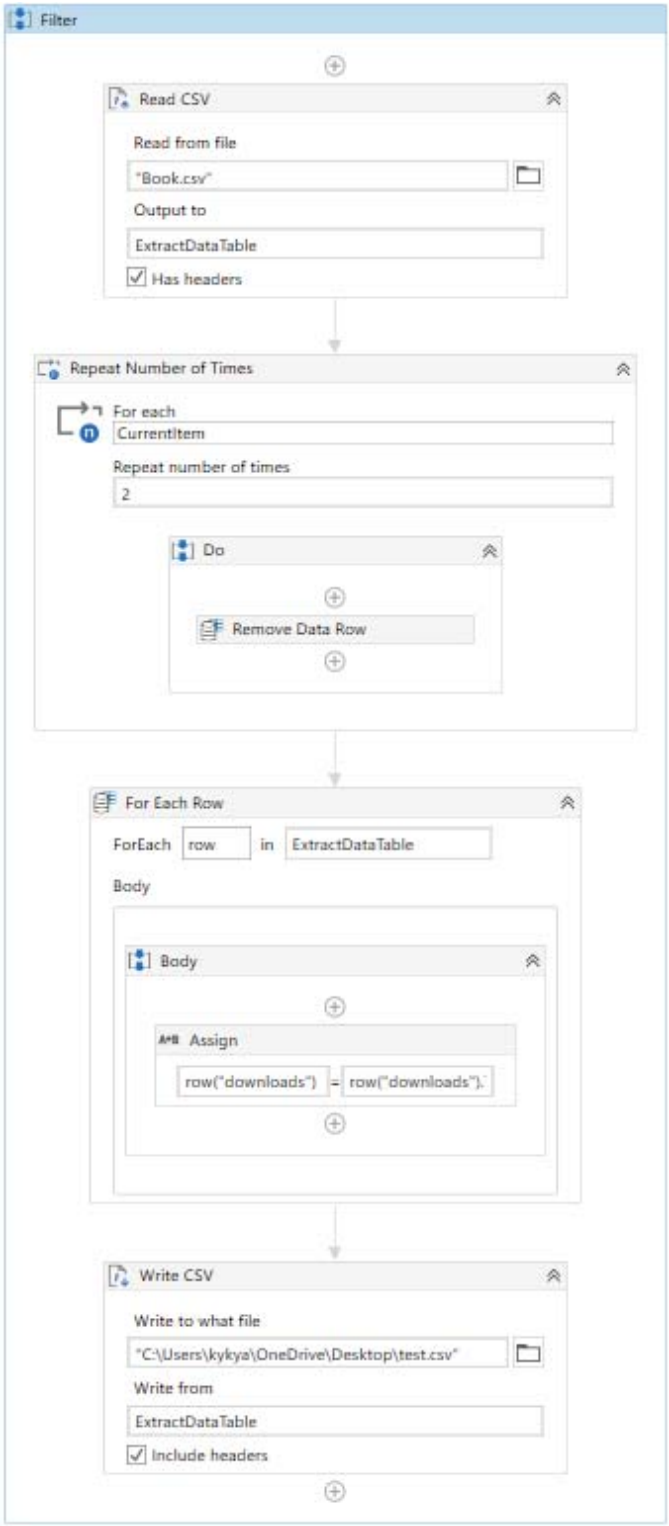

Fig. 5. RPA Filter

B. Benefits of RPA

The software bots provide improved and streamline workflow for the company. Software bots can handle high volume document intensive processes better than human employees. With careful implementation of these software bots produce very few errors completing tasks as opposed to human employees for the same task. Software bots do not make human errors while handling repetitive tasks and are very reliable.

With RPA solutions available in the market, setting up software bots is a code-free process. Users do not need to invest too much time or money in implementation of software bots. Thus making RPA an ideal choice for automation in small organizations.

C. Improvements for RPA

RPA technology shows significant speed and accuracy doing repetitive tasks. RPA technology also shows promising results completing complex tasks while maintaining ease of use and simplicity for users. While proper implementation of RPA can improve performance, any human error during RPA implementation can lead to disaster due to RPAs nature. Integration of AI with RPA can minimize the impact of such disasters while self correcting RPA systems.

As RPA technology mimics human interaction with information systems, good filtration and constant tweaking is necessary for optimal workflow.

V. Conclusion And Future Work

From tests performed the RPA showed promising results. Data collected by software bot with just initial commands was almost accurate. The RPA filters integrated directly into workflow making the system extreme efficient and simple. While RPA is accurate and fast following simple workflow, more work needs to be done for more complex operations.

Future work focuses on implementation of AI into RPA for more efficient workflow. With help of AI techniques, RPA will become more intelligent and can be used for data mining more effectively. Implementation of AI can be used to create self modifying RPA workflow to collect important data more accurately and processing it as per users needs.

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