Development of user interface using Robotic Process Automation in Healthcare

Naman Nihal, Jahanvi Singh, Aryan Mansani, Puneet Jaisinghani, Pooja Kamat, Priya Jadhav, Satish Kumar

Department of Information technology, Department of AI and ML, Department of Robotics and automation, Symbiosis Institute of technology, Pune, India

Email: Naman.nihal.btech2019@sitpune.edu.in

Abstract.

Today's healthcare facility leverages modern technologies to extend digital operations, provide e-services, and AI (artificial intelligence) for many processes. However, they are still being used marginally, and there exists abundant scope for healthcare organizations to evolve. India is one of the countries where disease control is still lacking and there exist fields where technology can be leveraged. This study examines the prospects and implementation of robotic process automation (RPA) in the healthcare industry and illustrates how RPA can work in sync with traditional websites and further build scalable systems that aim to reduce and eliminate repetitive operations and processes.

Keywords. Healthcare automation, robotics process automation, Ui Path.

1. INTRODUCTION

The healthcare infrastructure is one of the major sectors of revenue as well as employment in any country. Managing and processing data from various internal and external sources, such as clinical applications, insurance sites, and radiology information, is difficult in any healthcare system. Integration between these systems is often difficult and redundant, moreover, healthcare organizations rely on people to perform complex manual labor to process information. RPA in healthcare assists in the automation of processes and the improvement of healthcare operations[1]. In this paper, we will look at how RPA may be used to scan and analyze blood test results, the present focus is on applying RPA to blood reports and creating health status based on that blood report

2. LITERATURE REVIEW

Damian Kedziora and Kari Smolander highlighted the use of RPA in the City of Turku Healthcare Division's response to theCOVID-19 emergency. A generic RPA/ML-based framework was presented by Nitu Bhatnagar to assure the uniformity and quality of Bhasma - an end product acquired after various actions in the ancient Indian System of

Medicine - Ayurveda.

RPA was used to improve operational efficiency in the healthcare sector by Dr. N. Sumathi, Dr. A. Jeyalakshmi. Dr.Shahid Ud Din Wani et al. highlighted that AI can assist healthcare staff in expanding their knowledge, allowing them to spend more time providing direct patientcare and reducing weariness. Santiago Aguirre & Alejandro Rodriguez carried out a case study for demonstrating the applications of RPA in adifferent sector. Their results showed that productivity improvement is the main benefit of RPA

3. METHODOLOGY

3.1. Conventional

Doctors assess the blood reports of an individual to assess blood counts and cholesterol levels and to assist in the diagnosis of vitamin shortages or medical disorders.

Review of the conventional healthcare workflow and the RPA based workflow in the following subsections.The steps of a conventional healthcare workflow include:

- An individual first sees a doctor to learn about his health. The doctor might then advise doing a blood test.
- The actual blood draw often takes less than 3 minutes, and it can take several minutes to several hours for the results tobe available.
- The individual then makes another appointment with the doctor on receiving a blood report.
- When the patient visits the clinic, the doctor views his blood report and gives him a report on his health status[2].The disadvantages of using a conventional healthcare system:
- Because three separate parties the patient, the blood testing laboratory, and the doctor are involved in the traditional system, a lot of time is spent on each step.

3.2. RPA – Based Healthcare workflow

The first step is to train the RPA platform to execute the same tasks that the process engineer performs. After the workflow has been imagined as an RPA-based workflow[4], steps 3 to 5 of the conventional workflow are, in principle, automated. The RPA- driven workflow steps are:

- This is similar to the initial step of the conventional workflow where the doctor advises doing a blood test.
- The RPA bot scans submitted blood test reports for blood vitals. After scanning it processes the blood vitals values and stores them in an excel file, retrieving and converting them into JSON format for the health status algorithms to process and generate health statu.

3.3. RPA – Methodology

In this age of the modern world, where computers are getting smarter and humans are getting lazier, there's a need ofRPA.

There are a number of jobs and procedures in the traditional workflow of healthcare that can be automated using an RPA tool like UiPath. One among them is the manual review of blood reports, which is typically done by the attending physician and is also the first prospective task for automation[30]. Automation of the process would enable the medical professionals to focus more on the diagnosis and treatment; moreover, utilizing RPA[1,2].

- The patient can determine whether or not he has cardiovascular issues by viewing his health status immediately.
- The person's blood sample is collected.
- When the person receives his blood report, he can upload it to RPA based tool.

Tools to automate the review of blood reports make it possible for concurrent observations[37] and allow the doctor/physicians to consider several diagnoses and treatment options that are most appropriate for the patient[2].

3.4. Robotic Process Automation

The future and significance of Robotic Process Automation is bright as companies worldwide have already started to deploy RPA bots[2] to take stable rule-based processes from human workers and hand them to software, increasing efficiency and decreasing cost significantly.

Software Needed - UiPath, Node.js, Postman.

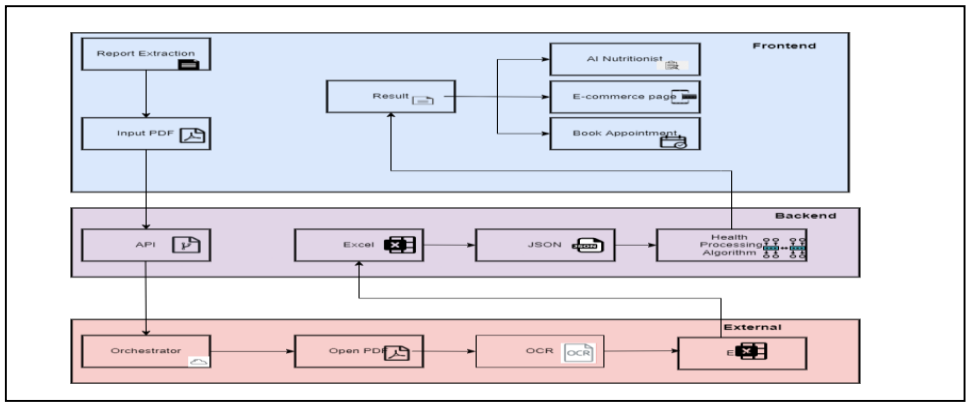

Fig 1: RPA Methodology

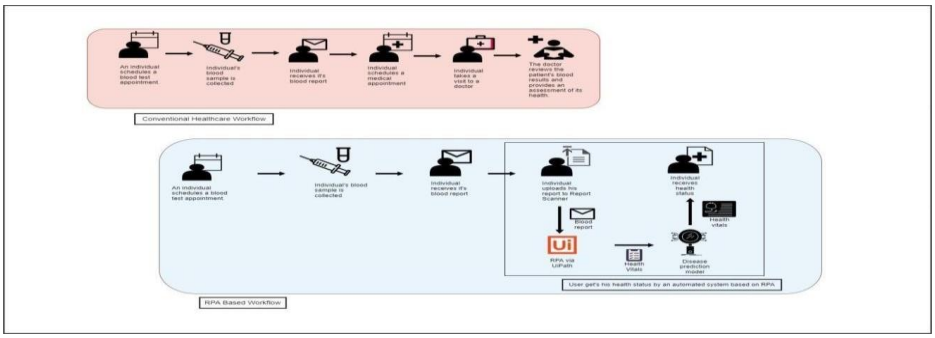

Fig 2: Comparison – Conventional and RPA Driven workflow

3.5. UI Path Methodology

The very initial step is to open the pdf in order to extract blood vital values, the same can be done by the Start process which isa part of UiPath core activities in the UiPath Studio. Once the report is fetched, the screen scraping of the blood vitals can be done via Optical character recognition. created, monitored, scheduled, deployed, and controlled by the orchestrator.

It acts as a mediator between third-party solutions and once the report is fetched the screen scraping of blood vitals can be done using Optical Character Recognition

3.6. Optical Character Recognition

OCR is process of converting a text from images into machine readable format.

Utilizing OCR allows the user to build automation based on what is displayed on the screen thus assisting in locating all of the characters displayed on the PDF. Once the blood report PDF has been scanned, relevant values can be extracted and exported to excel or any other storage.

3.7. Exporting Data to Excel

The write cell method in UiPath Studio can be used to export data to Excel and subsequently be used for various use cases.

3.8. Orchestrator overview

The UiPath Orchestrator is a web application that enables you to schedule how UiPath Robots[2] carry out repeated business tasks.

It may be understood as a location where the address of an RPA bot is maintained after deployment so that when we call the orchestrator using the API with a robot id and security settings, the address associated with that robot id is fetched and run.

Automation provided by UI path are categorized into two types -

- Attended Automation - These are the robots that require human supervision to complete their tasks[1,3]. Some of these tasks are automated, whileothers require human intervention. In attended automation, Orchestrator makes sure that package versions are correctly delivered to robots for execution andare managed centrally.

- Unattended Automation - Unattended Automations are designed for more complex and highly repetitive tasks that must be performed in batches andcan be determined by a predefined rule

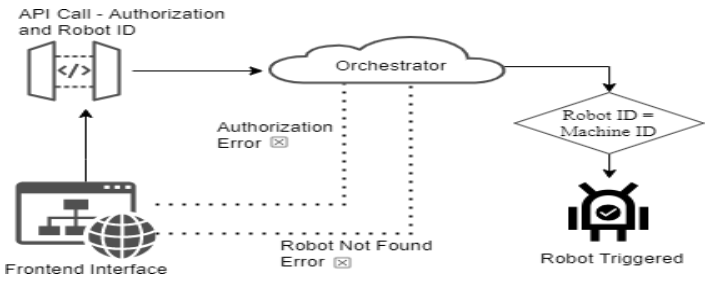

Fig 3: Orchestration overview for UiPath Bot

3.9. Robot Deployment

The previous section, we discussed the RPA bot creation process, now in this section we will be talking about how to publish your RPA bot on an orchestrator as an unattended automation.

- After creation of the robot, we need to first publish it on orchestrator[23].
  - On the right of the Studio ribbon, click Publish.
  - Enter the name of the package in the Publish properties tab.
  - Select Orchestrator Tenant Processes Feed in the Publish options tab, that's the location from where unattended robots can access the automation.
- Configuring UI Path Assistant
  - Open UI Path assistant. Login/Sign Up in UI
  - Path Assistant, from the same ID where you have published it.
- Orchestrator Setup
  - Open UI path orchestrator in your browser, from homepage click Tenants. Creating a new Folder - In tenants go inside Folders, create a new folder with desired name and descriptionand under process package source, click on Tenant Package Feed.
  - Managing Access –
    - Click on Manage Access, then from the users table select the user with registered emailID, and then click on edit. In the roles section select “Allow to be automated user”. In the next page, enable Unattended robot.
    - In the Domain/Username section you need to enter the designated domain of your machine, for that, Open command prompt on your machine and enter whoami, you will get your domain as Output. Enter your windows password in the password field and select credentials type as windows credentials. Click on Update.

- Machine Setup
    - From the tab, select machines Select your machine from the list and click on edit. In the Production (Unattended), update the field from 0 to 1.
- Click on machines then manage machines, find machine listed Now go back to the folder created by you and click on Users. Select your machine and then click on Update. Click om automation, then add process, then find your process name there and click next and then create.

4. RESULTS

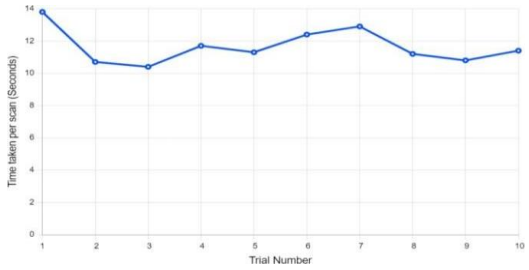

Fig 4: Trial Number vs Time Taken per Scan

With reference to the above graph, when automated processes are compared to the traditional way, this is incredibly cost- effective. Both the doctor and the patient who has taken the test might save a great deal of time this way. As a result of the substantial time savings, the healthcare system will benefit[2].

5. COMPARISON WITH EXISTING RESULTS

Jerry et al. (2021) [46] used RPA to relieve the IPC team of the load of repetitive duties related to the daily processing of test findings. According to the report, RPA cut administrative time by 3 hours per day, which corresponds to 18 hours per week or 936 hours per year. Furthermore, RPA saved a significant amount of time necessary for processing COVID-19 results and surveillance.

Considering this as base reference the process automation proposed under this paper optimizes the task more, depending upon the length of report, usually the process of scanning through the entire report takes around 120 – 180 seconds, which can be reduced to 10 – 12 seconds via RPA thus saving approximately 140 seconds per report. With an estimated 100 reports scanned per day, the deployment of RPA can save approximately 3.8 hours per day, which corresponds to 23.3 hours per week or 1260 hours per year.

6. CONCLUSION

In this study, we examined the prospects and implementation of RPA in the healthcare industry. We also illustrated how RPA[5-7]can be synced with traditional websites and be used to build scalable systems. We discussed conventional methodologies, and in contrast,

RPA methodology and RPA-based healthcare workflow. Wedemonstrate that the adoption of RPA into healthcare can reduce and eliminate repetitive processes and operations. Future work includes testing various RPA-based methodologies against each other to observe which one can be bestimplemented for different kinds of backgrounds.

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9. BIOGRAPHIES

Naman Nihal will receive his bachelor's degree in Information Technology from Symbiosis Institute of Technology (SIT) in 2023. He was former summer intern at Microsoft, Hyderabad and currently working at a firm based in Indore.

Jahanvi Singh will receive her bachelor's degree in Information Technology from SIT in 2023. She is currently working as intern at Nomura Services, Mumbai.

Aryan Mansani will receive hir bachelor's degree in Information Technology from SIT in 2023. He was former summer intern at Credit Suisse and currently working at a firm based in Indore.

Puneet Jaisinghani will receive his bachelor's degree in Information Technology from SIT in 2023. He has a passion for business and right now is seeking new opportunities to apply technical skills to real-world problems

Pooja Kamat works as an Assistant Professor in the Computer Science Engineering and AI & ML department at SIT, Symbiosis International (Deemed University), Pune, Maharashtra. She has completed her MTech from Mumbai University and is currently pursuing Ph.D. in the domain of Predictive Maintenance. She has a teaching experience of 12 years and has guided many UG and PG students in the domain of AI and ML. She has authored more than 30 international/national journal and conferences publications. According to Google Scholar, she has 300 + citations, with an H-index of 9 and an i10- index of 9.

Ms. Priya Jadhav is Assistant Professor in the Department of robotics and automation Engineering department at SIT, Symbiosis International (Deemed University), Pune, India. She has around 15 research publications published in various journals. She has 10 years of expertise in the educational area. Manufacturing, surface engineering, and corrosion analysis are among her research interests. She earned her master's degree in Mechanical Automotive Engineering in 2013 and is now pursuing her PhD at SIU Pune. She is now working on a project to improve surface properties for high temperature applications.

Dr. Satish Kumar is an Associate Professor in the Department of Robotics and automation Engineering and in-charge of Advanced Manufacturing Technology Lab at SIT, SIU. He is Program In-charge, Faculty of Engineering, SIU. He has completed his Master’s degree in 2013 and Doctoral degree (PhD.) in year 2020 from Visvesvaraya Technological University, Belgaum, Karnataka. His area of research interests includes Smart Manufacturing, Digital Twin, Condition Monitoring, Composites, Cryogenic Treatment, Additive manufacturing, and Hard materials machining. He has authored more than 32 + international/national journal and conferences publications. He has filed Indian patent based on his current research projects and he is also a corporate member of Institution of Engineers. He is a research supervisor to PhD. Research scholars and M. Tech students working in the domain of Predictive Maintenance, Manufacturing and Industry 4.0.