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INVOICE PROCESSING USING ROBOTIC PROCESS AUTOMATION

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ABSTRACT

This paper outlines our recent work to create an automated application to change how invoice processing is done in the field of finance operations. Robotic Process Automation (RPA), which may be used for a variety of finance and accounting activities, invoice processing, and more, serves as a prime illustration of the technology's ability to increase efficiency. Finance staff must make some decisions when processing invoices, so RPA DataBot automates some of those tasks. In addition, automation can minimize errors in such processes and reduce the need to handle exceptions manually. UiPath's RPA DataBots are capable of continuously monitoring a folder in which employees (or other DataBots) save invoice copies in PDF format. Invoices are automatically extracted from folders by robots when they detect their presence. DataBot translates invoice information into natural language using Intelligent Optical Character Recognition (OCR) and natural language processing. If the company's database or enterprise resource planning system hasn't already been opened by the robots, they use their credentials to open it. Once the invoice information has been transferred, the robots process them one at a time. Throughout the entire process, the DataBots are also performing background activities such as checking to see if the company's database is open, monitoring the dedicated invoice folder or its email address, and verifying whether the invoice information matches information in the database regarding the vendor (e.g. VAT number).

Keywords: Robotic Process Automation, Invoice Processing, Data Extractation, OCR, DataBot.

I. INTRODUCTION

According to a report by technology services firm Aberdeen. Group, companies typically take four to sixteen business days to process an invoice from receipt to payment approval. Particularly for companies that still process invoices manually on a daily basis, this conclusion may not surprise them. More than half of all invoices are processed manually, according to a Canon Business Process Services study. The numbers show that companies are not taking advantage of the new opportunities offered by digitization and automation in finance and accounting. Moreover, the high percentage of manual labor indicates significant inefficiencies in combination with a lack of standardization or centralization of invoice management processes, which also leads to unnecessary inconveniences such as unpaid invoices (and late fees) and higher labor costs than necessary.

INVOICE PROCESSING USING UIPATH.

Learn how businesses can utilize UiPath's Enterprise RPA Platform to reduce costs, increase efficiency, and increase accuracy in accounts payable with UiPath's Enterprise RPA Platform. Invoice delivery for several of their clients was reduced using UiPath by a global BPO provider. A remote virtual environment (Citrix technology) was required to access their ERP system. Due to UiPath's precision in recognizing screen elements and ability to automate even in difficult conditions such as Citrix, the BPO more than doubled the delivery effort and dropped AHT (average handling time) by 70%.

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Invoices in unstructured formats are processed by an European pharmaceutical company using intelligent OCR. 3 full-time employees processed 1800 monthly invoices for a European pharmaceutical company. Invoices were still being created on paper, and four applications were involved, including MS Office and e-mail. Using clever OCR, the UiPath Robot extracted the structured and semi structured data and carried out the essential validations, including comparing the PO number, the quantity of items, and the cost per item to the PO and the goods received.

II. LITERATURE REVIEW

Business processes such as ordering, acceptance, delivery, and payment are impacted by the invoicing process. The techniques involved various approaches for invoice processing based on cognitive theory, generic systems which use OCR engines, CBR (Case-Based Reasoning), optimization approaches which use SVM, Entropy, etc .

To produce candidates for individual invoice parts, SVM, maximum entropy, and HOG detectors are used in the first phase. Tested with real invoices, the proposed system has shown promise in real-world applications.

In addition to providing transactional data to suppliers, it also includes handling information about orders and payments. This application has improved productivity significantly since it was deployed in production with a client.

FRESCO and OCR tool are the two components of the given system. Domain knowledge is contained in the Fresco component. Knowledge about the domain is contained in the FRESCO component.

III. REQUIREMENTS

Identifying the needs of different stakeholders is part of the requirements analysis process. In other words, requirements analysis is the analysis, documentation, validation, and management of software or system requirements. It helps identify business opportunities, defines system design requirements that are actionable, measurable, testable, and traceable. After thoroughly analyzing the system's problems, we know what the current system needs in order to run smoothly. Functional and non-functional requirements are the two types of system requirements. These specifications are detailed below.

A. Hardware requirements

1) Minimum 4GB RAM.

2) 200 MB of free Hard Disk space.

3) Browser: Chrome(v49), Internet Explorer (v10) or higher.

4) Processor: 3GHz or higher.

B. Software requirements :-

1) Operating System : Windows 7 and above.

2) UiPath Studio.

3) UiPath Robots.

4) UiPath Orchestra.

C. Functional requirement

Functional requirement are the functions or features that must be included in any system to satisfy the business needs and must be acceptable to the users. Based on this, the functional requirements that the system must require are as follows:

1) Name and Address of the Recipient: The Name of Recipient is required to identify the person who has initiated the transaction. The name should be spelled correctly in order to avoid confusion. We require physical address of the customer to deliver any replacement or something else.

2) Sold By: This feature describes the seller of the product. Basically it answers the query from where is the product shipped and which outlet is responsible for shipping.

3) Total Amount: This field gives us the final amount of the product.

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4) Order Number: This field describes the order number or order ID of the product. This field can immediately help the seller outlet to identify all the product details.

5) Order Date: This field gives us the Date when the given product was purchased.

6) Invoice Number: This field shows us the Receipt (Invoice) number of the transaction. This number is useful in servicing centers to identify the product warranty or guarantee period.

7) Invoice Date: Date at which the invoice was printed.

8) Product Description: This field gives us the information about either products or services including prices and quantities. Often includes standard product description and inventory number.

D. Non-functional requirement :-

Non-functional requirement is a description of features, characteristics and attribute of the system as well as any constraints that may limit the boundaries of the proposed system. The non-functional requirements are essentially based on the performance, information, economy, control and security efficiency and services. Based on these the non- functional requirements are as follows:

1) Security:- Security requirements ensure that the software is protected from unauthorized access to the system and its stored data. It considers different levels of authorization and authentication across different user's roles. For instance, data privacy is a security characteristic that describes who can create, see, copy, change, or delete information. Security also includes protection against viruses and malware attacks.

2) Reliability:- Reliability defines how likely it is for the software to work without failure for a given period of time. Reliability decreases because of bugs in the code, hardware failures, or problems with other system components. To measure software reliability, you can count the percentage of operations that are completed correctly or track the average period of time the system runs before failing.

3) Performance:- Performance is a quality attribute that describes the responsiveness of the system to various user interactions with it. Poor performance leads to negative user experience. It also jeopardizes system safety when it's is overloaded.

4) Availability:- Availability is gauged by the period of time that the system's functionality and services are available for use with all operations. So, scheduled maintenance periods directly influence this parameter. And it's important to define how the impact of maintenance can be minimized. When writing the availability requirements, the team has to define the most.

5) Scalability:- Scalability requirements describe how the system must grow without negative influence on its performance. This means serving more users, processing more data, and doing more transactions. Scalability has both hardware and software implications. For instance, you can increase scalability by adding memory, servers, or disk space. On the other hand, you can compress data, use optimizing algorithms, etc.

IV. DESIGN AND IMPLEMENTATION

A financial process is an essential part of any organization, no matter how large or small. Additionally, a company's finance department is responsible for manual data entry into its company database and dealing with any inconsistencies from thousands of invoice formats. In my opinion, these things make the overall process slower and make it more difficult for businesses to automate. Manually transferring this information is time-consuming and prone to errors, since the invoices are not structured appropriately. As part of our proposed system, DataBot will automate invoices, allowing back office finance and procurement teams to focus on tasks that have a higher value. We propose to automate invoices using DataBot, freeing up the finance/procurement teams to focus on higher value activities.

A. Monitoring For Invoices :-

Emails with invoices can be flagged and forwarded for data extraction using an RPA bot or email an automation tool. As companies move toward centralizing invoice scanning, they are putting hard-copy invoices in a single address.

B. Invoice Capturing :-

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The results are sent to employees for manual verification if the software is uncertain about the results. Machine learning and optical character recognition are used to read invoices with OCR and to understand their context.

C. Evaluating Invoice Against Order Records And Other Criteria :-

Ensure that invoices and purchase orders are cross- checked. The payment time is determined by working capital optimization policies. A supplier's usual invoices may need to be manually checked if they are unusually large compared to his/her usual invoices.

D. Recording Invoice Related Information in System :-

Software robots can read invoice information by using intelligent OCR and natural language processing capabilities. If the company's enterprise resource planning system has not already been opened, robots open it with their credentials after extracting key information from each invoice.

E. Email Notification :-

Software robots are capable of sending posting notifications via email to the vendor or employee responsible after successfully registering each invoice. An email is also sent to the responsible party in case of an expression.

TECHNOLOGY USED

A. UIPATH STUDIO

Functional and non-functional requirements are the two types of system requirements. These specifications are detailed below. The automation application is one of Studio's most crucial concepts. A business process is represented graphically in an application. By offering you complete control over the execution sequence and relationships between a unique set of steps, also known as activities in UiPath Studio, it enables you to automate rule-based processes. The primary workflow types that are supported are:

1. Sequences are ideal for linear operations because they let you move from one task to the next without clogging your workflow.

2. Flowchart appropriate for a more intricate business logic, allowing you to connect choices and actions in a variety of different ways by using several branching logic operators.

3. State machines are good for handling very large workflows because they execute in a finite number of states that are triggered by conditions (transitions) or activities.

4. Global Exception Handler: Useful for both process debugging and establishing the workflow behavior when an execution fault occurs.

B. E-MAIL ACTIVITIES PACKAGE :-

1. The Mail Activities Pack, which supports multiple protocols like IMAP, POP3, and SMTP, is made to make it easier to automate any mail-related operations. Additionally, UiPath has activities designed specifically for use with Outlook and Exchange.

2. The use of certain mail protocols is not intended for actions like Save Mail Message and Save Attachments. Instead, they save the MailMessage object variable acquired through operations such as Get POP3 Mail Message to a specified folder on the current machine.

C. PDF ACTIVITIES PACKAGE

1. The activities in the PDF pack are made to extract data from PDF and XPS files and store it in string variables. The entire document can be used to extract the data, or a specific set of pages can be selected using the Range parameter available in each activity.

2. Data extraction from scanned documents can also be accomplished utilising OCR-based procedures, OCR-read PDF files and XPS files. Simply place the engine in the activity's body to select one of the three OCR engines designed specifically for UiPath: Google OCR, Microsoft OCR, and Abbyy OCR.

D. EXCEL ACTIVITIES PACKAGE :-

1. Since Microsoft Excel is a widely used programme in many kinds of enterprises, the Excel activities package helps users automate every part of the programme.

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2. It has functions that let you read data from cells, columns, rows, or ranges, write to other workbooks or spreadsheets, run macros, and even extract formulas. Data can also be sorted, color-coded, or added with new information.

E. UIPATH ROBOT :-

1. Because the Robot is an execution agent, you must give it the automation applications it needs to work.

2. It is necessary to publish an automation application locally or to Orchestrator after generating it in Studio. You can send an application to the Robot machine and begin its execution after it has been published.

3. The following information is prefilled by default when not plugged into the orchestrator

V. RESULTS AND DISCUSSION

Following are the results we obtained after performing a series of test with real time invoices. The accuracy we obtained is 100%.

1. This is the Sample copy of an invoice which we have used for testing.

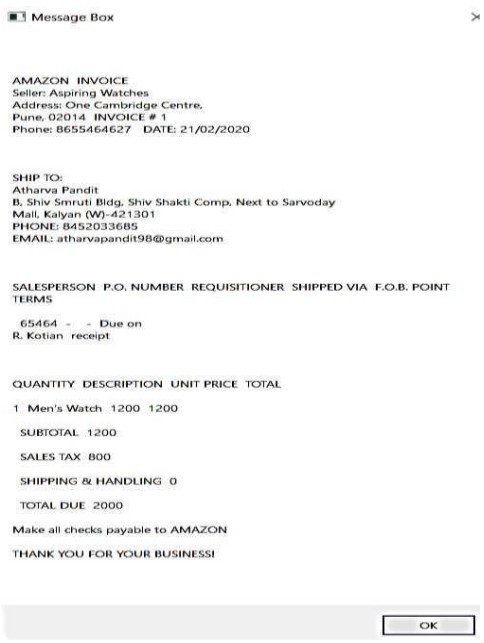

Fig 1: Sample copy of an invoice

2. All Invoices sent to RPA databot through email is successfully downloaded to a dedicated folder which is assigned during development. The databot never redownload the invoice which has been already downloaded previously.

3. After successfully downloading the invoices the databot correctly fetches invoices from that folder one by one. After this it's reads all the necessary content from the invoice using a ocr engine then it store the details in the Excel file with 100% accuracy in their correct places.

4. After successfully registering each invoice, the software robot is then able to send post notifications in the form of email to the concerned employee or to the vendor in question.

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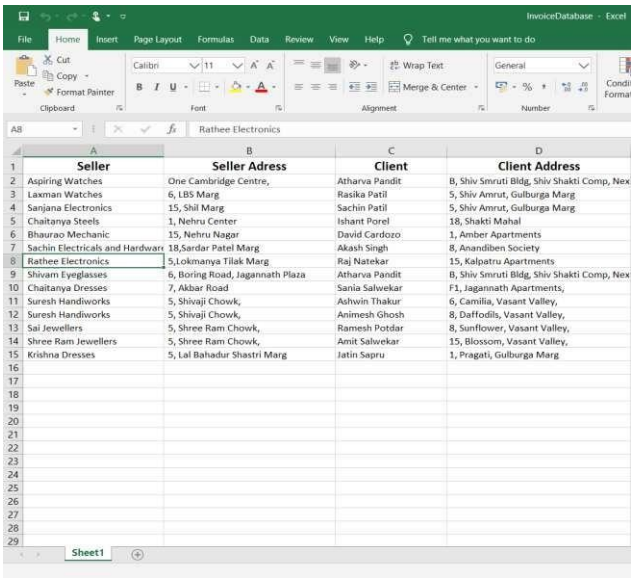

	Seller	Seller Adress	Client	Client Address
2	Aspiring Watches	One Cambridge Centre,	Atharva Pandit	B, Shiv Smruti Bldg, Shiv Shakti Comp, Nex
3	Laxman Watches	6, LBS Marg	Rasika Patil	5, Shiv Amrut, Gulburga Marg
4	Sanjana Electronics	15, Shil Marg	Sachin Patil	5, Shiv Amrut, Gulburga Marg
5	Chaitanya Steels	1, Nehru Center	Ishant Porel	18, Shakti Mahal
6	Bhaurao Mechanic	15, Nehru Nagar	David Cardozo	1, Amber Apartments
7	Sachin Electricals and Hardware	18,Sardar Patel Marg	Akash Singh	8, Anandiben Society
8	Rathee Electronics	5,Lokmanya Tilak Marg	Raj Natekar	15, Kalpatru Apartments
9	Shivam Eyeglasses	6, Boring Road, Jagannath Plaza	Atharva Pandit	B, Shiv Smruti Bldg, Shiv Shakti Comp, Nex
10	Chaitanya Dresses	7, Akbar Road	Sania Salwekar	F1, Jagannath Apartments,
11	Suresh Handiworks	5, Shivaji Chowk,	Ashwin Thakur	6, Camilia, Vasant Valley,
12	Suresh Handiworks	5, Shivaji Chowk,	Animesh Ghosh	8, Daffodils, Vasant Valley,
13	Sai Jewellers	5, Shree Ram Chowk,	Ramesh Potdar	8, Sunflower, Vasant Valley,
14	Shree Ram Jewellers	5, Shree Ram Chowk,	Amit Salwekar	15, Blossom, Vasant Valley,
15	Krishna Dresses	5, Lal Bahadur Shastri Marg	Jatin Sapru	1, Pragati, Gulburga Marg

Fig 2: Successful data entry of content in the Excel file.

VI. CONCLUSION

Automated invoice processing can achieve powerful results for accounts payable departments. Thanks to technological advancements in robotic process automation and computer vision technologies, invoice processing can eliminate bottlenecks within the AP process and turn the department into the profit center it can be. Automated invoice processing enables touchless automation across the entire accounts payable process, and can transform the business in just months, creating a powerful return on investment. Any organization that receives a large number of vendor invoices on paper can benefit from invoice processing technology. The more data from each invoice that you are hand- keying into your accounting software that more benefits you can get from each page you automate.

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