

Automation on Expense Claim Verification Reporting

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Abstract— In this era of technology and innovation, human needs are rapidly increasing and new ways to improve efficiency or to ease the process are constantly being invented. Human needs have no bound, but our bodies do have constraints. To diminish these constraints, the following studies are performed. Robotic process automation emphasizes reducing the physical strains put on by manual industrial works. Robotic process automation (RPA) is the use of software with artificial intelligence (AI) and machine learning capabilities to handle high-volume, repeatable tasks that previously required humans to perform.

Index Terms: RPA, UiPath, Automation, Activities, Variables, Template, Outlook, Excel

INTRODUCTION

In the project, I arranged the list of dummy email IDs in the excel sheet and created a predesigned template by using HTML and vb.net. The bot needs to send an email to a list of people with a predesigned template.

MOTIVATION OF THE PROJECT

In the everyday work of companies, repetitive tasks are often part of the daily routine. Employees lose valuable time when they execute complex processes manually.

With Robotic Process Automation, structured business processes can be automated using software robots. The digital robots independently take over tasks that would otherwise be performed by a human operator and thus help make individual processes significantly faster and more economical and effective.

Unlike a physical robot in the industry, RPA does not use machines, but so-called software bots. They do not perform physical work but control digital processes by imitating work steps on a user interface. Like human employees, RPA bots log into various

applications and systems and can then perform rule-based routine operations.

LITERATURE SURVEY

The researchers proposed various methodologies [1-6] to automate the manual time-taking processes and I have reviewed a few of the research papers as listed below.

In [1] I have seen how they are doing Process Automation for data mining using UiPath. In [2] client email sending process is automated with RPA. In [3] HighQuality Information is extracted and query-oriented summarization is done for automating Query-reply in the social network. In [4] a different type of process is automated using RPA (UiPath). In [5] How the techniques and tools of process automation are implemented. In [6] I can relate to how Robotic Process Automation contributes to this advanced world.

Additionally, In UiPath Academy I have seen an example of this type of automation that is not implemented there but this is a great real-time project with the implementation of the RPA tool UiPath.

I have added some new features in this project which I have learned from small videos of UiPath Academy.

DESIGN METHODOLOGY

REQUIREMENTS

1. SOFTWARE REQUIRED

- MS Excel
- Outlook
- OS Windows 10 Platform

2. HARDWARE REQUIRED

- RAM: 8GB(Recommended)
- Hard Disk: 300GB(Recommended)
- Processor Speed: 2GHZ
- Processor Configuration: Core i3

TOOLS AND TECHNOLOGIES

- RPA-UiPath Studio
- .net
- VBA/Macro

COMPONENTS DESCRIPTION AND ACTIVITIES

COMPONENTS

1. Data Table

The Data Table provides the bot with the recipient's email address and file path to the attachment. Create a table on the first sheet of an Excel workbook with columns for Employee id (GPN), Employee Name (Name), Employee Email id (Email id), Document id (OrgReportIndex) and Document type (Mode). Save the Data Table file.

	GPN	Name	Email id	OrgReportIndex	Mode		GPN	Name	Email id	OrgReportIndex	Mode
1											
2		No documents, Original submitted not traceable									
3											
4											
5											
6											
7											
8	IN010A02899	Derek Brian	abo@gmail.com	123456788	No documents		IN010M81486	Raymond Nolan	demo1@gmail.com	2173344006	Expense sheet
9	IN010A02899	Derek Brian	abo@gmail.com	123456788	No documents		IN010A00069	Melissa Tighish	demo1@gmail.com	2173271066	Expense sheet
10	IN010E00788	Melinda Parker	abo@gmail.com	198765467	Original submitted, not traceable		IN010A00069	Melissa Tighish	demo1@gmail.com	2173282264	Expense sheet
11	IN010E00788	Melinda Parker	abo@gmail.com	198765467	No documents		IN010A00069	Melissa Tighish	demo1@gmail.com	2173288336	Expense sheet
12	IN010E00788	Melinda Parker	abo@gmail.com	198765467	No documents		IN010A00069	Melissa Tighish	demo1@gmail.com	2173232662	Expense sheet
13	IN010E00788	Melinda Parker	abo@gmail.com	198765467	Original submitted, not traceable		IN010A02686	Karrik Pandey	demo2@gmail.com	2173233440	Scan receipts
14	IN010G10120	Tom Cook	abo@gmail.com	198765467	Original submitted, not traceable		IN010A02639	Richard Gerre	demo2@gmail.com	2173202914	Expense sheet
15	IN010G10120	Tom Cook	abo@gmail.com	177778899	No documents		IN010A03005	Bharat Kumar	demo2@gmail.com	2173239804	Expense sheet
16	IN010G10120	Tom Cook	abo@gmail.com	177778899	No documents		IN010A03005	Bharat Kumar	demo2@gmail.com	2173307134	Expense sheet
17	IN010G10180	William Benteek	wyz@gmail.com	190065467	No documents		IN010A03113	Ananaya Sharma	demo2@gmail.com	2173344836	Expense sheet
18	IN010G10180	William Benteek	wyz@gmail.com	190065467	Original submitted, not traceable		IN010A03113	Ananaya Sharma	demo2@gmail.com	2173344370	Expense sheet
19	IN010G10180	William Benteek	wyz@gmail.com	190065467	Original submitted, not traceable		IN010A03113	Ananaya Sharma	demo2@gmail.com	2173345012	Expense sheet
20	IN010G10180	William Benteek	wyz@gmail.com	190065467	Original submitted, not traceable		IN010E00230	Gayatri Gupta	demo2@gmail.com	2173237146	Expense sheet
21	IN010G10180	William Benteek	wyz@gmail.com	190065467	Original submitted, not traceable		IN010E00230	Gayatri Gupta	demo2@gmail.com	2173237152	Expense sheet
22	IN010G10180	William Benteek	wyz@gmail.com	190065467	Original submitted, not traceable		IN010E00230	Gayatri Gupta	demo2@gmail.com	2173243320	Expense sheet
23	IN010G10180	William Benteek	wyz@gmail.com	190065467	Original submitted, not traceable		IN010E00486	Arun Bhargava	demo2@gmail.com	2173348550	Expense sheet
24							IN010G10182	Raman Dev	demo2@gmail.com	2173360830	Expense sheet
25							IN010G10195	Surabh Jain	demo001@gmail.com	2173235396	Expense sheet
26							IN010G10195	Surabh Jain	demo001@gmail.com	2173246148	Expense sheet
27							IN010G10195	Surabh Jain	demo001@gmail.com	2173239768	Expense sheet
28							IN010G10195	Surabh Jain	demo001@gmail.com	2173263588	Expense sheet
29							IN010G10195	Surabh Jain	demo001@gmail.com	2173319352	Expense sheet
30							IN010G10195	Surabh Jain	demo001@gmail.com	2173368528	Expense sheet
31							IN010G10195	Surabh Jain	demo001@gmail.com	2173267132	Expense sheet

Figure 1: Excel Data Set

2. Email Template

I used wordtohtml.net to create the HTML email template. I simply typed the details in the Visual Editor (left in the image below) section of the web page and copy and paste the HTML from the HTML Editor section into Notepad.

Dear <Name>,

Trust you are doing well and keeping safe.

For the below mentioned claims submitted by you, request you to please send us the scan copy of the supporting documents by following the steps mentioned

GPN	Name	OrgReportIndex	Mode
IN010A02899	Derek Brian	123456788	No documents
IN010A02899	Derek Brian	123456788	No documents

Steps	Process
Step 1	Scan/take clear pictures of Expenses Report (Report Index) with all supporting bills/documents in the same order as claimed.
Step 2	Rename the Scan/Picture file as '10 Digit Report Index Number' as mentioned in the below table respectively. In case, there are multiple invoices claimed in a Report Index, copy all scanned documents in a folder, zip and rename that folder as the Report Index Number. Multiple pages should be consolidated in a single scan.
Step 3	Email the scanned file to ExpenseTeam@xyz.com with the subject line '<Report Index Number>-<GPN>-<Employee name>'. Please note that email with multiple attachments should not be sent and email size should not exceed 25MB.
Step 4	In case of any discrepancy, you will be notified via email.
Step 5	You would need to respond to the discrepancy notified by GT&E Team.

Figure 2: Template Format

ACTIVITIES

The activities used in this project are Read Range, For Each Row, Read Text File, and Send Outlook Mail Message.

1. ReadRange

Created a new project and dragged the Read Range (UiPath.Excel.Activities.ReadRange) activity into the Designer Panel.

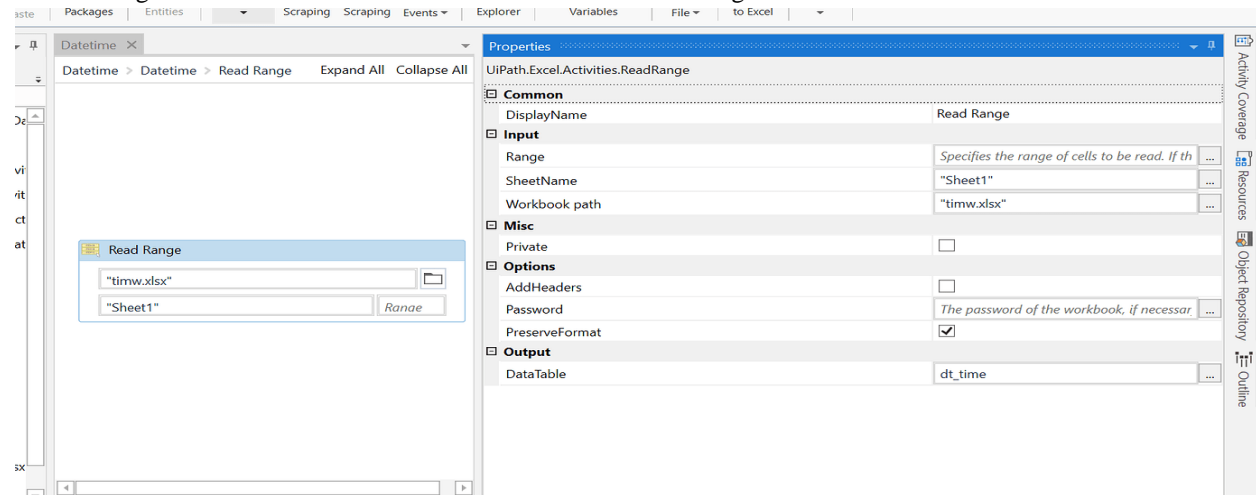


Figure 3: ReadRange

2. For Each Row
Added the For Each (UiPath.Core.Activities.ForEachRow) activity under

the Read Range in the project and enter the Data Table variable into the Data Table property

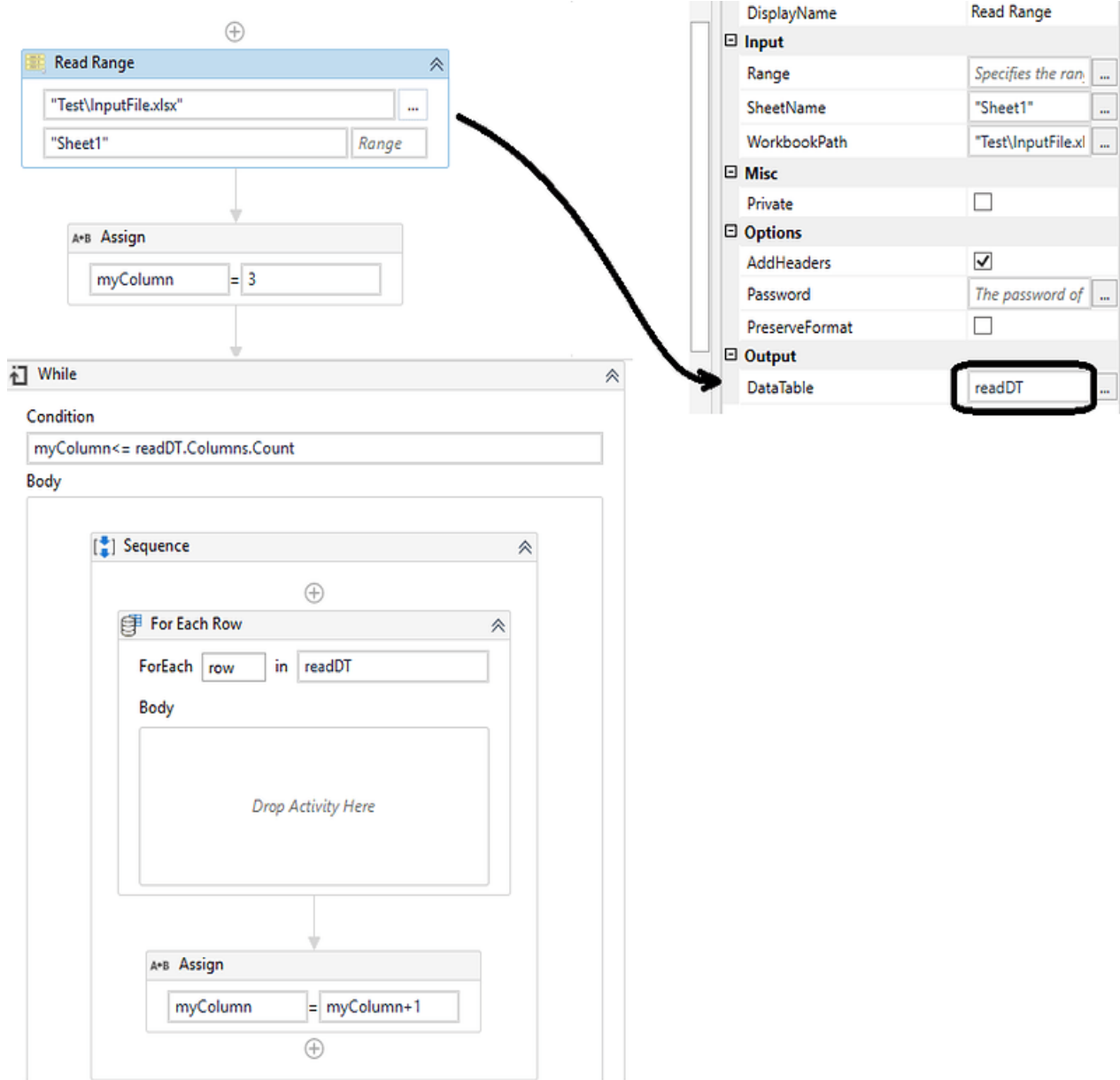


Figure 4: For Each Row

For Each will execute the subsequent activities for each row in the Data Table.

Added the Read Text File activity into the Body Section of the For Each activity.

3. Read Text File

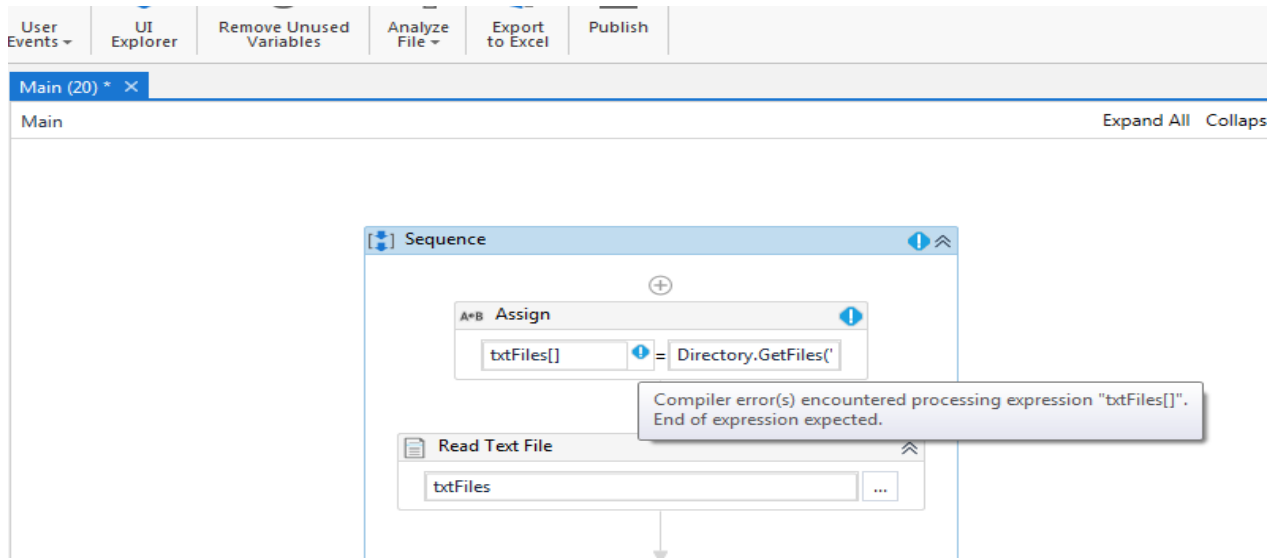


Figure 5: Read Text File

4. Send Outlook Mail Message

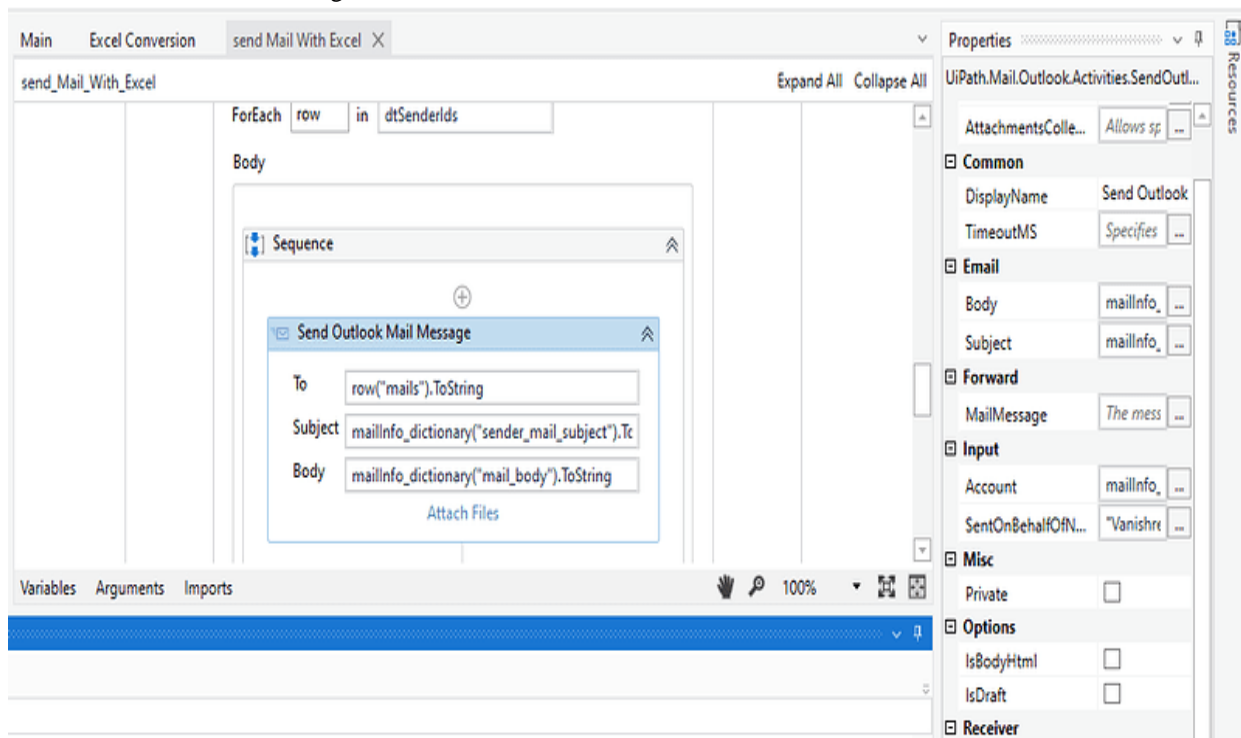


Figure 6: Send Outlook Mail Message

Added the Send Outlook Mail Message into the Body section of the For Each activity under the Read Text File activity with the corresponding variables.

VARIABLES AND ARGUMENTS

- Variables and Arguments both are case insensitive.

- [Variables](#) are used to pass the data between the activities of the same project. In variables, we can define the scope for them manually as per the requirement.
- [Arguments](#) are used to pass the data between the workflows or projects. Arguments have global scope in a workflow or project by default.

1. Variables (Example):

Name	Variable type	Scope	Default
SystemException	Exception	General Business ...	Enter a VB expression
BusinessException	BusinessRuleExcept	General Business ...	Enter a VB expression
Config	Dictionary<String,C	General Business ...	Enter a VB expression
dt_Dictionary1	Dictionary<String,D	General Business ...	Enter a VB expression
dt_Dictionary2	Dictionary<String,D	General Business ...	Enter a VB expression
outlookWindow	Window	General Business ...	Enter a VB expression
Create Variable			

Figure 7: Variables used

1. Arguments (Example):

Arguments of Initialization state All Application (Example):

Name	Direction	Type	Value
in_Config	In	Dictionary<String,Object>	Config
out_OutlookWindow	Out	Window	outlookWindow
out_dt_DictionaryTable1	Out	Dictionary<String,DataTable>	dt_Dictionary1
out_dt_DictionaryTable2	Out	Dictionary<String,DataTable>	dt_Dictionary2
Create Argument			

Figure 8: Arguments of Initialization

Arguments of backend Excel work (Example):

Name	Direction	Type	Value
in_ColumnArray	In	String	in_Config("TABLE_RANGES").ToString
in_InputFilePath	In	String	Path.Combine(Environment.CurrentDirectory+in_Config("input_FolderPath"),ToString,in_1
in_InputSheetName	In	String	in_Config("inputSheetName").ToString
out_dt_DictionaryTable1	Out	Dictionary<String,DataTable>	out_dt_DictionaryTable1
out_dt_DictionaryTable2	Out	Dictionary<String,DataTable>	out_dt_DictionaryTable2
in_VBAFilePath	In	String	Path.Combine(Environment.CurrentDirectory,in_Config("VBA_FilePath"),ToString)
Create Argument			

Figure 9: Arguments of backend Excel work

ORCHESTRATOR

UiPath Orchestrator is a web application that enables you to orchestrate your UiPath Robots in executing repetitive business processes. Orchestrator lets you manage the creation, monitoring, and deployment of resources in your environment. It acts as an

integration point with third-party solutions and applications.

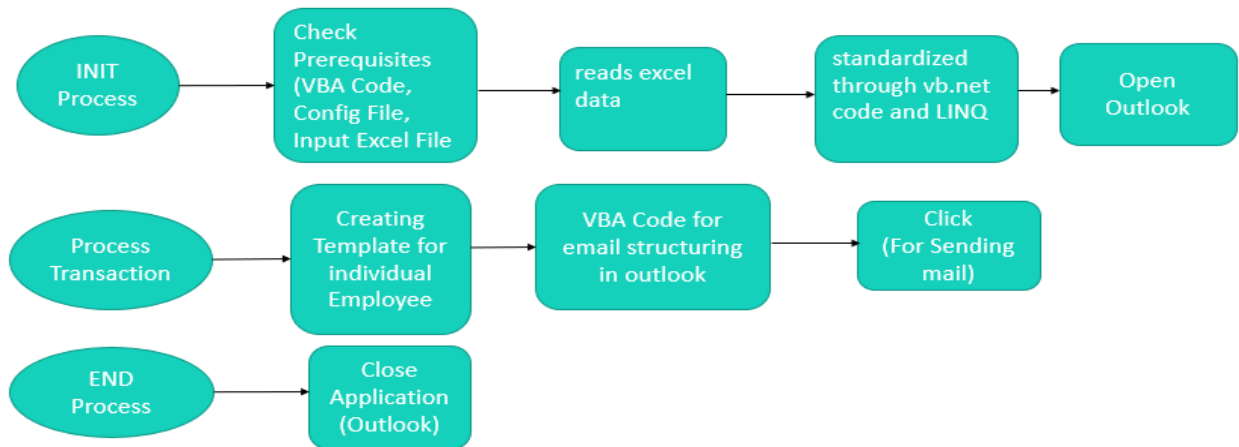
Its power comes from its capability of managing your entire Robot fleet.

Orchestrator Main Capabilities

- Provisioning - creates and maintains the connection between Robots and the web application
- Deployment - assures the correct delivery of package versions to the assigned Robots for execution
- Configuration - maintains and delivers Robot environments and processes configuration
- Queues - ensures automatic workload distribution across Robots
- Monitoring - keeps track of Robot identification data and maintains user permissions
- Inter-connectivity - acts as the centralized point of communication for 3rd party solutions or applications.

PROPOSED CONTROL MECHANISM

Block Diagram Mechanism



RESULT & ANALYSIS

The bot will read the data from the excel file, standardize it, data table will be prepared for each employee, followed by conversion into a template

format, using VBA Code structured email is framed in Outlook and with click button activity email is sent. In this way, Emails will be sent automatically one by one to each employee and this process will take at most 2-3 minutes to send emails to 50 employees.

EXECUTION OF CODE (ACTIVITIES)

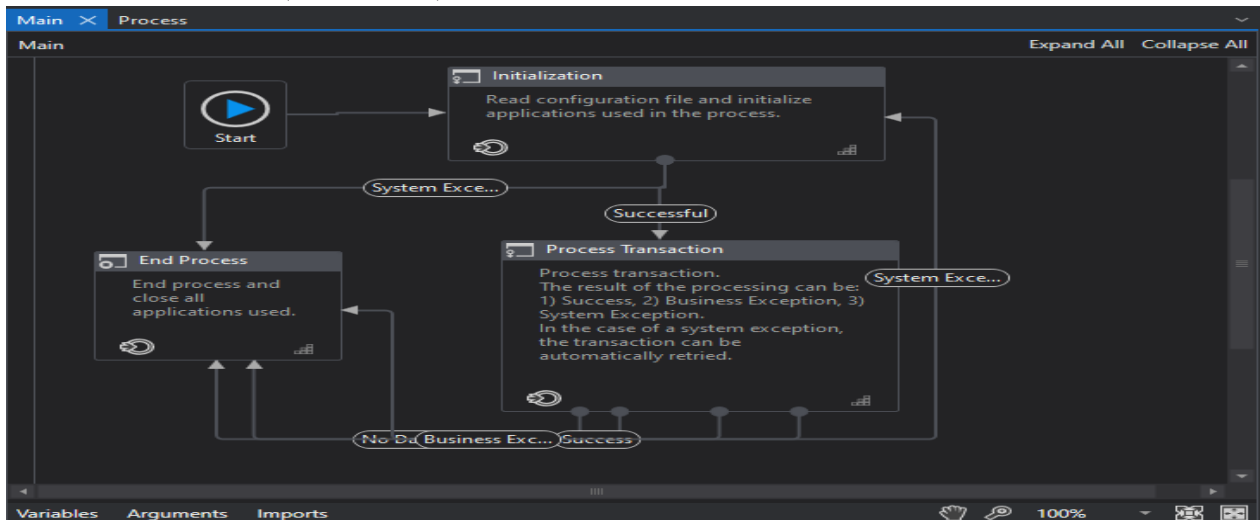


Figure 10: Main Workspace

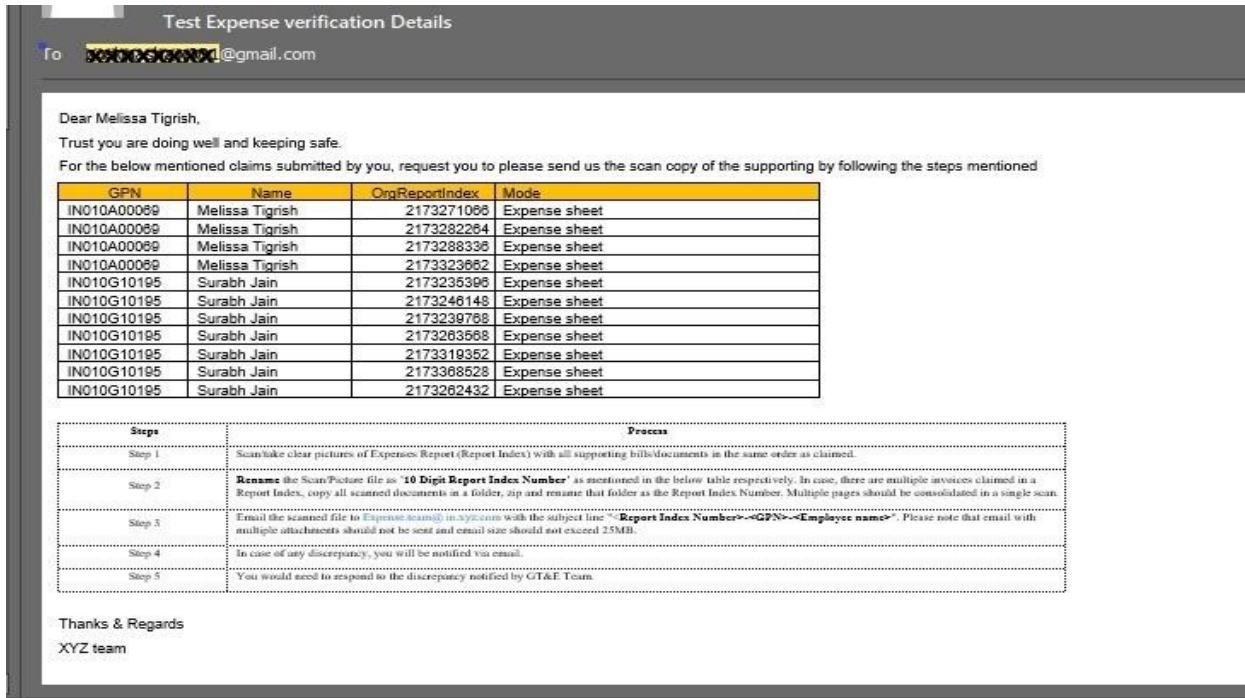


Figure 11: Automatic structuring mail as per the input format in outlook

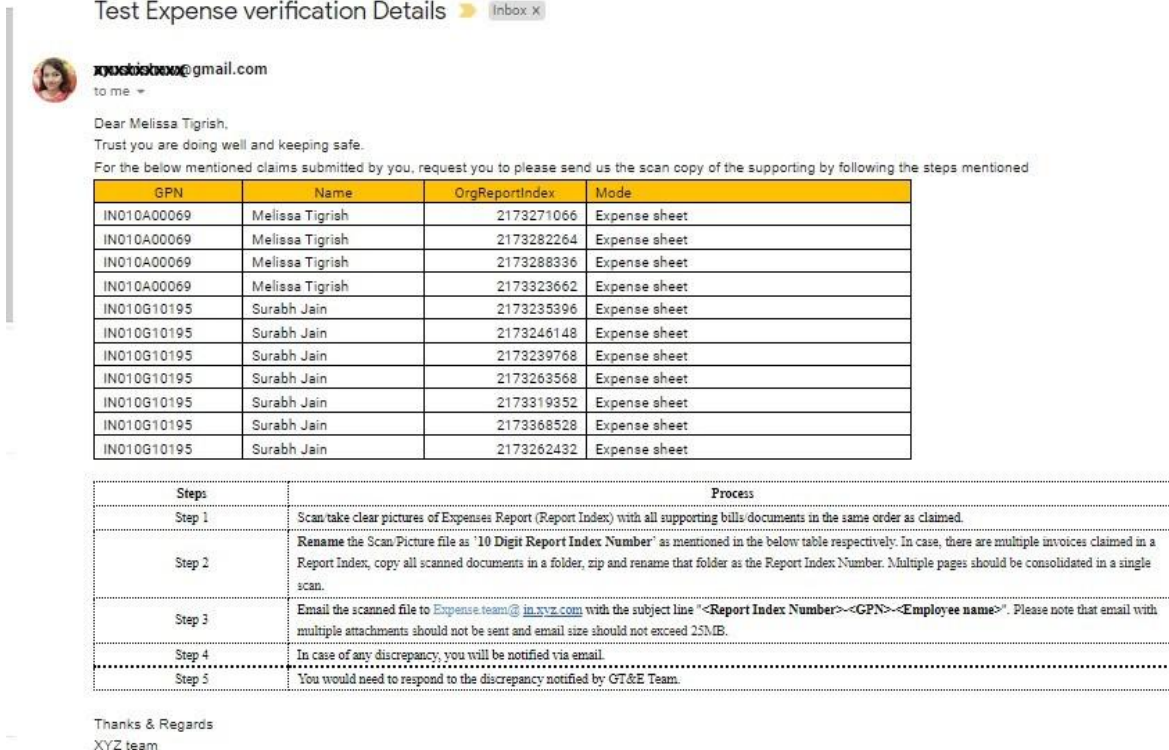


Figure 12: Format of received email by the Employee

FUTURE SCOPE

1. Since the project is currently limited to only Outlook, so we can enhance it by using other

email sending processes. Such as SMTP, which is a widely used secured technique for sending an email.

2. In general, there are many documents involved in the different phases of processing steps of expense reports and invoice processing. Those documents are currently manually verified by a different organization, the corresponding documents can be processed and validated by OCR, followed by some machine learning approaches for the data sanitization. This output can be efficiently used and processed by the automation Bot.

CONCLUSION

By Doing this automation, post-testing will always give error-free output. It will be more reliable than a human being and can work 24*7, it is a cost-saving approach for manual, repetitive tasks and increases productivity.

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