

How-to guide

INVOICE ANALYST AGENT

A practical guide for developers looking to build and use an AI-powered accounts payable assistant.

In collaboration with



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OVERCOMING TRADITIONAL Invoice Analysis CHALLENGES

In a traditional accounts payable (AP) environment, AP specialists often face challenges that limit their productivity and ability to process invoices in a timely manner. These issues can lead to delayed payments, increased stress, and supplier dissatisfaction. The reliance on manual processes, such as individual expertise, tedious research, and trial-and-error methods, often results in longer payment cycles and a higher risk of errors.

Processing invoices is typically a serial task, with each stage—invoice receipt, data entry, approval, and payment—dependent on the completion of the previous step. Attempts to speed up these tasks by processing multiple invoices simultaneously often lead to confusion and errors, further slowing down payment resolution and straining supplier relationships.

Differences in experience between AP specialists can add to the problem. Routine tasks, such as invoice matching or data entry, are often repeated manually when they could be automated, and limited access to shared information hinders the team's ability to work efficiently. Inexperienced staff may struggle to find the right information, while more experienced workers are bogged down by routine tasks.

Overall, difficulties in accessing and processing relevant invoice data significantly impact employee morale and supplier satisfaction, highlighting the need for a more efficient and automated solution to streamline the accounts payable process.

INTRODUCING THE Invoice Analyst AGENT

The Invoice Analyst Agent is an AI-powered tool designed to automate and optimize various accounts payable tasks, such as invoice processing, approval workflows, and payment scheduling.

This guide serves as a blueprint and practical resource for developers, presenting a systematic approach to developing a powerful accounts payable assistant, the Invoice Analyst Agent, by using the power of AI-powered automation from Automation Anywhere.

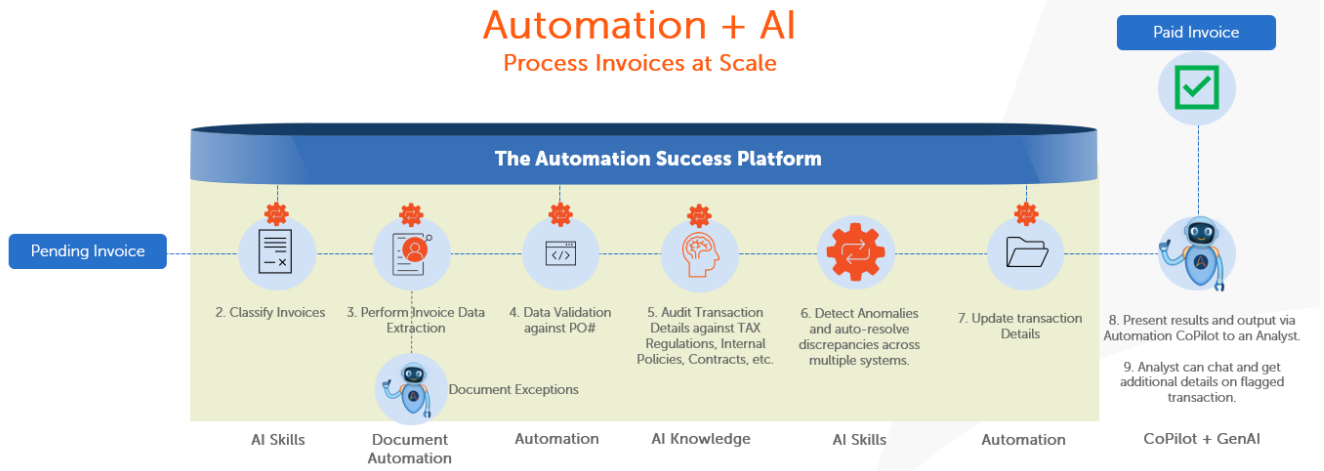
The agent utilizes generative AI and automation to enhance efficiency, accuracy, and scalability by executing routine tasks, making informed decisions, and providing insights through data analysis. Seamlessly integrating with existing IT and CRM systems, the agent ensures smooth data flow and enhanced operational performance.

Key benefits include increased efficiency, enhanced customer experience, cost savings, scalability, and proactive problem-solving, making it a transformative tool in modern service operations.

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AI Agent - Invoice Analyst

Reduce errors and ensure precise payment calculations with automated intelligence



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SOLUTION OVERVIEW

The Invoice Analyst Agent transforms AP operations by efficiently processing routine tasks such as invoice data entry, matching, and approval routing, allowing AP teams to focus on more complex financial matters. This leads to faster invoice processing times and improved employee satisfaction, benefiting both the AP department and the organization by enhancing efficiency and strengthening supplier relationships.

Comprehensive application

This solution is versatile and can be applied to a wide range of accounts payable scenarios, including invoice processing, payment reconciliation, and dispute resolution. It can also be integrated with one or multiple accounts payable platforms within an organization, enhancing overall efficiency and streamlining AP workflows.

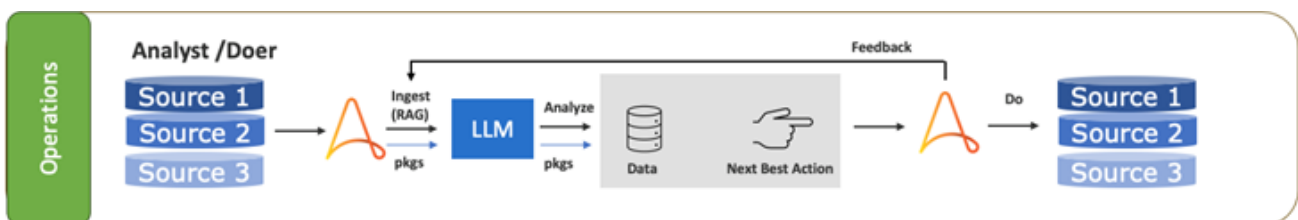
Integrated and adaptive solution

Integrating your accounts payable (AP) platform with the power of Automation Anywhere and your preferred generative AI provider results in a more efficient, responsive, and adaptive AP solution.

To address the challenges of traditional AP processes and enhance employee productivity, incorporating a digital assistant into the workflow can make a significant impact. By offering a centralized platform within the AP system, the digital assistant can streamline a variety of tasks, reducing the time spent on manual invoice entry, data extraction, and approvals. Employees can rely on the assistant to automate routine administrative tasks, such as matching invoices with purchase orders, retrieving payment details, and sending relevant notifications and reminders for pending approvals. This integration allows for uninterrupted workflow, enabling AP teams to focus on higher-value tasks, ultimately improving accuracy, reducing payment delays, and enhancing supplier relationships.

Leveraging generative AI

Furthermore, the digital assistant can leverage generative AI (GenAI) from hyperscaler frameworks or AAI Enterprise Knowledge to offer intelligent insights, personalized recommendations, and automated workflows. This allows AP analysts to focus on core responsibilities and maximize productivity. By reducing time spent on mundane and repetitive tasks, employees can allocate their efforts toward more strategic and value-added work, enhancing overall productivity and job satisfaction while addressing the needs of the requester.



Key features of the Invoice Analyst Agent

- Automates invoice processing and can initiate automatic matching, approval routing, and payment initiation.
- Augments interaction with service operations platforms.
- Connects to multiple knowledge sources like purchase orders, contracts, vendor information, and payment histories, etc.
- Provides accurate and up-to-date insights to the entire AP team.
- Learns from every human interaction for continuous improvement.








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THE Invoice Analyst AGENT COMPONENTS

Customizing your Invoice Analyst Agent

The Invoice Analyst Agent's working knowledge is made of data and leverages retrieval augmented generation (RAG) for fast indexation and knowledge retrieval. By leveraging AWS Bedrock Service, we can build robust knowledge activities in our AI Agent which can expand to complex analysis, decisioning and suggestion. This data can be purchase orders, contracts, vendor information, and payment histories, and much more. We have made it very easy to customize the Invoice Analyst Agent to your business needs using your GenAI provider of choice.

- AWS Knowledge Retrieval & Conversation Package ([Link to BotStore](#))

Selected package details	
Name GenAIRAGAWSPackage	Description Generative AI Retrieval Augmentation Package.
Vendor Unspecified	Recommended bot agent version 21.250 or above
Actions	Actions (7)
	>  Ask Questions
	>  Chat with your document
	>  Create new knowledge base
	>  Create S3 Bucket
	>  Get Sync Status for Knowledge Base
	>  Sync knowledge base
	>  Upload file(s) to S3 Bucket

For more complex scenarios, use the AWS Bedrock Console.

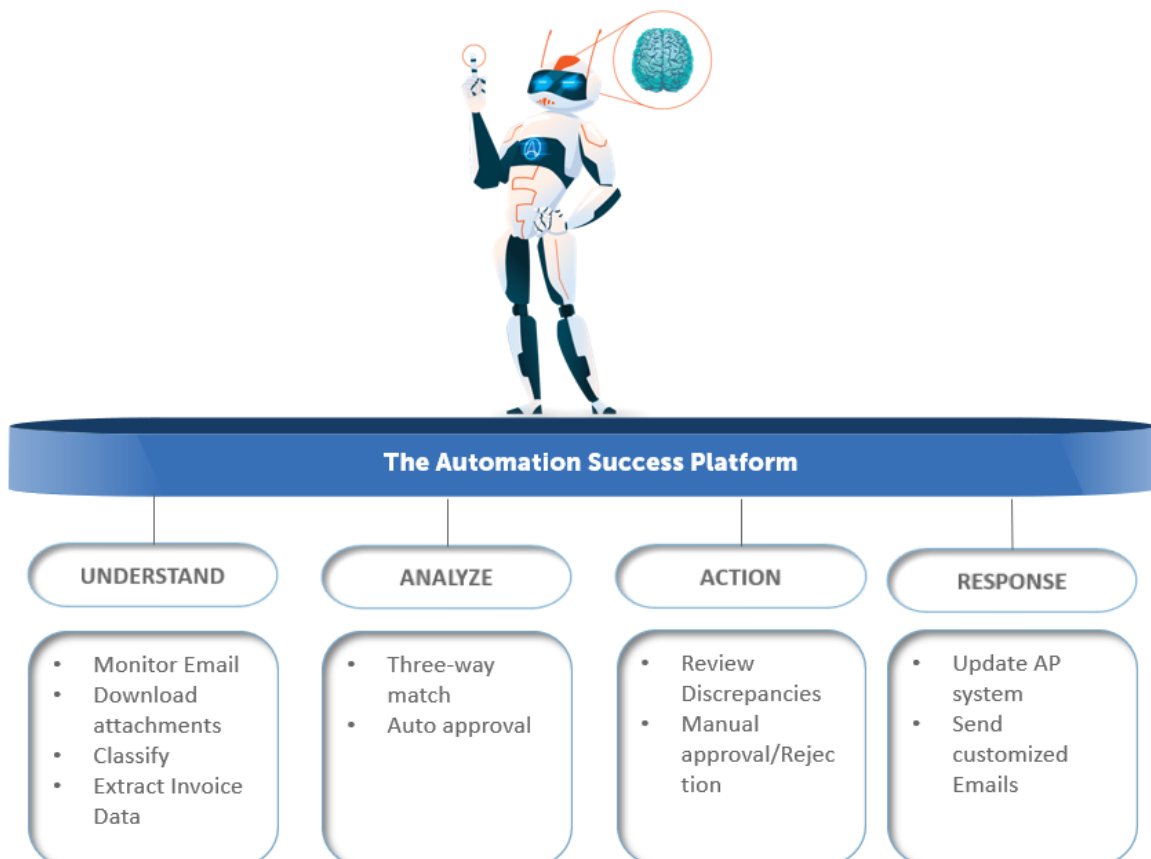
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Connecting the Invoice Analyst Agent knowledge to an automation

Automation retrieves data and working knowledge to provide actionable recommendations. System and user prompts are used together to ask questions and receive answers, leveraging knowledge from the Invoice Analyst Agent with the language and reasoning from the LLM. System prompts include dynamic data from the request and persona definitions for what needs to be done. Automation serves as the vehicle for the AI to pass user data, case information, and system metrics to the LLM, enabling fully automated dynamic decision making and case resolution.

- Request Data
 - Request data is surfaced through automation, which interacts with your Service Operations Platform via RPA or API.
- The Invoice Analyst Agent identifies automated and suggested action(s).
 - Automation-based actions with the Accounts Payable Platform
 - Automation within the Automation Success Platform
 - Automation-based actions with other systems
- The Invoice Analyst Agent identifies response needs.
 - Automation-based communications
 - Accounts Payable Platform API interaction
 - Accounts Payable Analyst UX interaction

MAIN FEATURES



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Understand

- Monitor the vendor email inbox
- Download PDF attachments
- Classify the request and PDF Attachments
- Extract data from vendor invoice

Analyze

- Validate invoice by matching against purchase order and goods receipt.
- Auto Approval
 - If invoice matched against purchase order and goods receipt.
 - If invoice amounts are within auto-approval threshold.

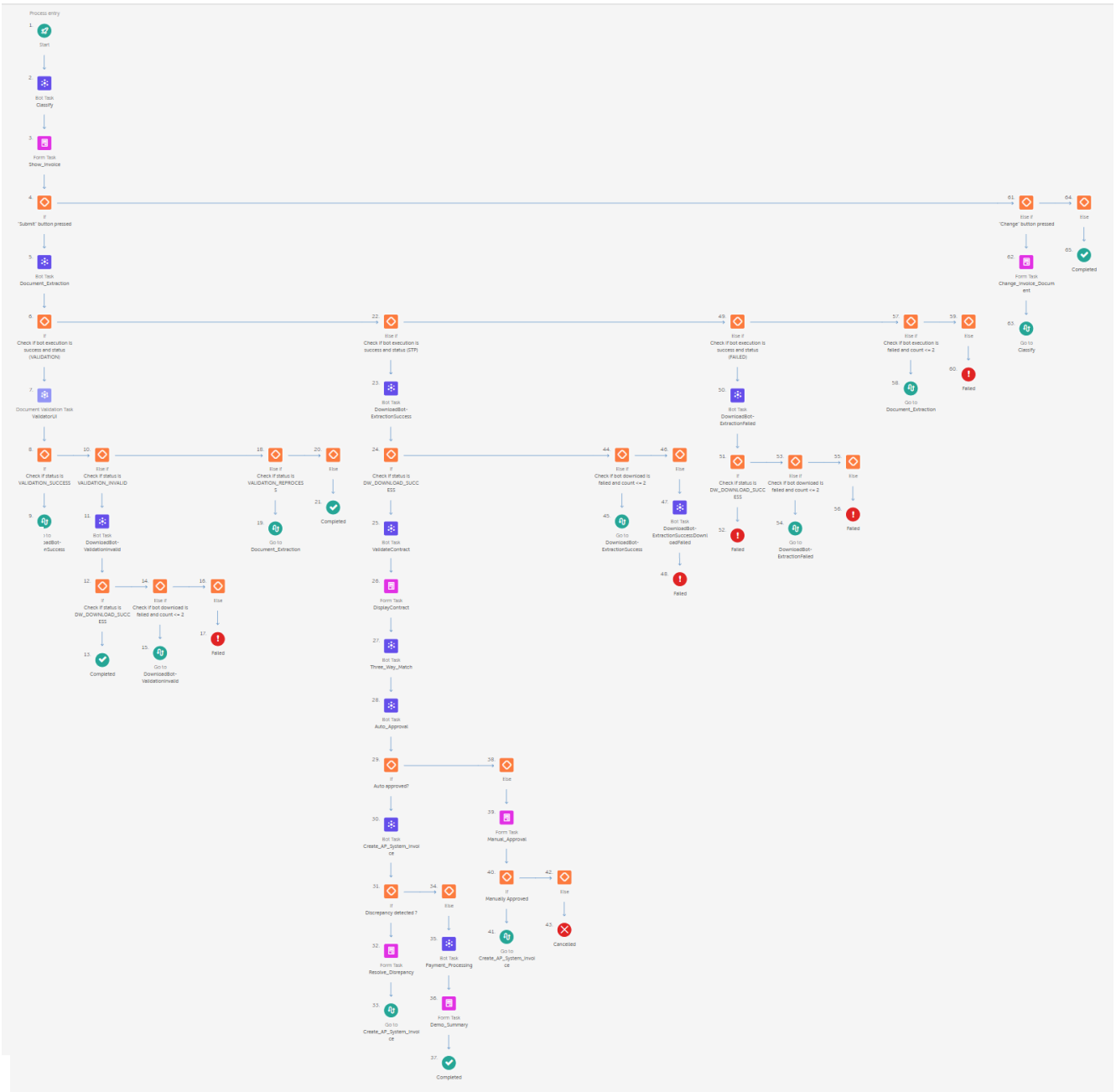
Action

- Payable clerk reviews invoices which have incomplete match or exceed threshold and queries purchase order LLM.
- Payable clerk uses Co-Pilot to approve/reject invoices for payment from exception queue.

Response

- Update Accounts Payable system with approved invoice amount and payment.
- Crafts customized email to vendor regarding payment status and approval.

USING THE CODE



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WALKTHROUGH

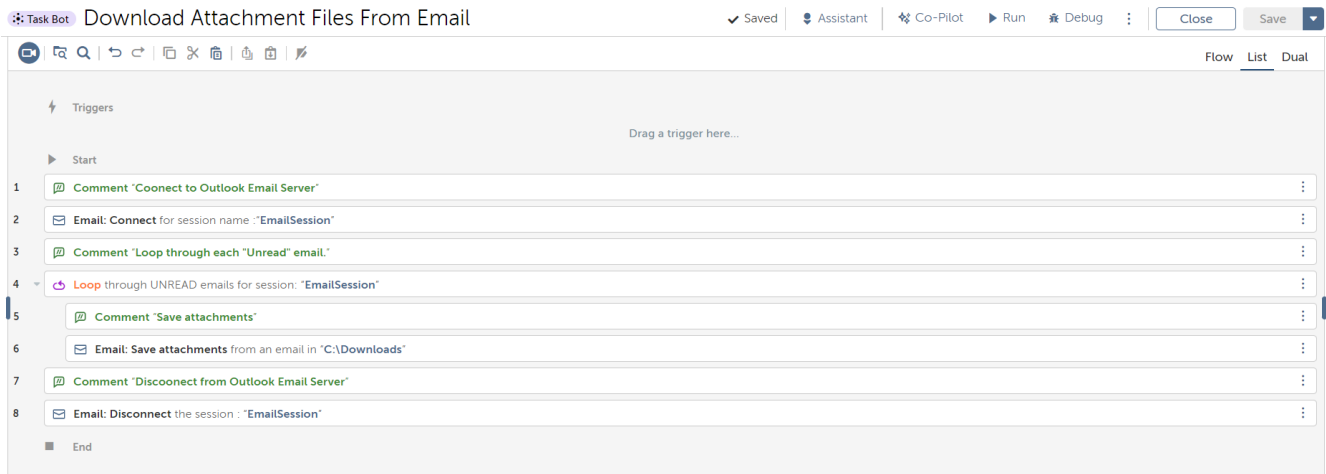
Here is a high-level flow of the Service Operations Agent solution:

1. The Invoice Analyst Agent works in the account payable platform (CRM, SAP, e-mail, etc.) where requests arrive and captures the details of each case. The Invoice Analyst Agent can be programmed to run on a schedule or triggered whenever a new email comes in.
2. In the second step, the Invoice Analyst Agent downloads the attachment from each email and classifies it accordingly using generative AI.
3. If the Invoice Analyst Agent is unable to classify the case correctly, it will send the request for human validation.
4. If the Invoice Analyst Agent classifies the case correctly, it will extract data from invoice document using Document Automation.
5. If Document Automation unable to extract few fields, then it will send the request for human validation, allowing user to either add/modify information and submit it for downloading extracted data or mark extraction as invalid, download invoice file into “Invalid Document” folder and stop the process.
6. On the other hand, if the Document Automation successfully extract the information, then it downloads the extracted data.
7. If the Invoice Analyst Agent unable to download the extracted data, then download the invoice file into “Failed Document” folder and stop the process.
8. On the other hand, if Invoice Analyst Agent successfully downloads the extracted data, then Invoice Analyst Agent uses its “Account Payable Knowledgebase” to audit the invoice against the Contract signed with the vendor to detect the anomalies.
9. If the Invoice Analyst Agent finds no anomalies, then it will send the invoice for three-way match using generative AI. In three-way match the Invoice Analyst Agent validate the invoice against Purchase Order and Goods Receipt. It also validates If Invoice amount is less than the threshold.
10. If the Invoice passes through Three-way match and its Invoice Amount is less than the threshold then the Invoice Analyst Agent approve it automatically and creates an Invoice entry into the account payable system (i.e. CRM or SAP).
11. On the other hand, if invoice passes through Three-way match, but its Invoice Amount crosses the threshold limit then it will send the request for human validation where reviewer will either approve or reject the invoice.
12. If the invoice unable to pass through Three-way match and the Invoice Analyst Agent finds some discrepancies in it, then it will send the request for human validation to review discrepancies where reviewer will resolve the discrepancies and send it to reviewer for review where reviewer will either approve or reject the invoice.

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1. Download Attachment Files From Email

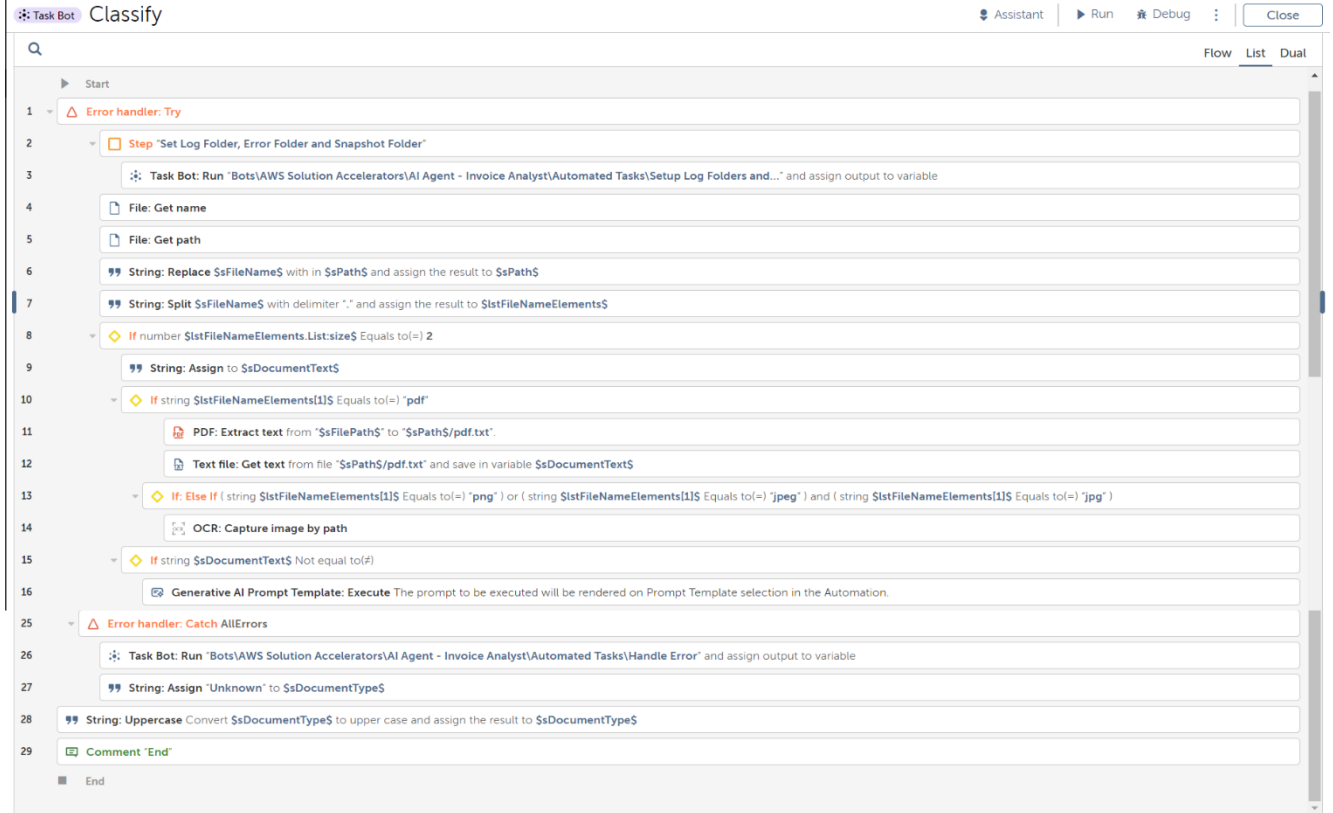
The **Download Attachment Files From Email** task example below interacts with the email provider to download the attachment files for processing. RPA can be used here to connect with email server, loop through each unread emails and download attachment files from them.



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2. Classifier

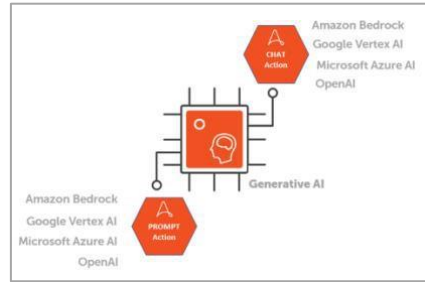
The classifier combines GenAI and automation to determine the type of document based on logic and the GenAI prompt response. The basic goal is to classify the document into Invoice and Non-Invoice category. Additional categorization logic as a keyword query or GenAI topic analysis could be extended.



The **Classify** task example demonstrates the general flow of this task.

We have made it very easy to connect to multiple LLM providers using pre-built connectors inside Automation Anywhere. Find more information on our [official documentation](#).

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1. Authenticate to your chosen LLM Provider.
2. Connect to your LLM Provider via Prompt with proper parameters. *Message* is where your prompt will be inserted.

3. The *message* contains details from the **Attachment Files** and persona details for the prompt.
4. Disconnect from GenAI.
5. Output maps to **sDocumentType** variable

Refer to Appendix A under CLASSIFIER PROMPT to review the example prompts you can use for this section

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3. Manual Classification

Manual classification may be necessary. Automation Co-Pilot enables a human-in-the-loop method for the invoice analyst to augment the automation.

4. Data Extraction

Data extraction task will extract the data from the invoice. It used Document Automation Solution to do so. If Data Extraction fails, then request sent to human. Automation Co-Pilot enables a human-in-the-loop method for the invoice analyst to augment the automation.

5. Validate Invoice Against Contract

The **Validate Invoice Against Contract** task example is the heart of augmented solution delivery. This enables invoice audit and augments the Invoice Analyst with knowledge.

The screenshot shows a workflow titled "Validate Invoice Against Contract". The steps are as follows:

- Task Bot: Run "Bots\AWS Solution Accelerators\AI Agent - Invoice Analyst\Automated Tasks\Setup Log Folders and..." and assign output to variable
- Error handler: Try
- File: Copy Control Room file "Bots\AWS Solution Accelerators\AI Agent - Invoice Analyst\Documents\Signed_CW35771.pdf" at "\$RootLogDirectory\$\Documents\Signed_CW35771.pdf"
- Process Composer: Upload Storage file Upload Storage file
- GenAI RAG AWS Package: Ask Questions
- If boolean \$bPriceDiscrepancy\$ Equals to(=) True
- String: Assign "{Contract #:'CW35771','Invoice #:'34212','PO #:'P-232...'" to \$sOutput\$
- If: Else
- String: Assign "{Contract #:'CW35771','Invoice #:'94122','PO #:'23221...'" to \$sOutput\$
- Message box \$sOutput\$
- String: Extract text Source string \$sOutput\$: Extract sub-string after "```json" and assign the result to \$sOutput\$
- String: Extract text Source string \$sOutput\$: Extract sub-string before "```" and assign the result to \$sOutput\$
- Message box \$sOutput\$
- JSON Deserializer: To Dictionary
- Error handler: Catch AllErrors
- Task Bot: Run "Bots\AWS Solution Accelerators\AI Agent - Invoice Analyst\Automated Tasks\Handle Error" and assign output to variable
- End

It starts with the retrieval of the **dInvoiceDetails**. Then, credentials are used for connecting to the GenAI. Specific knowledge base and foundational LLM are composed for the retrieval augmented generation (RAG) with prompt parameters. This composable feature enables a directed RAG activity to fetch the response or solution to the incident.

***Refer to the AWS Bedrock Packages in previous sections to learn how to upload and Q&A your own data. ***

The User Query contains details from the **dInvoiceDetails** and the *Knowledge base Prompt Template* contains the persona details for the prompt.

Refer to the Appendix A under SOLUTION SEEKER to review the example prompts you can use for this section

The screenshot shows the "Knowledge base prompt template" configuration window. It includes the following fields and options:

- Knowledge base prompt template**: A text area containing the prompt template.
- Temperature**: A dropdown menu set to 0.
- TopP**: A dropdown menu set to 1.
- Max Tokens**: A dropdown menu set to 2048.
- User Query**: A section with a "Required" field and a "User Query Session ID (optional)" field.

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Finally, the response is fed as a dictionary object **dictResponse**, and details are shared with the next Task Bot.

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6. Three Way Match

One of the key functionalities in Invoice Analyst is a Three way match. Here, we are comparing the invoice data with it's purchase order and Goods receipt. Here we are verifying Unit price, Total Quantity and Taxes applicable.

Task Bot Three-Way-Match Assistant Run Close

Q Flow List Dual

Start

1 Comment 'Check Line Items'

2 Generative AI Prompt Template: Execute The prompt to be executed will be rendered on Prompt Template selection in the Automation.

3 Message box \$sAllInvoiceIssues\$

4 String: Extract text Source string \$sAllInvoiceIssues\$: Extract sub-string before

5 String: Extract text Source string \$sAllInvoiceIssues\$: Extract sub-string before

6 Loop : 3 times

16 String: Assign 'Description ; Quantity ; Unit Price ; Total Price' to \$sLineItems\$

17 String: Assign \$String.NewLine\$ to \$sNewLine\$

18 Loop For each row in table

19 String: To number Convert string \$sTableRow('Unit_Price')\$ to a number and assign it to number variable \$nUnitPrice\$

20 String: To number Convert string \$sTableRow('Total_Price')\$ to a number and assign it to number variable \$nTotalPrice\$

21 String: To number Convert string \$sTableRow('Quantity')\$ to a number and assign it to number variable \$nQuantity\$

22 String: Assign '\$sLineItems\$\$sNewLine\$\$sTableRow('Description')\$: \$sTableRow...' to \$sString\$

23 If (string \$sTableRow('Unit_Price')\$ Not equal to(\$i)) and (string \$sTableRow('Total_Price')\$ Not equal to(\$i)) and (string \$sTableRow('Quantity')\$ Not equal to(\$i))

27 Number: Increment \$nCounter\$ by 1 and assign result to a \$nCounter\$ variable

28 Loop : 3 times

29 String: Generate random string of length 10 to \$OpenAISession\$

30 OpenAI: ChatGPT \$sString\$

31 Generative AI Prompt Template: Execute The prompt to be executed will be rendered on Prompt Template selection in the Automation.

32 String: Extract text Source string \$sAllInvoiceIssues\$: Extract sub-string before

33 String: Extract text Source string \$sAllInvoiceIssues\$: Extract sub-string before

34 If string \$sAllInvoiceIssues\$ Equals to(=) "Discrepancy_Found"

35 Boolean: Assign False to \$bThreeWayMatch\$

36 Loop: Break

37 If: Else

38 Boolean: Assign True to \$bThreeWayMatch\$

39 String: Assign 'Three-Way-Match successful' to \$sThreeWayMatchReason\$

40 If string \$sPONumber\$ Equals to(=)

41 String: Assign 'No PO Number for Three-Way-Match' to \$sReason\$

42 List: Add Item \$sReason\$ to \$lstReasons\$

43 List: Size of \$lstReasons\$

44 If number \$nNoofReasons\$ Greater Than (>) 0

45 Boolean: Assign False to \$bThreeWayMatch\$

46 List: Join items of the list \$lstReasons\$

47 If: Else

48 Boolean: Assign True to \$bThreeWayMatch\$

49 String: Assign 'Three-Way-Match successful' to \$sThreeWayMatchReason\$

50 Comment 'End'

End

We'll get **lstDiscrepancy** as an output, if **blnThreeWayMatch** is False.

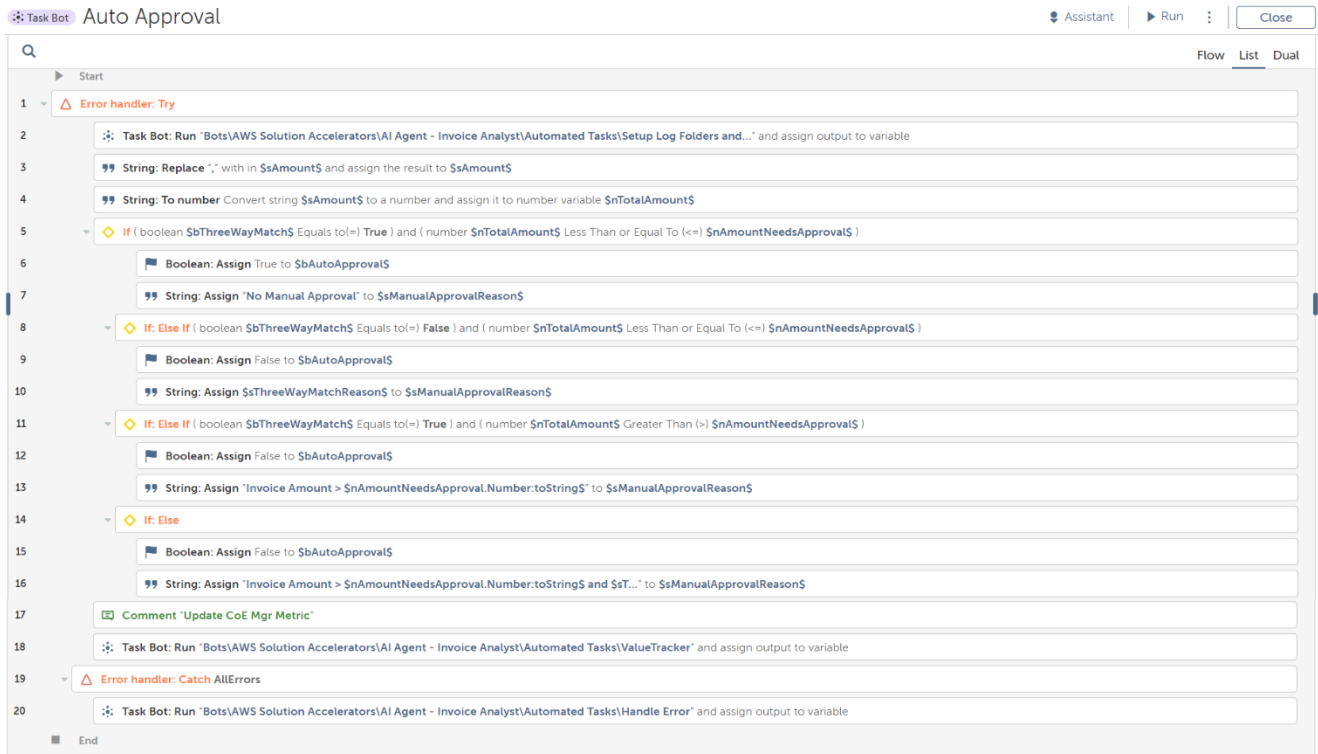
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7. Auto Approval

Auto Approval task verifies 2 things.

1. Three way match is successful
2. Invoice Amount is less than the Threshold.


If above mentioned conditions fulfilled then this task will direct create invoice entry into the ERP system. Otherwise, it will send the request for manual approver.



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8. Manual Approval / Review

Manual approval may be necessary. Automation Co-Pilot enables the human-in-the- loop method for the service operations analyst to augment the response and solution to the incident.

 Review Invoice

Invoice Number

Invoice Date

☐ Recurring Payment

PO Number

Supplier / Vendor

Amount

Supplier / Vendor Address

Ship - To

Bill - To

Line Items

Description	Quantity	Unit_Price	Total_Price

AI Recommendation & Comments

Powered by Automation Anywhere

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SOLUTION DEVELOPMENT STEPS

Prerequisites

Environment Setup

- Set up Automation 360
- Enable Automation to Automation Co-Pilot

Preproduction

Identify Content Store

- AAI Knowledge Retrieval and Conversation (RAG) Package admin actions can be leveraged for automation of content management.
 - Content stores are often shared storage repository (S3 Bucket.)
 - Approved users or processed may submit to the shared content store.
 - Deploy automation to move content to the shared content store.
 - Content can be a URL root, SharePoint library for crawling.
 - If Using AAI Enterprise Knowledge, configure content crawling.
 - If not, configure the necessary automation(s).

Define Knowledge Store

- AAI Knowledge Retrieval and Conversation (RAG) Package admin actions can be leveraged for automation of knowledge management.
- The knowledge store can be created using common vector databases or knowledge graphs.
- Hyperscalers provide cloud-provisioned solutions that are readily adaptable.
- AAI Enterprise Knowledge console can be used to define a knowledge base in a project.
- The Automation Success Platform can be used to sync content from a defined content store repository.
 - Consider the following seeding documents:
 - Procedure Guides
 - History of Successfully Closed Incidents
 - Whitepapers
 - Existing Knowledge Base Articles
 - Training materials
 - Troubleshooting tips and ticks
 - Pertinent articles
 - Once the Invoice Analyst Agent is configured, you can create knowledge base articles from your prior and day-forward requests.

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APPENDIX A

Prompt Examples

Classifier

Persona (Use this as an example System Message for your Prompt)

Please analyze the following document and classify its type based on its content. Choose the most appropriate category from the OPTIONS provided below. Reply only with the option and don't add additional notes.

DOCUMENT:

\$sDocumentText\$

OPTIONS:

Invoice
Sales Order
Credit Memo
Bank Statement
Purchase Order
Order Confirmation
Bill of Material
Shipping Notice
Goods Receipt
Unknown

sDocumentText (Pass this variable as the Incident that requires classification) Text extracted from Invoice Documents sent by vendor.

Automated KB Invoice Auditor (KBGeni)

Persona (Use this as an example System Message for your Prompt)

You are an invoice and contract analyst in charge of reviewing incoming invoices and expert in the vendor's contracts and agreement.

Your goal is to analyze invoices and transactions and compare them against their contracts and Purchase Order Bills in the knowledgebase.

Validate items like Equipment Charges and determine if the vendor is charging the right amounts.

You will get data from the invoice and from the contract to fill out the below information.

Your response should be in the following JSON Format:

Contract #:

Invoice #:

PO #:

Invoice Submitted Date: " ",

Supplier Name: " ",

Contract End Date: "May 31, 2025",

Invoice Service Date: " ",

Overall Discrepancy Identified: "(Yes/No) ",

Overall Description: " ",

Message

Extracted Invoice details **dtInvoiceDetails**

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APPENDIX B

Invoice Analyst Agent Definitions

Service provider is an organization that offers AP services.

Account Payable operations platform

- As simple as a form and database for invoice submission and tracking.
- ERP systems (SAP, Oracle, Microsoft Dynamics)
- Case Management System
- Financial management module in a larger solution (SAP, Salesforce, Workday,)
- Cloud based Account Payable offering
- Combinations of one or more of the above

Accounts payable analyst

- Service subject matter expert (SME)
- Examples: AP clerks, AP specialists, finance assistants, and payment coordinators

Service requester

- Employee, Vendor, Internal departments managing budgets and approvals

Automation

- Automation interacts with your systems of record like a accounts payable platform and the other systems in the Finance Ops environment. This also includes accounts payable team communications, requester communications, and other essential system integrations that make up your end-to-end process and engage the user teams of the process.
- Automation uses the GenAI response to further the action and augment invoice analyst activity.

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Augmented human interaction

- Augmented human interaction for the invoice analyst not only involves the humans but prepares them for tasks. This can be summaries, suggestions, proposed communications, referenced details, etc.
- Automation Co-Pilot provides a user experience for action oversight and decisioning when automation and/or the GenAI require additional handling of the request process.