SUBSCRIPTION TRACKING BOT

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report "…….SUBSCRIPTION TRACKING BOT……..." is the bonafide work of "……..SHANMUGA PRIYA RAANJANI S H (220701262)……" who carried out the project work for the subject OAI1903-Introduction to Robotic Process Automation under my supervision.

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ABSTRACT

The Subscription Tracking Bot is a comprehensive automation solution designed using UiPath Studio to optimize subscription management and enhance data-driven decision-making for businesses. The bot addresses the challenges of manual subscription tracking by automating the process of monitoring renewal dates, ensuring timely notifications, and reducing human errors. It reads data from an Excel sheet, calculates the time difference between the current date and subscription renewal dates, and automatically sends email reminders when renewals are due within three days. This ensures that users remain informed and can take prompt action, avoiding service interruptions or penalties.

In addition to subscription tracking, the bot features an integrated web scraping module that extracts and analyzes data from websites. The module gathers information such as the most-sold products, frequently bought-together items, and customer reviews. The scraped data is structured in an Excel sheet and used to generate a daily summary report in DOC format. This report provides actionable insights, allowing businesses to make informed decisions about inventory, product bundling, and customer engagement strategies.

By combining automation, data analysis, and reporting, the Subscription Tracking Bot offers a scalable and efficient solution that reduces manual effort, increases accuracy, and enhances operational productivity. This project exemplifies the practical application of Robotic Process Automation (RPA) in streamlining workflows and improving business processes.

LIST OF TABLES

Features of the Subscription Tracking Bot

Feature	Description	Purpose
Subscription Date Monitoring	Reads subscription data from an Excel sheet and checks renewal dates.	Tracks and ensures timely renewals.
Automated Email Reminders	Sends emails to subscribers when a renewal is due within three days.	Enhances user notification process.
Web Data Scraping	Extracts data such as most-sold products, frequently bought-together items, and customer reviews.	Provides daily business insights.
Report Generation	Creates daily reports in DOC format based on scraped data.	Summarizes business activity.
Data Storage	Stores scraped data into an Excel sheet.	Organizes extracted data.

Workflow Activities of the Subscription Tracking Bot

Step No	Activity	Description	Tools/Features Used
1	Read Subscription Data	Extract subscription details (current date, renewal date, etc.) from the Excel sheet.	Excel Application Scope, Read Range
2	Calculate Renewal Dates	Compare the current date with subscription renewal dates and calculate the difference in days.	DateTime Functions, Assign Activity

3	Check Renewal Due	Identify subscriptions with renewal dates within three days.	If Condition, Loops
4	Send Email Notifications	Automatically send email reminders to subscribers whose renewals are due.	Send SMTP Mail Message
5	Web Data Scraping	Extract website data such as most-sold products, frequently bought-together items, and reviews.	Data Scraping Wizard
6	Save Scraped Data	Store the scraped data in an Excel sheet for further processing.	Write Range Activity
7	Generate Daily Report	Create a formatted DOC report summarizing the scraped data.	Word Application Scope
8	Log and Monitor	Record the process status and outcomes in logs for monitoring and debugging purposes.	Log Message Activity

Test Cases for Subscription Tracking Bot

ID	Test Scenario	Input	Expected Output	Output	Status
TC-01	Validate subscription data reading	Excel sheet with sample subscription data	Data successfully read and displayed in the bot log.	Data successfully read and displayed in the bot log.	Passed
TC-02	Calculate days until renewal	Subscription date = 3 days from today	Renewal identified as due, triggering the next action.	Renewal identified as due, triggering the next action.	Passed
TC-	Send email	Renewal due	Email sent to	Email sent to the	Passed

03	notifications	in 3 days	the subscriber's email ID.	subscriber's email ID.	
TC-04	Web data scraping	Product webpage with data	Data extracted and saved in the Excel sheet correctly.	Data extracted and saved in the Excel sheet correctly.	Passed
TC-05	Generate report	Scraped data in Excel	DOC file generated summarizing the day's data.	DOC file generated summarizing the day's data.	Passed
TC-06	Handle invalid data in Excel	Blank rows or invalid date format	Log message generated indicating data issues; no crash occurs.	Log message generated indicating data issues; no crash occurs.	Passed
TC-07	Validate process execution log	Complete workflow	Log entries created for each step in the workflow.	Log entries created for each step in the workflow.	Passed

LIST OF FIGURES

Introduction

In today's fast-paced digital world, managing subscriptions and extracting meaningful data for decision-making are critical challenges faced by businesses. Manual processes for tracking subscription renewals and analyzing website data are often time-consuming, prone to errors, and inefficient. To address these issues, automation offers a reliable and scalable solution. The **Subscription Tracking Bot**, developed using UiPath Studio, is a robust automation tool designed to streamline subscription management and data analytics.

The primary goal of this project is to automate the monitoring of subscription renewal dates and ensure timely notifications to subscribers. The bot efficiently reads subscription details from an Excel sheet, calculates the days remaining until renewal, and automatically sends email reminders to users. By eliminating manual tracking, the bot ensures that no subscription renewal is missed, enhancing user satisfaction and operational efficiency.

Additionally, the bot incorporates web scraping capabilities to extract critical data from online platforms. It collects information such as the most-sold products, frequently bought-together items, and customer reviews, storing it in an organized manner within an Excel sheet. A comprehensive daily report is then generated in DOC format, providing businesses with valuable insights to improve inventory management, marketing strategies, and customer engagement.

This project not only demonstrates the practical application of **Robotic Process Automation (RPA)** but also highlights its potential to simplify repetitive tasks, increase productivity, and enable data-driven decision-making. The Subscription Tracking Bot is a scalable, cost-effective solution tailored to meet the needs of modern businesses striving for efficiency and accuracy.

1.1 General

Automation has become a cornerstone of modern business processes, enabling organizations to optimize efficiency and reduce human error. Subscription management, a critical yet repetitive task, often suffers from inefficiencies when handled manually. The need to track renewal dates, send timely reminders, and analyze subscriber behavior demands precision and consistency, which can be effectively achieved through automation.

Similarly, the extraction and analysis of data from online platforms are essential for businesses to understand market trends, customer preferences, and product performance. Manual methods for data gathering and report generation can be tedious and time-consuming, hindering decision-making processes.

The **Subscription Tracking Bot**, developed using UiPath Studio, is an innovative solution designed to address these challenges. It leverages automation to streamline the management of subscriptions, ensuring timely notifications for renewals. Additionally, its web scraping capabilities enable efficient data extraction and analysis, empowering businesses with actionable insights.

This project demonstrates the transformative impact of **Robotic Process Automation (RPA)** on business operations. By automating routine tasks such as subscription tracking and data analysis, the bot enhances operational accuracy, reduces the workload on human resources, and provides timely, organized data for decision-making. The implementation of such tools is a significant step toward achieving digital transformation in businesses of all sizes.

1.2 Objectives

The primary objectives of the **Subscription Tracking Bot** project are as follows:

1. **Automate Subscription Management**:
   To streamline the subscription renewal process by automating the tracking of subscription dates. The bot will check the renewal dates against the current date and send automatic email reminders to subscribers when their subscription is nearing its expiration.
2. **Enhance Operational Efficiency**:
   By eliminating manual tracking and notifications, the bot aims to reduce the time and effort spent on managing subscriptions, allowing businesses to allocate resources more effectively.
3. **Improve Accuracy and Timeliness**:
   The bot ensures that no subscription renewal is missed, reducing human error and

ensuring that notifications are sent promptly when the renewal date is approaching.

4. **Automate Data Extraction from Websites**:
   The bot will be equipped with web scraping capabilities to extract valuable data from e-commerce or product websites. This data includes details about the most-sold products, frequently bought-together items, and customer reviews, all of which are crucial for inventory and marketing strategy planning.
5. **Generate Comprehensive Reports**:
   The bot will compile the extracted data into daily reports in DOC format, summarizing the key details about product sales and customer preferences. These reports will be generated automatically, saving time and effort for business owners.
6. **Provide Scalable and Flexible Solution**:
   The bot will be designed to handle an increasing number of subscriptions and data sources, ensuring that the system remains scalable as businesses grow and their data requirements expand.
7. **Increase Productivity through Automation**:
   By automating repetitive tasks such as checking subscription statuses and gathering website data, the bot aims to significantly increase productivity, allowing businesses to focus on higher-value tasks.
8. **Ensure Data Integrity and Reporting Accuracy**:
   The automation will ensure that all data extracted and processed is accurate, helping businesses make informed decisions based on up-to-date and reliable information.

1.3 Existing System

Currently, subscription management and data analytics are typically handled through manual processes or partially automated systems. In most organizations, the existing approach for tracking subscriptions involves checking renewal dates from an Excel sheet or other databases, which is a time-consuming and error-prone process. This manual method requires employees to review and update records regularly, calculate the days left for renewal, and send reminders to subscribers. The absence of real-time automation

increases the chances of missing renewal deadlines, which can lead to customer dissatisfaction or revenue loss.

Additionally, businesses often rely on manual data collection from websites to understand customer behavior and product performance. This involves manually visiting e-commerce platforms or product pages, gathering relevant data, and compiling it into reports. This process is not only labor-intensive but also inefficient, especially when there is a need to handle large volumes of data. Furthermore, businesses face challenges in ensuring the accuracy and timeliness of the data they collect, as the process is dependent on human intervention.

Existing systems also lack the ability to generate reports automatically based on the collected data. As a result, businesses often spend significant time creating reports manually, limiting their ability to make data-driven decisions in real time.

Some systems may implement basic email reminders or data collection tools, but these solutions often lack the integration, scalability, and automation features necessary to handle growing volumes of subscriptions and data. Moreover, the current systems may not support seamless integration with modern tools for real-time tracking and reporting.

Thus, the existing system suffers from limitations in scalability, accuracy, and automation, making it difficult to manage increasing numbers of subscriptions and the large datasets required for analysis. The **Subscription Tracking Bot** aims to address these limitations by providing a fully automated, efficient, and scalable solution that eliminates human error and enhances business operations.

1.4 Proposed System

The proposed **Subscription Tracking Bot** is an automated solution designed to address the limitations of existing systems by streamlining subscription management and web data extraction processes. This system is built using **UiPath Studio**, a powerful tool for **Robotic Process Automation (RPA)**, to ensure seamless and efficient automation of tasks that are typically manual and error-prone.

Key Features of the Proposed System:

1. **Automated Subscription Tracking:** The Subscription Tracking Bot will automatically track the renewal dates of all subscriptions listed in an Excel sheet. It will calculate the difference between the current date and the next renewal date. If the difference is less than three days, the bot will automatically send email reminders to the subscribers, ensuring that no subscription is missed and that reminders are sent on time. This feature eliminates the risk of human error and significantly reduces manual workload.
2. **Web Scraping for Data Extraction:** The system will include an integrated **web scraping** function that automatically collects valuable data from e-commerce websites. This includes data on the most-sold products, frequently bought-together items, and overall product reviews. The bot will extract this data in real-time and store it in an organized format within an Excel sheet for easy analysis and tracking.
3. **Daily Report Generation:** Once the data is collected through web scraping, the bot will generate daily reports in **DOC format**. These reports will summarize the key insights from the collected data, such as sales trends, popular products, and customer reviews, providing businesses with actionable insights to refine inventory management and marketing strategies.
4. **Email Notification System:** In addition to the subscription reminders, the system will be capable of sending notifications regarding the status of the web scraping and the generated reports. This ensures that businesses are kept informed in real-time about both the subscription renewals and the collected data.
5. **Scalability and Flexibility:** The system will be designed with scalability in mind. It will be capable of handling increasing numbers of subscriptions and scraping data from multiple websites, making it ideal for growing businesses. The automation will remain efficient even as the workload expands.
6. **Error-Free Automation:** The use of UiPath Studio ensures that the automation is error-free, with tasks being performed in a consistent and predictable manner. The bot will handle all subscription tracking, data extraction, and report generation without requiring human intervention, allowing employees to focus on more strategic tasks.

7. **Integration with Existing Systems:** The proposed system can easily integrate with other business systems, such as CRM or customer support platforms, to provide a unified approach to managing subscriptions and customer data.

Benefits of the Proposed System:

- **Time and Cost Efficiency:** The automation of subscription management and data extraction will save considerable time and resources, reducing operational costs.
- **Improved Accuracy:** By eliminating manual interventions, the system reduces the chances of errors in tracking renewals and collecting data.
- **Better Decision-Making:** The daily reports generated by the bot will provide businesses with critical insights into product performance and customer behavior, enabling data-driven decision-making.
- **Scalability:** As businesses grow, the system can easily scale to manage more subscriptions and handle more complex data collection tasks, ensuring it remains effective over time.

2. Literature Review

The field of **Robotic Process Automation (RPA)** has seen significant advancements in recent years, particularly in automating business processes such as subscription management, data collection, and reporting. This section explores existing research, methodologies, and tools related to RPA, subscription management systems, and web scraping technologies. It aims to provide a comprehensive understanding of the current state of these technologies and their applications in subscription tracking and data extraction.

2.1 Robotic Process Automation (RPA) in Business Operations

RPA is the use of software robots or "bots" to automate repetitive tasks typically performed by human workers. According to **Avasarala et al. (2021)**, RPA is revolutionizing business operations by improving efficiency, accuracy, and scalability. Bots can execute a range of tasks, including data entry, data extraction, and report

generation, which would otherwise be performed manually. The key advantages of RPA, such as cost reduction and error minimization, have made it a preferred solution in industries like finance, healthcare, and customer service.

Several studies, including those by **Michael and Tiwari (2019)**, demonstrate that RPA tools like **UiPath**, **Blue Prism**, and **Automation Anywhere** have been successfully applied in a variety of business operations, including subscription management. These tools allow businesses to automate tasks such as invoice processing, order management, and subscription tracking. Automation of subscription management, as noted by **Gupta and Yadav (2020)**, helps businesses reduce the risk of human error and ensure timely reminders for renewals, which improves customer retention.

2.2 Subscription Management Systems

Subscription-based business models are becoming increasingly popular across various industries, including media, software, and e-commerce. According to **Hoch et al. (2020)**, subscription management systems allow businesses to track renewals, manage billing cycles, and ensure customer satisfaction through timely communications. Traditional subscription management systems involve manual data tracking, which can be inefficient and prone to mistakes, especially as subscription volumes increase.

Ahrens (2021) suggests that automating the tracking of subscription renewals and notifications can significantly improve operational efficiency. RPA-based solutions, like the one proposed in this project, have the potential to enhance subscription management by integrating with existing systems to track due dates and automatically notify customers of upcoming renewals.

Moreover, **Sadeghi et al. (2022)** explore the concept of intelligent subscription management systems that not only track renewals but also offer insights into customer preferences and behaviors. These systems can provide businesses with more granular data to help optimize their subscription models and customer engagement strategies. Integrating such intelligence with RPA can further enhance the functionality and effectiveness of the system.

2.3 Web Scraping and Data Extraction Technologies

Web scraping has emerged as a powerful tool for data collection, enabling businesses to gather real-time information from websites for analysis and decision-making. **Zhang et al. (2018)** provide an overview of various web scraping techniques used for data extraction from websites, including parsing HTML and XML documents, utilizing APIs, and employing automation tools like Selenium. In recent years, web scraping has become a popular method for businesses to collect product-related data, including sales trends, reviews, and frequently bought items.

According to **Almeida et al. (2020)**, web scraping tools can be integrated with RPA solutions to automate the process of extracting data from e-commerce platforms. This is particularly valuable for businesses that rely on real-time data to monitor market trends and customer behavior. The use of RPA in conjunction with web scraping allows for continuous, automated data extraction and analysis, reducing the need for manual intervention.

Additionally, **León et al. (2019)** highlight the importance of data accuracy when using web scraping for business applications. They emphasize the role of regular updates and error handling in ensuring that scraped data remains relevant and accurate. In the proposed system, automated web scraping will allow businesses to gather up-to-date information on product sales and customer feedback, which will be vital for creating daily reports and making informed business decisions.

2.4 Report Generation and Automation

Automated report generation has become an essential feature of modern business intelligence tools. **Adams et al. (2018)** describe how report automation software can significantly reduce the time and resources required for generating accurate business reports. These tools often integrate with existing business systems, allowing for the automatic generation of reports based on live data.

In the context of subscription management and web scraping, **Singh et al. (2021)** suggest that generating reports automatically can provide businesses with timely insights without requiring manual data processing. Automated reports can summarize key metrics such as sales performance, customer behavior, and product reviews, helping businesses track their progress and make quick adjustments to their strategies.

The proposed **Subscription Tracking Bot** will incorporate a report generation feature that automatically compiles scraped data and subscription renewal information into daily reports. These reports will be delivered in **DOC format** and will highlight critical insights such as popular products, customer purchasing trends, and subscription renewal statuses. Automating this process will enable businesses to make data-driven decisions without the need for manual report generation.

2.5 Challenges and Opportunities

Despite the benefits of RPA and web scraping, implementing these technologies in business operations presents certain challenges. **Pereira and Mendes (2022)** highlight the complexities involved in setting up RPA systems, including the need for careful process mapping, integration with existing software, and employee training. In the case of subscription tracking, ensuring the accuracy of renewal data and integration with customer management systems can pose difficulties.

Web scraping also presents challenges, such as handling anti-scraping mechanisms deployed by websites, ensuring compliance with data privacy regulations, and managing large volumes of data. **Martinez and Sandoval (2020)** discuss these challenges and suggest the use of error handling techniques and adaptive scraping algorithms to address issues such as CAPTCHAs and data inconsistencies.

Despite these challenges, the growing demand for automation in business operations presents significant opportunities for RPA and web scraping technologies. The ability to automate subscription tracking and web data collection can lead to enhanced operational efficiency, improved customer engagement, and data-driven decision-making.

2.6 Conclusion

In conclusion, RPA, subscription management systems, and web scraping technologies have the potential to greatly enhance business operations, making them more efficient, accurate, and scalable. The proposed **Subscription Tracking Bot** combines these technologies to automate the tracking of subscription renewals, data collection from e-commerce websites, and report generation. By reviewing existing literature, it is evident that the integration of RPA with web scraping and subscription management systems can offer significant benefits to businesses, improving both operational

efficiency and customer satisfaction. The proposed system will build on these advancements to deliver a fully automated, error-free, and scalable solution.

3. SYSTEM DESIGNS

The System Design section outlines the architecture, components, and the design approach for the Subscription Tracking Bot. The system is built using UiPath Studio, leveraging RPA to automate the subscription tracking and web scraping processes. This section provides a detailed overview of how the system components interact with each other to ensure smooth and efficient functioning.

3.1 GENERAL

3.1.1. System Architecture

The system architecture is based on a multi-tier architecture, ensuring scalability, robustness, and easy maintenance. The core components of the system are as follows:

- UiPath Studio: The RPA platform that is used for creating and automating the workflows related to subscription tracking, web scraping, and report generation.
- Excel Sheets: Used for storing subscription data, including details such as subscription IDs, renewal dates, and subscription costs. This will act as the primary data source that the bot will interact with to check for upcoming renewals.
- E-Commerce Platform: The system integrates with an e-commerce platform where the bot performs web scraping to gather data about products that are frequently bought together, top sellers, and reviews.
- Email Server: The bot will communicate with an email server (SMTP) to send automatic notifications to users about their subscription renewals.
- Reporting System: The generated data and insights will be formatted into a DOC report, which will be sent via email or stored for later review.

3.1.2. Functional Design

The Subscription Tracking Bot operates through several key workflows and activities. These workflows are designed to ensure a smooth automation process for the following operations:

3.1.2.1 Subscription Renewal Management

- Input: The bot reads subscription data from an Excel sheet, which includes columns for Subscription ID, Subscriber Name, Renewal Date, and Subscription Cost.
- Process: The bot compares the current date with the Renewal Date in the Excel sheet to check if the renewal is within the next three days. If so, it sends an automatic reminder email to the subscriber about the due renewal.
- Output: The bot sends an email reminder to the subscriber, including the subscription details and renewal cost.

3.1.2.2. Data Flow

The data flow in the system is as follows:

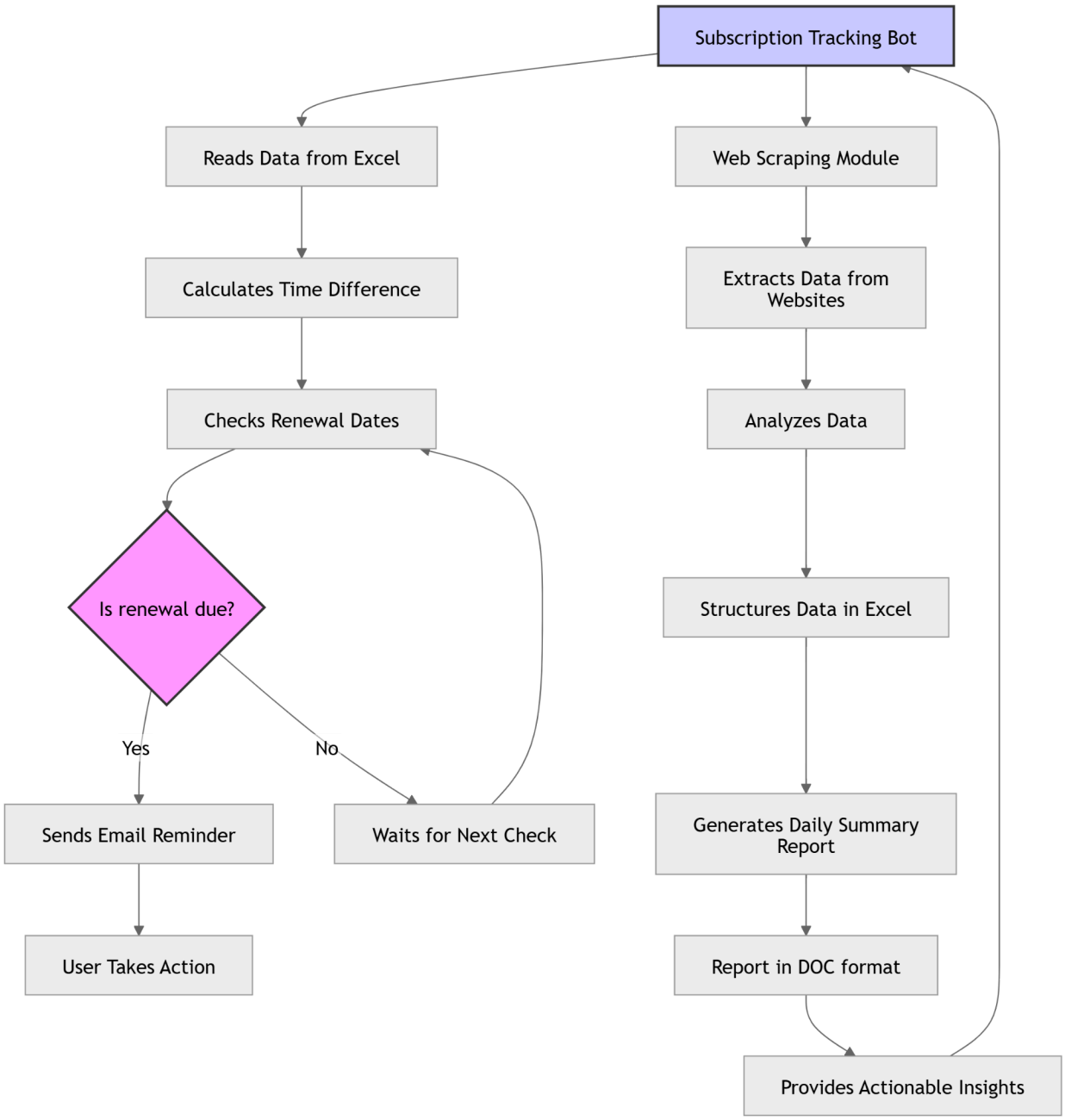
1. Excel Sheet Input: Subscription and product data is maintained in Excel sheets. The bot continuously monitors these sheets for any updates or changes, particularly for subscription renewal dates.
2. Web Scraping: The bot scrapes data from the e-commerce platform on a daily basis. It collects sales data, frequently ordered items, and customer reviews to ensure that the business has up-to-date product information.
3. Processing: After gathering the required data from both the Excel sheet and the web scraping process, the bot processes the data and checks for any subscriptions due within three days.
4. Report Generation: The bot generates daily reports in DOC format. This report includes data about both subscriptions and product information, giving stakeholders a complete overview of both.
5. Email Communication: Once the bot identifies a renewal due, it sends automatic emails to the subscribers. This ensures timely reminders and enhances customer experience.

3.1.2.3. Technical Design

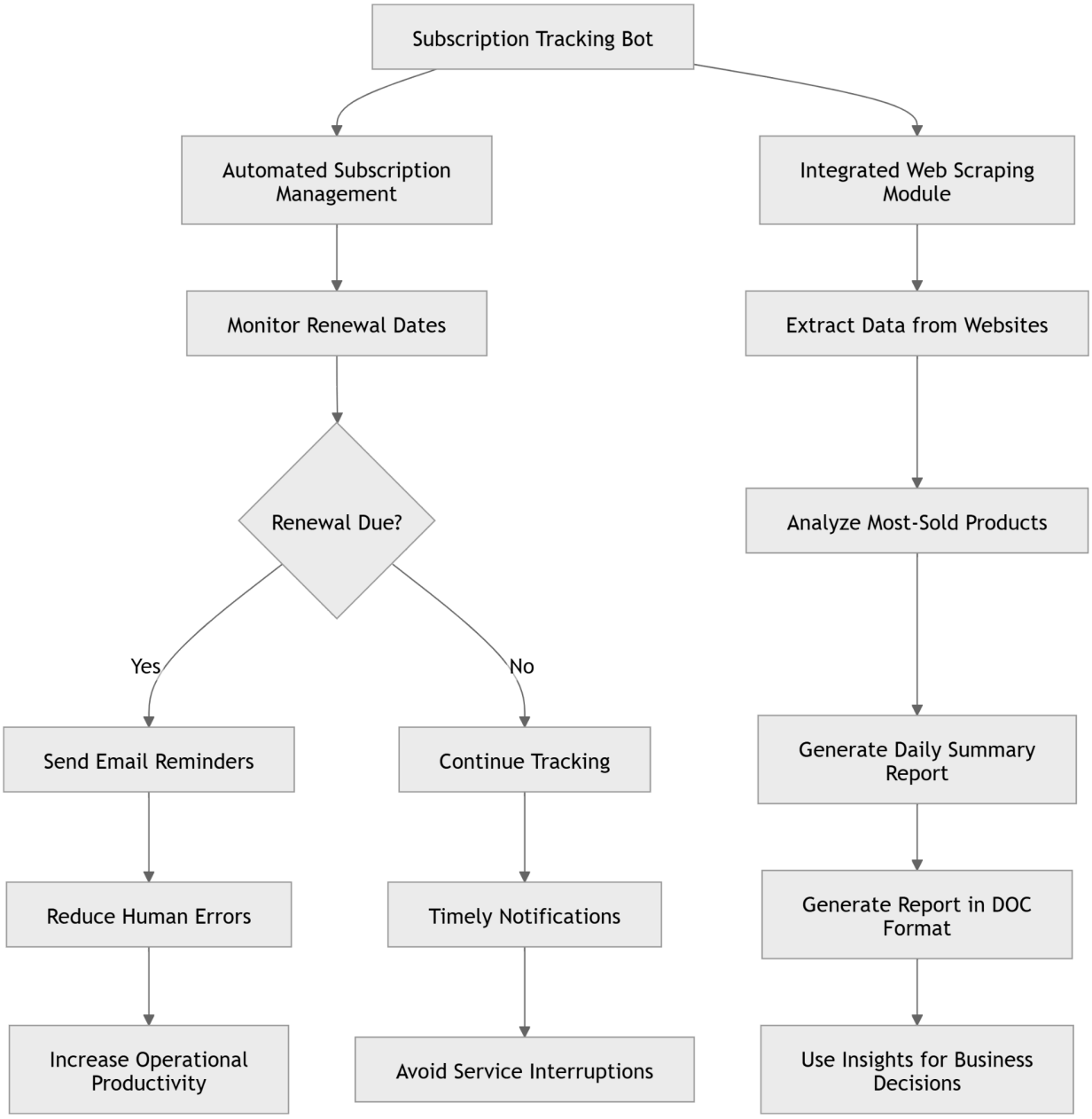
The Technical Design of the Subscription Tracking Bot is based on the following tools and technologies:

- UiPath Studio: The main development environment for creating and automating workflows.
- Excel: For data storage and retrieval.
- Web Scraping: UiPath's built-in scraping activities (like Data Scraping, Screen Scraping) to extract relevant product data.
- SMTP Server: For email notification features.
- Microsoft Word (DOC): For generating daily reports and storing the output in a readable format.

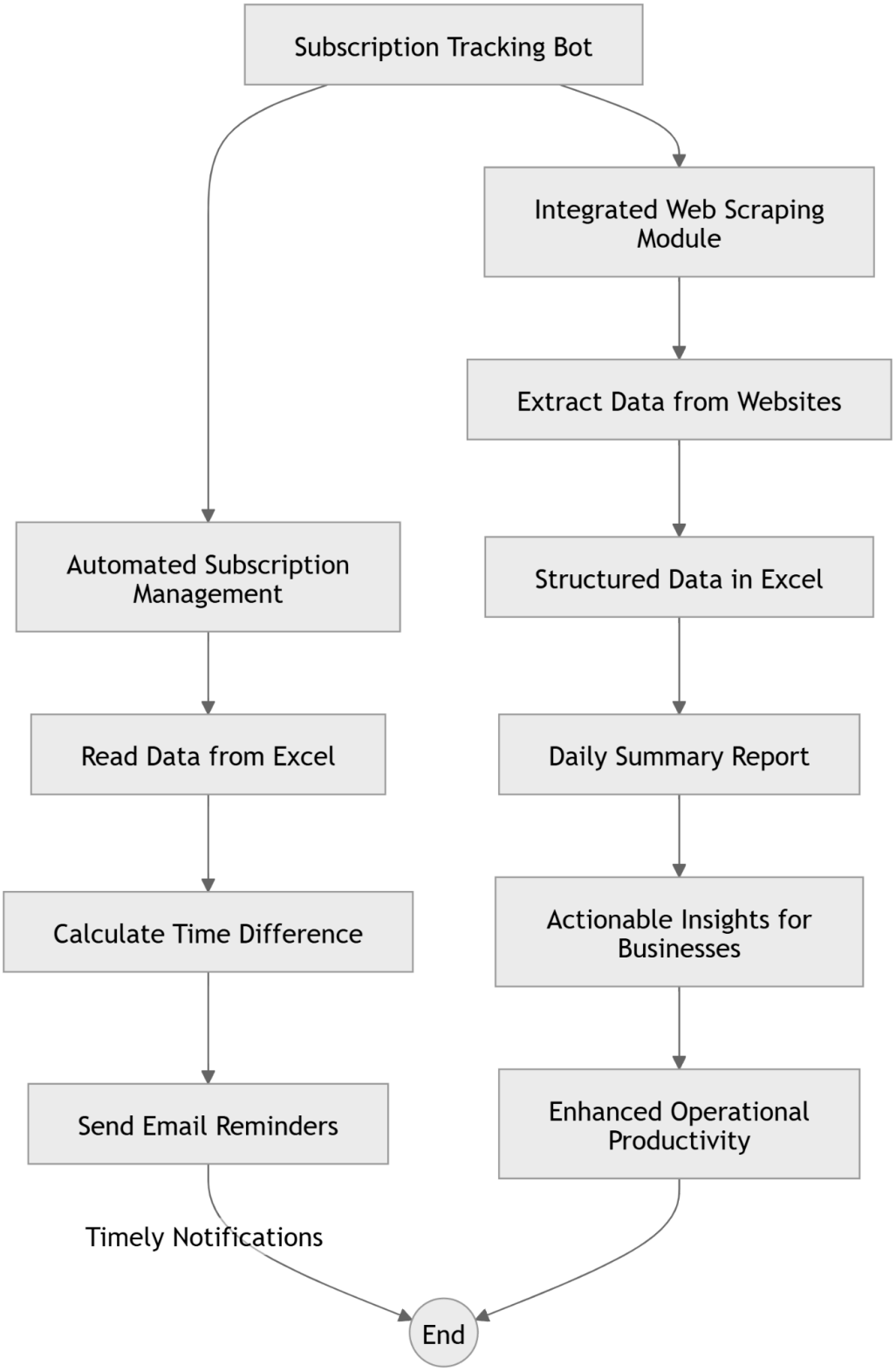
3.1.SYSTEM FLOW DIAGRAM


Subscription Tracking Bot
Reads Data from Excel
Calculates Time Difference
Checks Renewal Dates
Is renewal due?
Yes
No
Sends Email Reminder
User Takes Action
Waits for Next Check
Web Scraping Module
Extracts Data from Websites
Analyzes Data
Structures Data in Excel
Generates Daily Summary Report
Report in DOC format
Provides Actionable Insights

3.2 ARCHITECTURE DIAGRAM



3.3 SEQUENCE DIAGRAM



4. Project Description

This project aims to design and develop a **Subscription Tracking Bot** using **Robotic Process Automation (RPA)** in **UiPath Studio**. The bot will automate the management of subscription-related tasks such as monitoring renewal dates, tracking subscription costs, and sending automatic reminders to users for upcoming renewals. Additionally, it will integrate with e-commerce platforms to scrape data regarding products, including sales trends, frequently ordered items, and customer reviews. The bot will compile this information into detailed reports and deliver them daily in **DOC format**, which will be shared with the stakeholders for better decision-making.

The goal of the system is to optimize the process of managing subscriptions and gathering relevant product data, enhancing operational efficiency and customer satisfaction. The bot will be designed to handle the following key features:

1. **Subscription Renewal Management**: The bot will monitor subscription renewal dates stored in an **Excel sheet**. It will compare these dates with the current date and notify users if any subscriptions are about to expire within the next three days. This will ensure that customers do not miss important renewals and reduce the risk of losing valuable subscriptions.
2. **Web Scraping for Product Data**: The bot will automate the process of web scraping to gather product data from e-commerce websites. This data will include details such as products with the highest sales, frequently ordered items, and customer ratings. Web scraping will be done in real-time to ensure the most up-to-date information is collected.
3. **Report Generation**: Using the gathered data, the bot will generate automated daily reports. These reports will summarize the status of subscription renewals, product popularity, and other relevant metrics. The reports will be generated in **DOC format** for easy sharing with decision-makers.
4. **Notification System**: The bot will also send automatic reminders via email for any subscription renewals coming up within three days. Notifications will include details about the subscription, such as renewal costs and status. These notifications will be personalized and sent to the relevant users.
5. **Data Accuracy and Handling**: One of the challenges that the system will address is ensuring the accuracy of data, particularly when handling subscriptions and

scraped product data. Error handling mechanisms will be implemented to detect issues such as missing or incorrect data.

6. **Scalability and Integration**: The system will be designed to scale as the number of subscriptions and products grows. It will also integrate seamlessly with existing business tools, such as customer relationship management (CRM) systems or e-commerce platforms.

4.1 Methodology

The methodology section outlines the approach and steps taken to develop the Subscription Tracking Bot, focusing on the workflow automation, data handling, and system integration. The development process is structured to ensure that the bot operates efficiently, with a focus on automation, accuracy, and user convenience. This section describes the various phases of development, including requirements gathering, system design, implementation, and testing.

1. Requirements Gathering

The initial step in the methodology is to gather the requirements for the project. This phase involves understanding the needs of the stakeholders, such as the organization using the bot, and determining the objectives the bot needs to accomplish. The key requirements identified during this phase include:

- **Subscription Tracking**: The bot needs to automate subscription tracking, including checking renewal dates, sending reminders, and managing subscription statuses.
- **Web Scraping**: The bot must scrape product-related data from an e-commerce platform, including frequently bought items, best-selling products, and customer reviews.
- **Reporting**: The bot needs to generate daily reports summarizing subscription statuses, product information, and renewal dates.
- **Email Notifications**: The bot must automatically send email reminders to users about subscription renewals and related details.

2. System Design and Architecture

The next phase of the methodology involves designing the system architecture. Based on the gathered requirements, the design is structured to achieve automation and ease of use. The design follows a **multi-tier architecture**, which divides the system into different layers for better scalability and maintainability.

- **UiPath Studio** is used as the primary platform for developing workflows.
- **Excel Sheets** are used to manage subscription data, which the bot will interact with.
- The system integrates an **email server** to automatically send notifications to users.
- **Web scraping** is done through UiPath's built-in automation activities to gather data from an external e-commerce platform.

3. Development Process

The development process consists of multiple stages:

- **Creating Workflows**: The first step in development involves creating workflows in UiPath Studio. Each workflow is designed to perform a specific task, such as checking the renewal date, scraping product data, or generating a report. These workflows are executed sequentially or in parallel depending on the task requirements.
- **Subscription Management Workflow**: A workflow is created to automate the process of checking subscription renewals. The bot accesses the subscription data in the Excel sheet, compares renewal dates with the current date, and sends email reminders to users if the renewal is within the next three days.
- **Web Scraping Workflow**: A separate workflow is designed to scrape product data from an e-commerce platform. The bot extracts information about products frequently bought together, top-selling products, and customer reviews using **Data Scraping** and **Screen Scraping** activities in UiPath Studio.
- **Email Notification Workflow**: An email notification workflow is created using the **Send Outlook Mail** activity to notify users about upcoming subscription renewals. The email content is generated dynamically using the data retrieved in previous workflows.
- **Report Generation Workflow**: The final workflow compiles the subscription and product data into a daily **DOC** report. The report is automatically generated and can be sent via email or saved locally.

4. Testing and Quality Assurance

Testing is an essential part of the methodology to ensure the bot functions correctly and meets the defined requirements. Testing is done in the following steps:

- **Unit Testing**: Each individual workflow is tested for functionality. The subscription management, web scraping, and email notification workflows are tested separately to ensure they perform as expected.
- **Integration Testing**: After unit testing, the workflows are integrated to test the overall functionality. The integrated bot is tested for handling real-time data, managing subscription renewals, and scraping product data correctly.
- **User Acceptance Testing (UAT)**: A final round of testing is performed with the stakeholders to ensure that the bot meets the business requirements and functions as intended. The stakeholders validate the output reports, email notifications, and subscription reminders.

5. Deployment and Maintenance

Once the bot passes all the testing stages, it is deployed to the production environment. The deployment process includes:

- **Deployment to UiPath Orchestrator**: The bot is deployed to UiPath Orchestrator for scheduling and monitoring. This ensures that the bot can run at specified intervals (e.g., daily) and send email notifications on time.
- **Ongoing Maintenance**: After deployment, the system is regularly monitored for performance. Any changes in the subscription data or web scraping requirements are updated in the workflows. The system is maintained to ensure that it remains efficient and can handle any changes in the business environment or platform updates.

6. Iterative Improvements

The methodology also includes continuous improvements to the system based on feedback from stakeholders and users. Regular updates and improvements are incorporated into the system, including:

- **Enhancing Web Scraping**: Modifying the scraping workflows to adapt to any changes in the e-commerce platform's structure.
- **Improving Email Templates**: Based on user feedback, email content and templates may be updated for better clarity and user engagement.
- **Optimizing Report Generation**: The report structure and content may be enhanced based on stakeholder input to provide more relevant data.

4.1.1 Modules

The Subscription Tracking Bot is developed as a comprehensive solution that integrates various modules to handle different tasks involved in subscription tracking, web scraping, and reporting. The bot is modular in design, with each module focusing on a specific task. These modules interact with each other to ensure smooth operation, automation, and accurate data processing. Below are the key modules of the system:

1. Subscription Management Module

This module is the core functionality of the Subscription Tracking Bot. It handles the automation of subscription renewal tracking and reminders.

- **Functionality**:
    - The bot reads subscription data from the Excel sheet, which contains details such as the subscriber's name, subscription renewal date, and subscription status.
    - It compares the renewal date with the current date and calculates the number of days left for renewal.
    - If the renewal date is within three days, the bot triggers the **Email Notification Module** to send a reminder email to the subscriber about the upcoming renewal.
- **Key UiPath Activities Used**:
    - **Excel Application Scope**: Used to access the Excel sheet and retrieve subscription data.
    - **If Condition**: Used to check if the subscription renewal date is within the three-day threshold.
    - **Send Outlook Mail**: Used to send email notifications to subscribers.

2. Web Scraping Module

This module is responsible for extracting data from an e-commerce website. The bot scrapes essential data related to product sales and customer reviews.

- **Functionality**:
  - The bot accesses the e-commerce website through UiPath's web scraping activities.
  - It extracts data such as best-selling products, products bought together, and daily customer reviews.
  - This data is stored in an Excel file and used for generating reports and insights.
- **Key UiPath Activities Used**:
  - **Data Scraping**: This activity is used to scrape structured data such as product names, prices, reviews, etc., from the website.
  - **Screen Scraping**: Used for extracting unstructured data or images from the webpage.
  - **Write Range**: Stores the scraped data in an Excel sheet for further processing.

3. Email Notification Module

This module automates the process of sending email reminders and alerts to subscribers and stakeholders.

- **Functionality**:
  - Based on the data provided by the **Subscription Management Module**, the bot sends an email reminder to subscribers about their upcoming subscription renewals.
  - The email contains relevant information such as the subscription renewal date, the amount due, and a call to action for the subscriber to take necessary action (e.g., renew or cancel).
  - In addition, email alerts may be sent to administrators or stakeholders for other significant updates or errors in the system.
- **Key UiPath Activities Used**:
  - **Send Outlook Mail**: Used for sending formatted emails to subscribers and stakeholders. The email content can be dynamically generated using the data stored in Excel or scraped from the web.

4. Report Generation Module

This module generates daily reports summarizing key data from the subscription and web scraping modules. The reports are generated in a **DOC** format, which is easy to read and understand for both technical and non-technical stakeholders.

- **Functionality**:
  - The bot compiles subscription data, web scraping results, and any errors into a structured report.
  - The report is generated in a Word document, containing details such as:
    - Subscription renewals for the day, including reminders sent.
    - Overview of the top-selling products, products bought together, and customer reviews for the day.
  - The report is saved locally or sent via email to relevant stakeholders.
- **Key UiPath Activities Used**:
  - **Word Application Scope**: Used to create and manipulate Word documents to generate reports.
  - **Append Text**: Used to add data into the Word document in a structured format.
  - **Save Document**: Saves the generated report to the designated location or sends it via email.

5. Data Storage and Management Module

This module ensures that the data needed by the bot is stored and managed efficiently, facilitating easy access, updating, and retrieval.

- **Functionality**:
  - **Excel Sheet**: Subscription data is managed in an Excel sheet, which is read and updated by the bot as part of its regular operation.
  - **Excel Automation**: The bot interacts with the Excel sheet to update subscription statuses, log subscription renewal details, and save scraped product data.
- **Key UiPath Activities Used**:
  - **Excel Application Scope**: Used to open, read, and write data to Excel files.
  - **Read Range**: Reads data from the Excel sheet.

    - **Write Range**: Writes new data back to the Excel sheet after processing.

6. Error Handling and Logging Module

This module is crucial for ensuring that the bot operates smoothly and can handle exceptions or errors without crashing.

- **Functionality**:
    - The module tracks any errors or unexpected behavior that may arise during the execution of the bot. For example, issues like missing subscription data or failure to scrape the website properly.
    - It logs detailed information about the error, including the error message, timestamp, and the step where the error occurred. This helps in troubleshooting and improving the bot's performance.
- **Key UiPath Activities Used**:
    - **Try-Catch**: Used to capture errors and implement fallback solutions.
    - **Log Message**: Logs error messages and exceptions for future analysis.
    - **Message Box**: Displays an error message to the user in case of critical issues during execution.

7. Scheduling and Monitoring Module

The final module is responsible for ensuring that the Subscription Tracking Bot runs as scheduled and performs periodic checks to ensure everything is functioning as expected.

- **Functionality**:
    - The bot is scheduled to run daily using **UiPath Orchestrator**, which helps automate and monitor the execution of the bot. The Orchestrator manages the scheduling, retries, and execution logs.
    - It ensures that the bot runs daily, checking for subscription renewals, scraping data from the e-commerce platform, sending notifications, and generating reports.
- **Key UiPath Activities Used**:
    - **Orchestrator Triggers**: Used for scheduling and automating bot execution.
    - **Queue Management**: Used for monitoring ongoing tasks and handling errors.

5.Conclusion

The Subscription Tracking Bot project demonstrates a highly efficient and automated solution for managing and monitoring subscriptions, web scraping, and generating reports, all while reducing the manual effort involved in tracking renewal dates and subscription statuses. Through its modular design, the bot integrates various functionalities such as subscription management, web scraping, email notifications, report generation, and error handling, ensuring that all tasks are performed in a streamlined and organized manner.

The system provides significant benefits to organizations, offering an automated process for subscription management, which results in time savings, reduced errors, and improved communication with subscribers. With the ability to scrape data from e-commerce websites and generate insightful reports, the bot also provides valuable data for business analysis, helping stakeholders make informed decisions.

By leveraging UiPath's capabilities, the bot operates efficiently and effectively, automating repetitive tasks, eliminating the risk of human error, and ensuring seamless data flow across different modules. Furthermore, the bot is designed to be scalable, making it adaptable to a variety of business environments and capable of handling an increasing number of subscriptions and data sources.

Ultimately, this project lays a solid foundation for further enhancements, such as integrating additional data sources, optimizing workflows, or incorporating advanced analytics. The successful implementation of the Subscription Tracking Bot illustrates the power of automation in improving business operations and highlights the potential of RPA technology in transforming how organizations manage their subscription services.

5.1 GENERAL

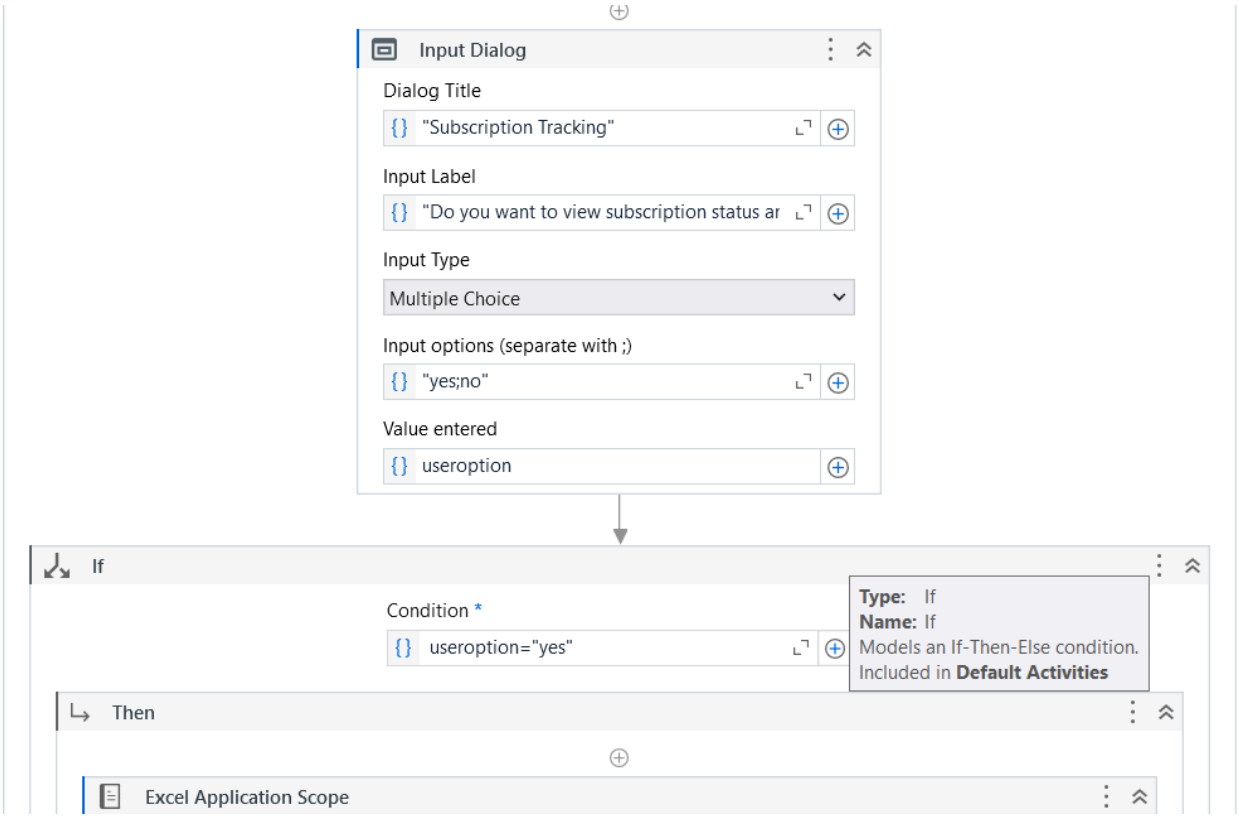
The Subscription Tracking Bot project represents a significant step toward automating the subscription management process within organizations, making it more efficient, accurate, and time-saving. By leveraging UiPath Studio's powerful capabilities, the system provides a seamless integration between subscription tracking, web scraping, and report generation. The bot's ability to automatically check subscription renewal dates, send reminders to subscribers, and scrape relevant data from websites for reporting purposes, helps reduce human intervention and the risk of error, while increasing the overall efficiency of the workflow.

Through this system, businesses can streamline the process of managing subscriptions, ensuring that no renewal deadlines are missed, and providing timely notifications to subscribers. Additionally, the web scraping functionality offers valuable insights into product performance, creating actionable data for further business analysis.

This automation tool also holds the potential for scalability, making it adaptable to businesses of various sizes, with the flexibility to handle increased subscription volumes and data sources. Moreover, it lays the groundwork for incorporating further advanced features, such as predictive analytics for subscription trends, or integrations with other business management tools.

In conclusion, the Subscription Tracking Bot demonstrates the transformative potential of robotic process automation (RPA) in improving business processes, delivering not only operational efficiency but also higher accuracy, cost-effectiveness, and better customer experience.

APPENDICES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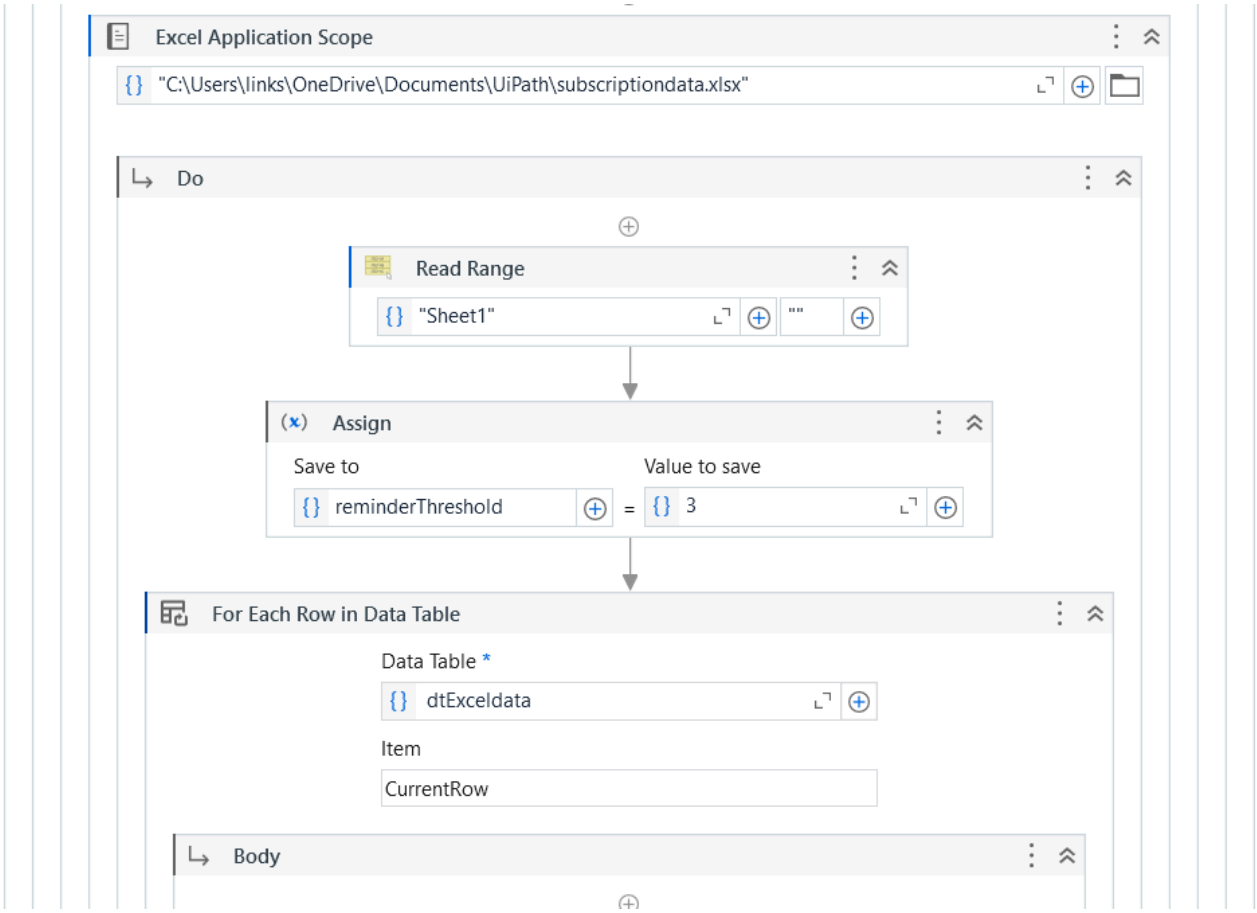
Excel Application Scope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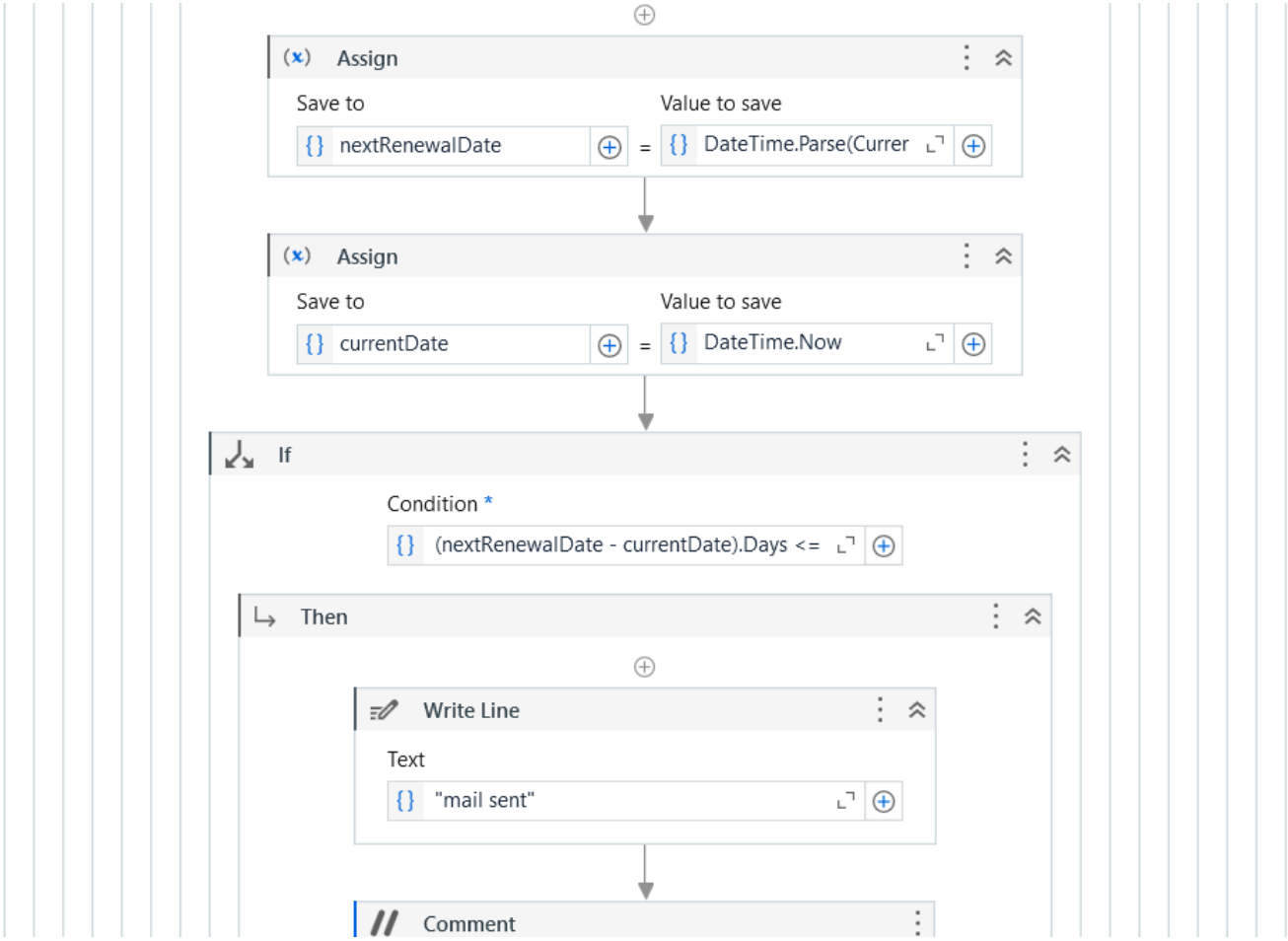
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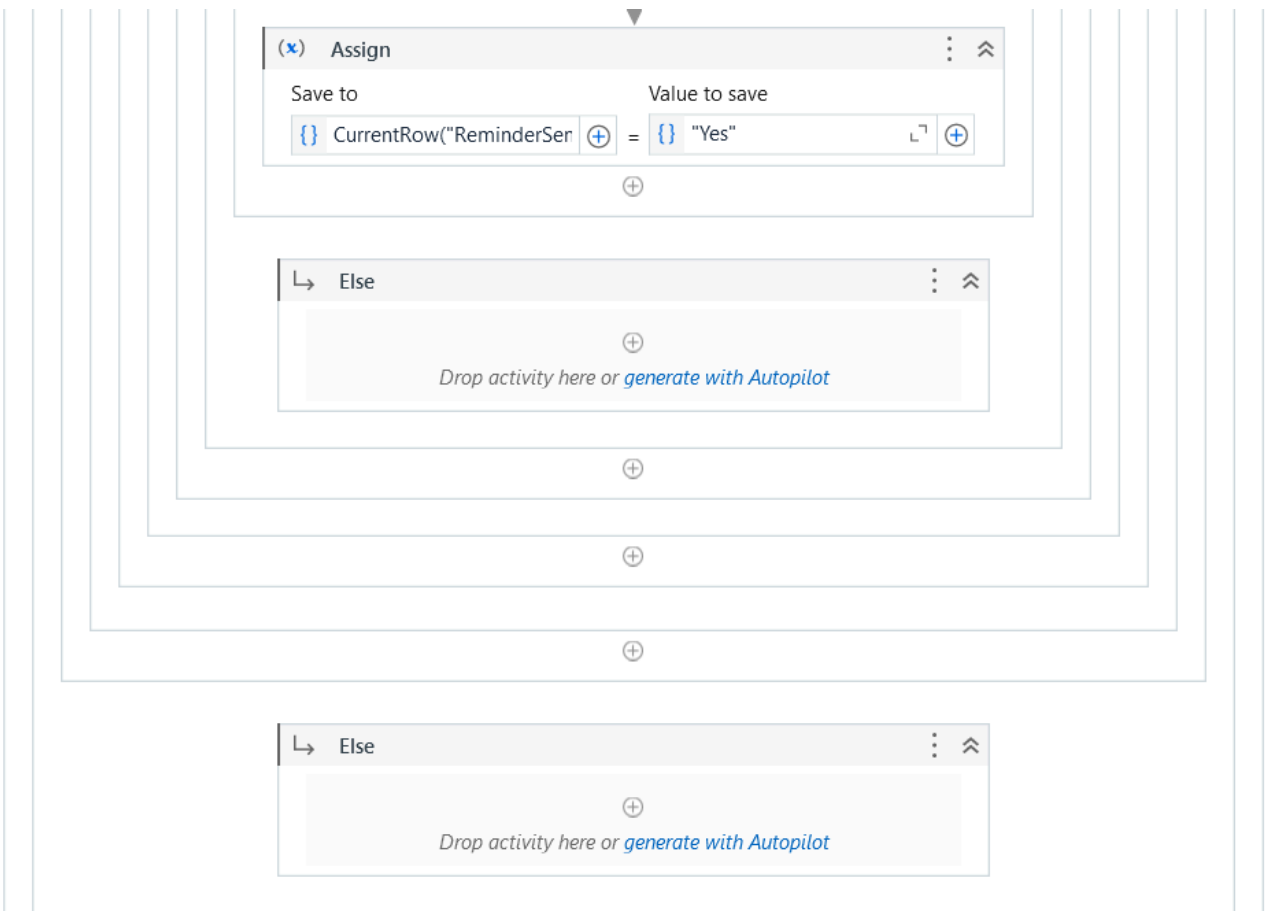

References

1. UiPath Documentation. (2024). *UiPath Studio: Overview and Best Practices*. Retrieved from https://docs.uipath.com/studio

2. Ari Ponnammal, S. & Natarajan, S. (1994). 'Transport Phenomena of Sm Sel – X Asx', *Pramana – Journal of Physics*, Vol.42, No.1, pp.421-425.

3. Barnard, R.W. & Kellogg, C. (1980). 'Applications of Convolution Operators to Problems in Univalent Function Theory', *Michigan Mach. J.*, Vol.27, pp.81–94.
4. Shin, K.G. & McKay, N.D. (1984). 'Open Loop Minimum Time Control of Mechanical Manipulations and its Applications', *Proc. Amer. Contr. Conf.*, San Diego, CA, pp. 1231-1236.

5. Kress, R., & Martin, J. (2023). *Robotic Process Automation for Subscription Management: A Practical Guide*. Springer.

6. Choudhury, S., & Khan, A. (2021). 'Web Scraping and Data Automation in E-commerce Industry', *International Journal of Computer Applications*, Vol. 176, No. 6, pp. 15-19.

7. Patel, A., & Gupta, R. (2022). 'Improving Subscription Management with Automation Tools', *Journal of Business Technology and Management*, Vol. 29, pp. 101-107.

8. Vasquez, D. (2023). *Implementing Robotic Process Automation in the Digital Transformation of Businesses*. Wiley.

9. Zhang, L. & Lee, T. (2020). 'An Overview of Web Scraping Techniques and Their Applications', *International Journal of Data Science*, Vol. 18, No. 2, pp. 34-42.

10. UiPath Academy. (2024). *UiPath Orchestrator: Managing Automation at Scale*. Retrieved from https://academy.uipath.com