LIBRARY MANAGEMENT BOT

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report **"LIBRARY MANAGEMENT BOT "** is the Bonafede work of **"GUHANRAJ.P (220701078)"** who carried out the project work for the subject OAI1903-Introduction to Robotic Process Automation under my supervision.

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GUHANRAJ.P (220701078)

ABSTRACT

The modern era demands efficient automation solutions to streamline repetitive and manual processes, especially in resource-intensive sectors such as library management. This project focuses on the development and implementation of an automated system using UiPath Robotic Process Automation (RPA) to manage library membership and book searching. The RPA process begins with the registration of new library members. Using interactive input dialogs, the system captures essential member information, including name, phone number, address, and email. To ensure the authenticity of user-provided data, the system integrates OTP-based verification for both phone numbers and email addresses. Once validated, the member data is securely stored in an Excel database, and a confirmation email is sent to welcome the new member.

Another key functionality of this project is book search automation. Users can input the name of the desired book, and the system will cross-reference the input with a preloaded inventory stored in an Excel file. If the book is available, the system retrieves its precise location (cupboard, row, and position) and emails the details to the user. The workflow also includes robust error-handling mechanisms to manage invalid inputs or missing data, ensuring seamless execution at every stage. Technologies used include UiPath's Input Dialog, Excel Application Scope, Read Range, For Each Row, and Send SMTP Mail Message activities. Key challenges, such as secure handling of user data and integration with email servers, have been addressed effectively within the workflow.

This project serves as a robust solution for automating library membership and inventory management, reducing administrative burden, and providing users with a faster and more reliable service. The approach can be extended to other domains, offering a scalable and secure automation framework.

LIST OF TABLES

Field Name	Data Type	Description
BookList.xlsx	xlsx	The "BookList.xlsx" contains the Name of Books available in Library.
Library Members	xlsx	The "LibraryMembers.xlsx" Contains the empty sheet with heading value as "NAME , PHONE , ADDRESS , EMAIL , BOOKNAME ".

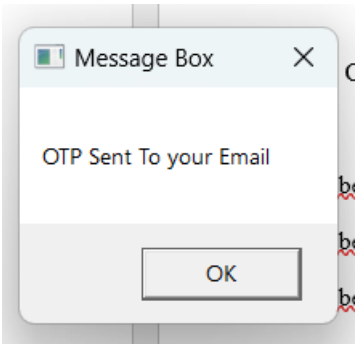
DESCRIPTION:

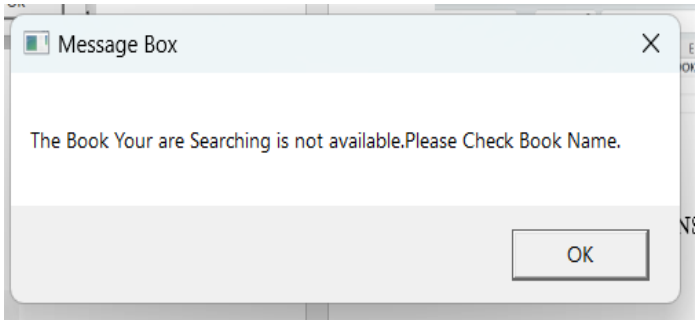
- Represents the data and contains details about the books available in the library. Initially a value of 500 Books are given as sample. Used to search for a book based on user input.
- Represents and storage of input data into LibraryMembers.xlsx file. Contains information about registered library members helping recruiters prioritize candidates effectively.

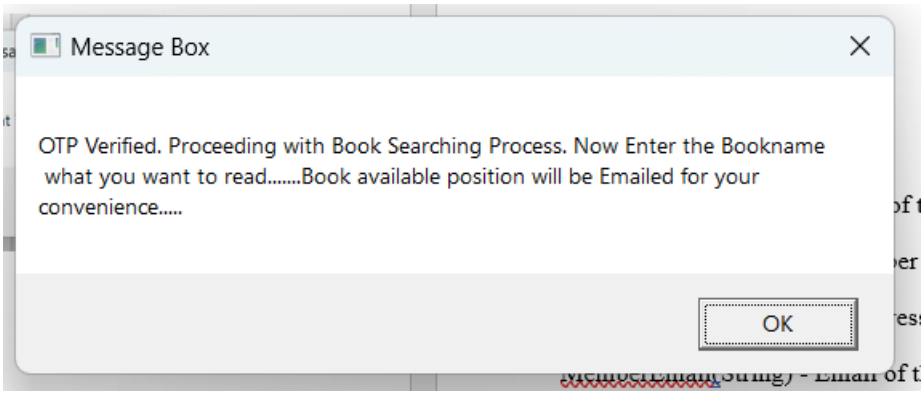
LIST OF FIGURES:

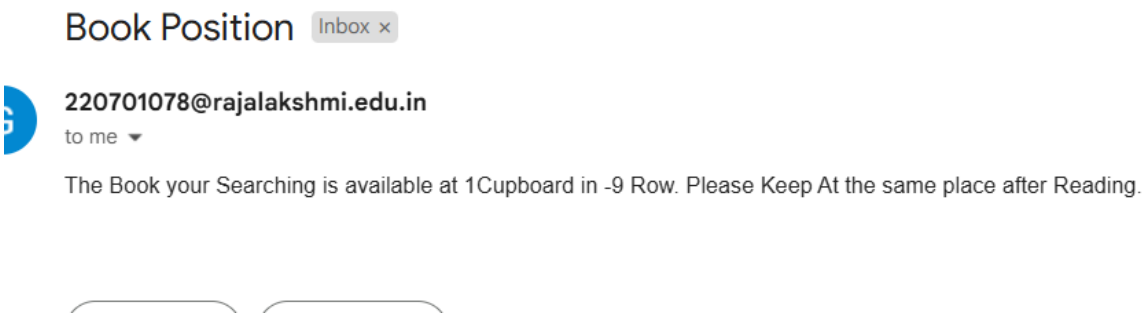
1.Process:

Enter the inputs……..

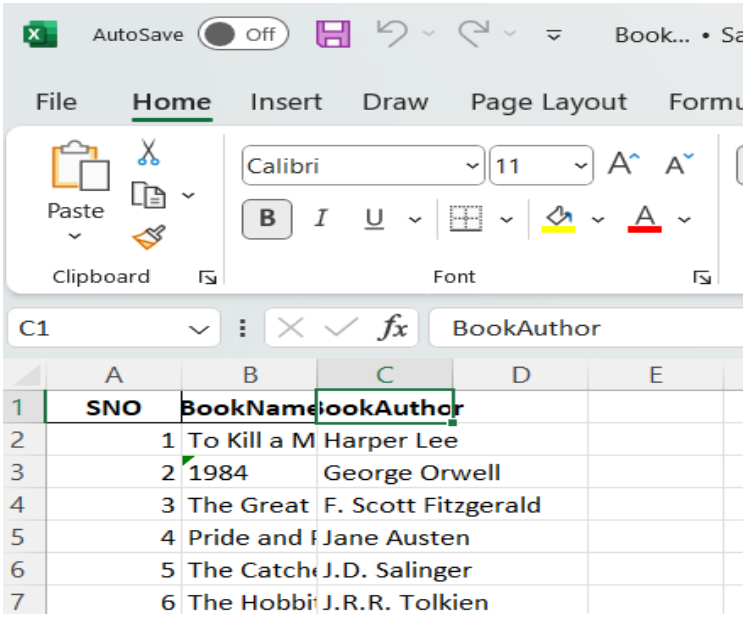




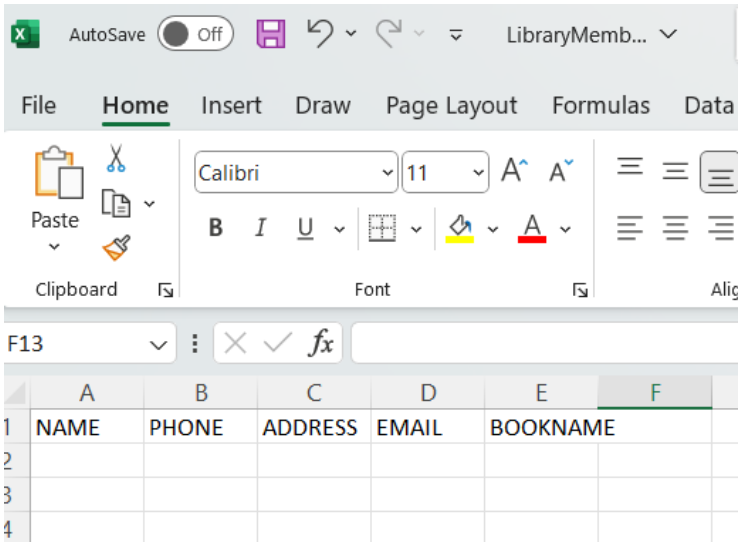




2. Books available in library.



3. Storage of Input Details



INTRODUCTION

The advancements in automation and artificial intelligence have transformed the way repetitive and time-consuming tasks are managed in organizations. Libraries, as knowledge hubs, often face challenges in managing memberships and inventory effectively. This project aims to streamline these operations using UiPath Robotic Process Automation (RPA). By automating tasks such as member registration, OTP-based verification, and book search, the project enhances efficiency, minimizes errors, and provides users with a seamless experience.

1.GENERAL

Manual management of library memberships and book inventories can lead to inefficiencies, such as errors in data entry, delays in service, and difficulty in tracking resources. Automating these tasks can significantly reduce administrative burden and improve user satisfaction. RPA tools, like UiPath, offer robust capabilities for automating workflows by mimicking human actions, interacting with applications, and performing rule-based tasks.

This project leverages UiPath's automation capabilities to manage two core library operations:

1. Membership Management: Automated registration, OTP-based verification, and data storage in a structured format.

2. Book Inventory Management: Quick retrieval of book location details based on user queries.

2.OBJECTIVE

The primary objective of this project is to automate key operations in library management to enhance operational efficiency, reduce manual workload, and

improve user experience. The specific objectives include simplifying the registration process for new library members by automating data collection and verification through OTP. Provide users with instant information about the location of books in the library based on their requests. Ensuring secure and efficient storage of member and inventory data in Excel files for easy access and updates. Reducing errors and improving the speed of operations by eliminating manual intervention.

3.EXISTING SYSTEM

The existing library management system relies heavily on manual processes, which include:

1. Membership Registration: Manual collection of user information, which is prone to errors and delays.

2. Book Search: Users or librarians manually search through records to find the location of books, consuming significant time.

3. Data Management: Information about members and books is often stored in unstructured formats, leading to difficulty in retrieval and reporting.

Challenges in the existing system:

- High dependency on human effort.

- Time-consuming and inefficient processes.

- Risk of data entry errors and loss of records.

4.PROPOSED SOLUTION

* Collection of user details via input dialogs.

* OTP-based verification for email and phone number to ensure data authenticity.

* Secure storage of member information in an Excel file.

Book Search Automation:

* Users can input the book name, and the system retrieves its location from the inventory database.

* Sends an email with the book location details for convenience.

Enhanced Data Security and Accessibility:

*Member and inventory data is stored systematically in Excel sheets for easy access and updates.

User Notifications:

* Automatic emails to welcome new members and provide book location details.

Benefits:

Improved efficiency and reduced time for operations.

Enhanced accuracy and security of data.

Better user experience through quick and reliable services.

LITERATURE REVIEW:

The integration of automation in library management has been extensively studied in recent years, focusing on enhancing efficiency and user satisfaction. Traditional library systems have long struggled with challenges related to manual processes, data management, and scalability. Robotic Process Automation (RPA), as a technology, has demonstrated significant potential in addressing these challenges by automating repetitive and rule-based tasks. The literature surrounding automated library systems emphasizes three key areas: membership management, book inventory handling, and user communication. Each of these areas presents unique opportunities for leveraging RPA tools like UiPath to transform library operations.

GENERAL

1. Automation in Library Management:

Studies highlight the need to replace manual processes with automated solutions to reduce human error and improve operational efficiency. By automating membership registration, book searching, and notifications, libraries can focus more on core activities like community engagement and knowledge dissemination.

2. Data Accuracy and Security:

Effective data management is critical in library systems. Automation ensures that member and book data is consistently stored, retrieved, and updated securely. Literature stresses the importance of structured data formats (e.g., Excel or databases) to maintain data integrity and accessibility.

3. User Experience and Accessibility:

Enhancing user experience is a primary focus. Automated systems

provide users with instant access to book information, membership confirmation, and notifications, thereby improving their overall satisfaction.

4. Technology Adoption in Libraries:

The adoption of RPA tools in libraries is often constrained by factors like initial cost, technical expertise, and integration with existing systems. Research highlights strategies to overcome these barriers, including modular implementations and training programs.

SYSTEM ARCHITECTURE

The system consists of the following components:

1. Input Layer:

   User Inputs: Inputs collected via dialog boxes for member registration (name, phone, address, email) and book search (book name)

   - BookList.xlsx: Stores the inventory of books, including book names, authors, and location details.
   - LibraryMembers.xlsx: Stores member data such as name, phone, email, and associated book details.

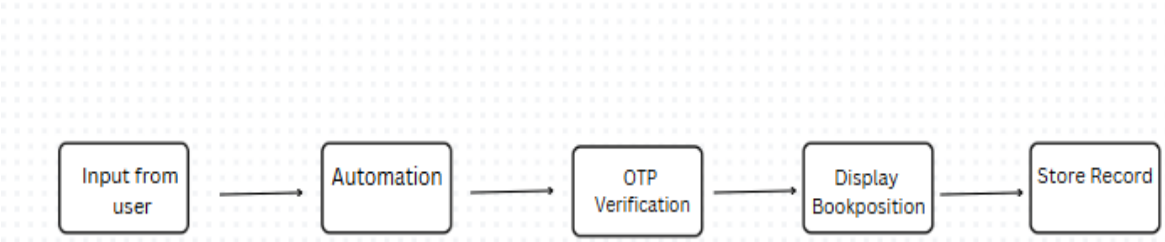
2. Processing Layer:

   - Membership Registration Workflow: Collects and verifies user data through OTP, stores validated information in the members' database, and sends a welcome email.
   - Book Search Workflow: Searches for the requested book in the inventory database and retrieves its location details.

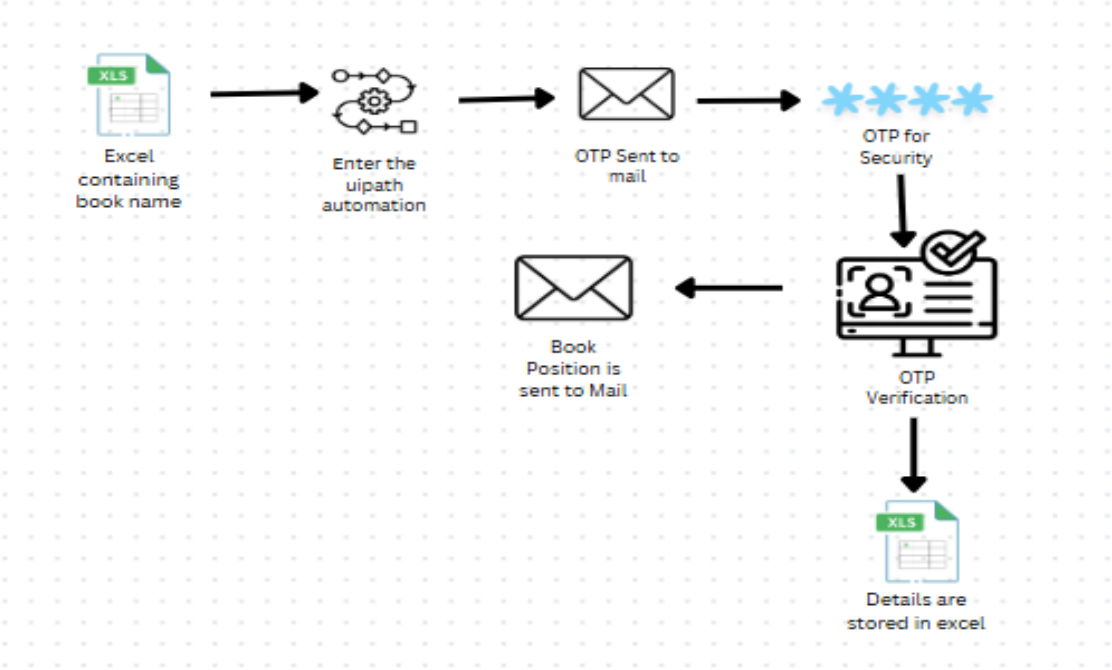
3. Output Layer:

   Sends notifications (e.g., OTPs, welcome emails, book location details) via email using Send SMTP Mail Message.Updates Excel sheets with new member registrations and book status changes.

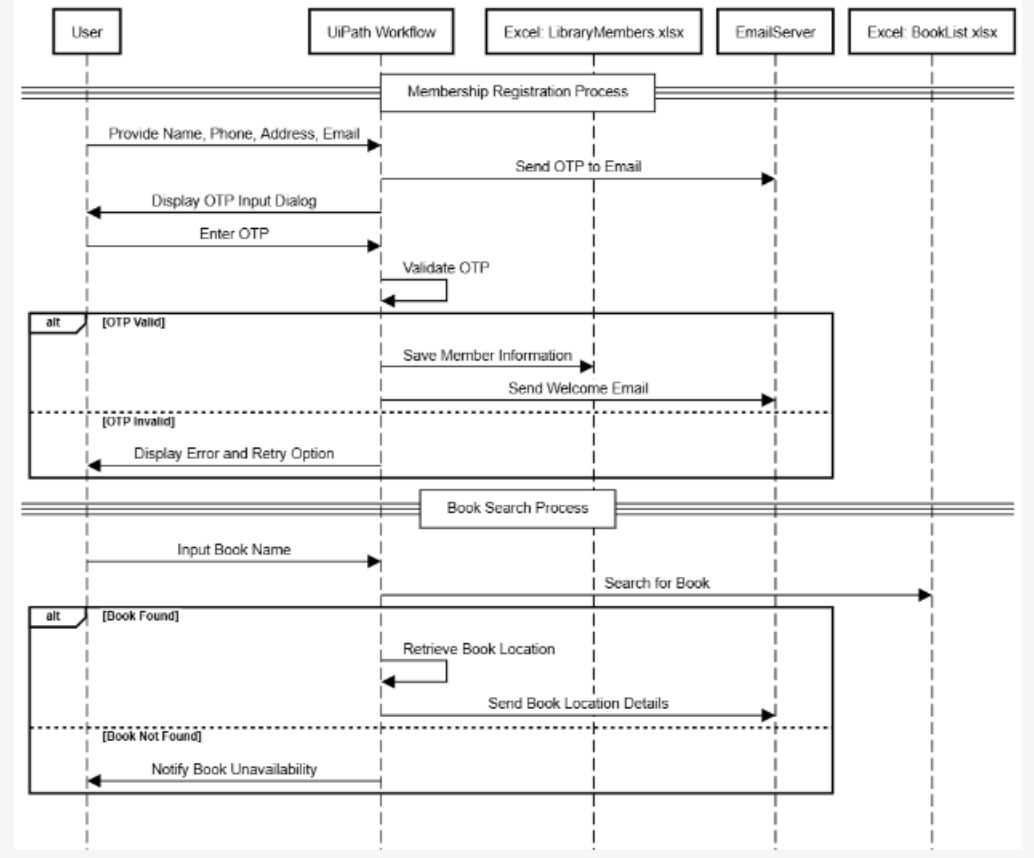
SYSTEM FLOW DIAGRAM:



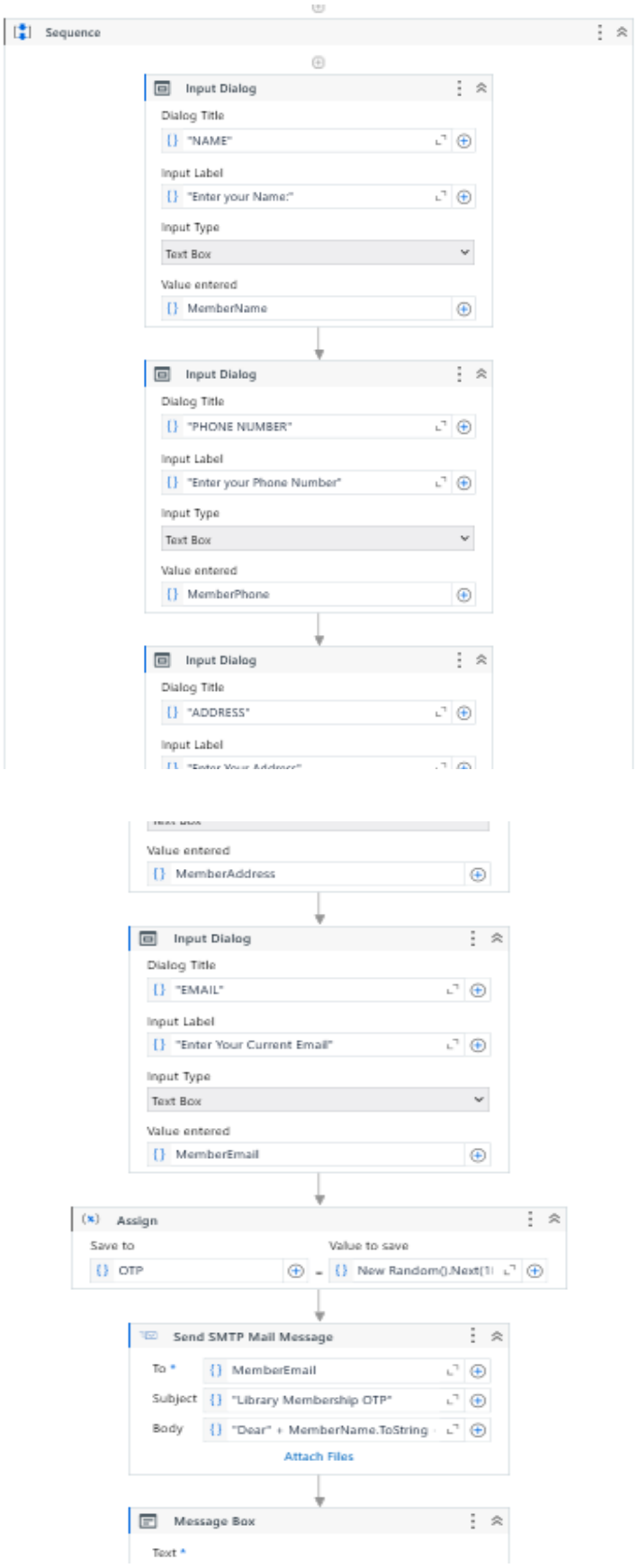
ARCHITECTURE DIAGRAM:



SEQUENCE DIAGRAM:



WORKFLOW:


Sequence
Input Dialog
Dialog Title
"NAME"
Input Label
"Enter your Name:"
Input Type
Text Box
Value entered
MemberName
Input Dialog
Dialog Title
"PHONE NUMBER"
Input Label
"Enter your Phone Number"
Input Type
Text Box
Value entered
MemberPhone
Input Dialog
Dialog Title
"ADDRESS"
Input Label
Value entered
MemberAddress
Input Dialog
Dialog Title
"EMAIL"
Input Label
"Enter Your Current Email"
Input Type
Text Box
Value entered
MemberEmail
Assign
Save to
OTP
Value to save
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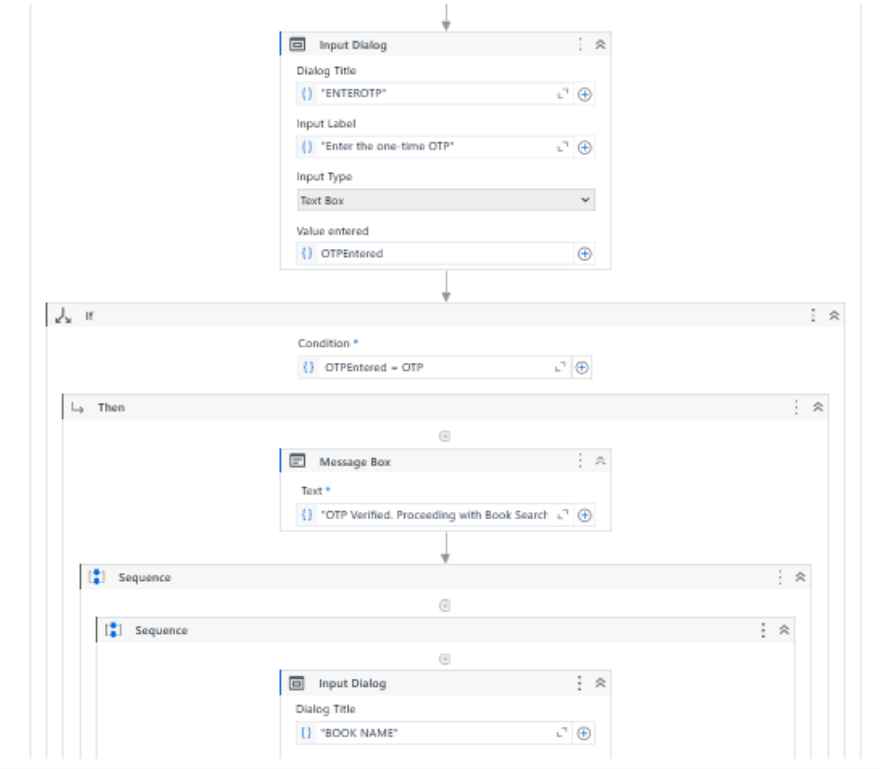
MemberEmail
Subject
"Library Membership OTP"
Body
"Dear" + MemberName.ToString
Attach Files
Message Box
Text *


Input Dialog
Dialog Title
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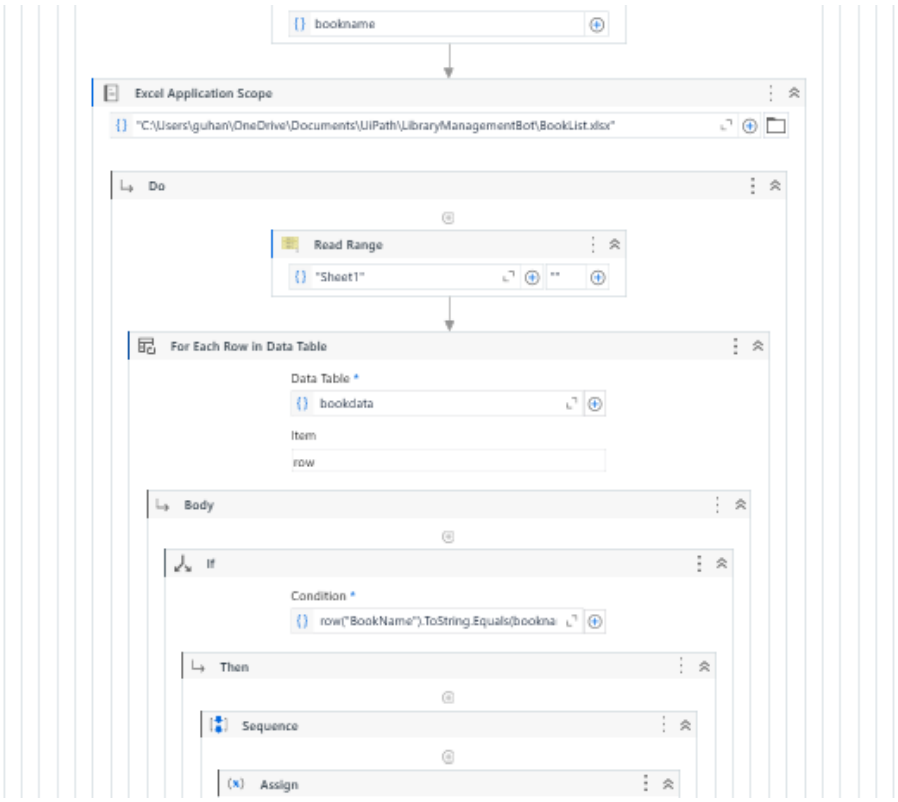
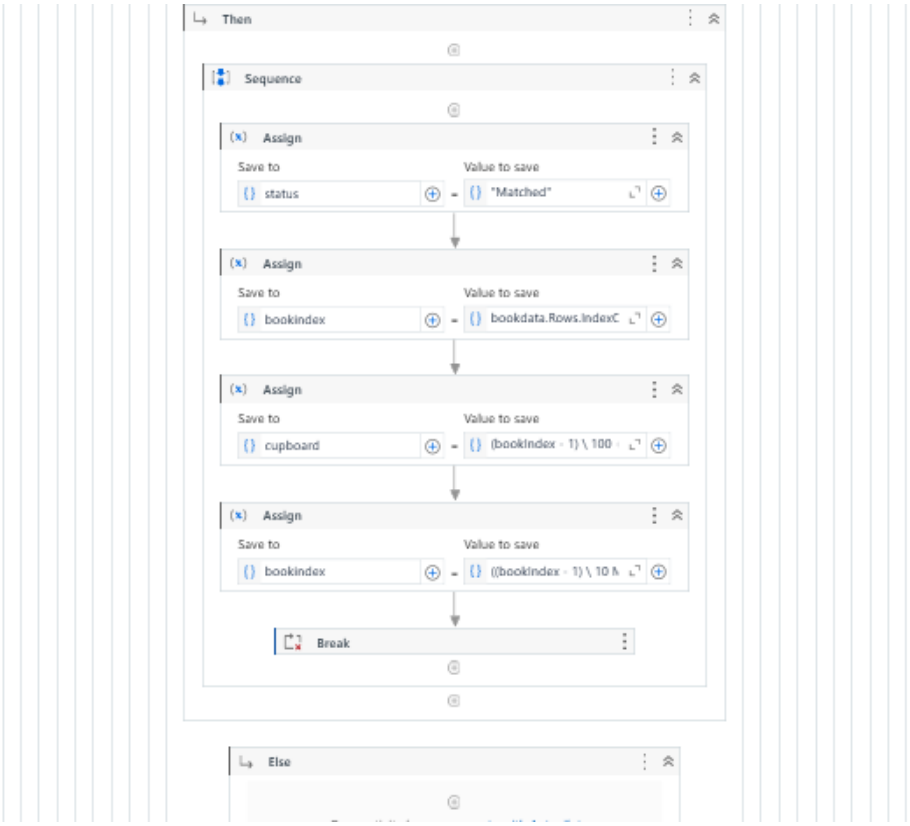
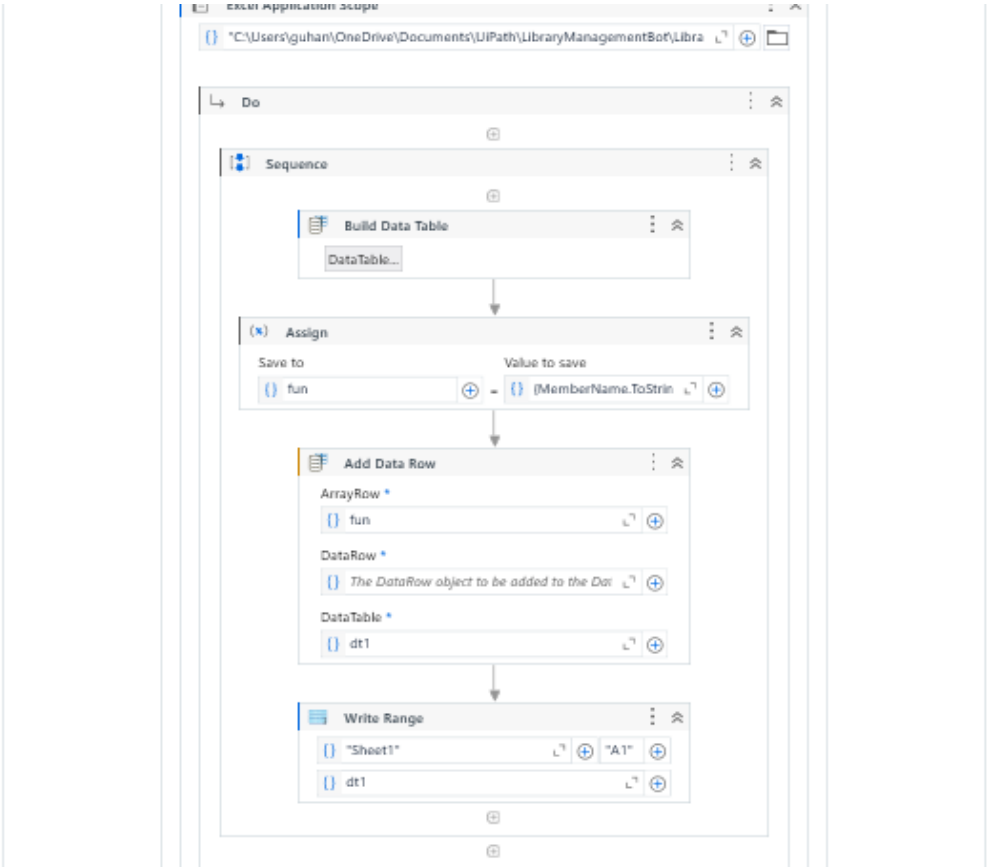
Input Label
"Enter the one-time OTP"
Input Type
Text Box
Value entered
OTPEntered
If
Condition *
OTPEntered = OTP
Then
Message Box
Text *
"OTP Verified. Proceeding with Book Search
Sequence
Sequence
Input Dialog
Dialog Title
"BOOK NAME"


bookname
Excel Application Scope
"C:\Users\guhan\OneDrive\Documents\UiPath\LibraryManagementBot\BookList.xlsx"
Do
Read Range
"Sheet1"
""
For Each Row in Data Table
Data Table *
bookdata
Item
row
Body
If
Condition *
row("BookName").ToString.Equals(bookna
Then
Sequence
Assign


Then
Sequence
Assign
Save to
Value to save
status
"Matched"
Assign
Save to
Value to save
bookindex
bookdata.Rows.IndexC
Assign
Save to
Value to save
cupboard
(bookIndex - 1) \ 100
Assign
Save to
Value to save
bookindex
((bookIndex - 1) \ 10 M
Break
Else


"C:\Users\guhan\OneDrive\Documents\UiPath\LibraryManagementBot\Libra
Do
Sequence
Build Data Table
DataTable...
Assign
Save to
Value to save
fun
(MemberName.ToStrin
Add Data Row
ArrayRow *
fun
DataRow *
The DataRow object to be added to the Dat
DataTable *
dt1
Write Range
"Sheet1"
"A1"
dt1

PROJECT DESCRIPTION

METHODOLOGIES

1. Membership Management

Registration Automation: Studies demonstrate how RPA can streamline member registration by automating data collection and verification processes. OTP-Based Verification: Research underscores the importance of secure user verification to prevent fraudulent entries and ensure data authenticity.

2. Book Inventory Management

Automated Search Systems: Literature explores the implementation of automated search features, where users can retrieve book locations instantly based on their input. Inventory Tracking: Automating book status updates (borrowed/returned) has been highlighted as a way to improve inventory accuracy.

3.Integration of Communication Tools

Email Notifications: Research emphasizes the importance of automated communication for enhancing user engagement, such as sending welcome emails or notifying users about book availability. Incorporating RPA to automate user feedback collection and analysis is identified as a future enhancement for library systems.

4. Scalability and Efficiency

Studies reveal that automated systems can be scaled easily to accommodate growing libraries, making them suitable for both small and large institutions. Literature also discusses how automation minimizes human intervention, leading to reduced operational costs.

CONCLUSION

The Library Management Bot developed using UiPath successfully automates the process of locating books within a library system. By leveraging UiPath's capabilities, the bot reads an input Excel file containing book details and categorizes books into different cupboards based on their serial number. This reduces the time required to find a specific book and improves the efficiency of library management. The bot's user interaction module allows users to easily search for books by name, returning the cupboard and row location where the book is stored. Future enhancements could include integrating a database to handle dynamic updates and expanding the bot's functionality to manage book checkouts and returns.

REFERANCES

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- UiPath Forum Discussions on Excel Automation. Retrieved from https://forum.uipath.com

3. RPA Best Practices:

- Best Practices for Building UiPath Bots. Retrieved from https://docs.uipath.com/studio/docs/best-practices

APPENDICES

Appendix A: Project Structure

1. Main.xaml - The primary workflow file that handles the overall automation process.

2. Input Folder:

- BookList.xlsx: Excel file containing columns like Serial Number, Book Name, Genre, Author Name, and Description.

3. Output Folder:

- Stores logs or results generated during bot execution.

4. Config File - Contains settings such as Excel file paths and the number of books per cupboard.