REVIEW-WISE

AN AI-POWERED REVIEW SENTIMENT ANALYZER

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this Project Report "**REVIEW-WISE: AN AI POWERED REVIEW SENTIMENT ANALYZER"** is the Bonafide work of **"DEEPIGA DHARSHINI C (220701057)"** who carried out the project work for the subject OAI1903-Introduction to Robotic Process Automation under my supervision.

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Internal Examiner **External Examiner**

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ABSTRACT

The "Review-wise: An AI-Powered Review Sentiment Analyzer" is a Robotic Process Automation (RPA) solution designed using UiPath Studio and UiPath AI Center. The project aims to streamline and automate the process of analysing product reviews to provide users with actionable insights and recommendations. By integrating advanced automation workflows with AI-driven sentiment analysis, the system extracts, processes, and evaluates customer reviews from e-commerce platforms efficiently and accurately.

The methodology begins with a user input dialog box in UiPath Studio, where the product details are specified. Using browser automation, the system extracts product information, including name, price, rating, and a dataset of 100 reviews. These reviews are appended to an Excel workbook for structured storage. The reviews are then processed through a pre-trained sentiment analysis model in the UiPath AI Center via ML Skill integration, which identifies the sentiment (positive, negative, or neutral) for each review.

The system calculates sentiment counts and derives a Weighted Sentiment Score (WSS) using a weighted formula to quantify the overall sentiment impact. Subsequently, a Recommendation Score (RS) is computed to classify the product into three categories:

- **Recommended** ($RS > 0.4$)
- **Good Product** ($0.2 < RS \leq 0.4$)
- **Not Recommended** ($RS \leq 0.2$)

The final analysis and recommendation results are stored in the Excel workbook, enabling easy data access and visualization. This automation ensures time efficiency, accuracy, and a user-friendly interface for handling large volumes of review data.

"Review-wise" demonstrates the potential of UiPath's RPA capabilities when combined with AI Center's pre-built machine learning models. This project showcases a robust application of RPA in enhancing consumer decision-making, enabling businesses to analyze customer feedback effectively, and offering scalable, automated solutions for sentiment analysis.

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LIST OF AGGREGATION:

Abbreviation	Full Form
ERD	Entity Relationship Diagram
DFD	Data Flow Diagram
RPA	Robotics Process Automation

Chapter 1

INTRODUCTION

1.1 INTRODUCTION

In today's digital age, online reviews play a pivotal role in determining a product's success. However, manually analysing a product's reviews to make purchasing decisions can be time-consuming and subjective. This is where "Review-wise: An AI-Powered Review Sentiment Analyzer" comes into play. Review-wise leverages Robotic Process Automation (RPA) using UiPath and AI to streamline the process of gathering, analysing, and evaluating product reviews. By automating the review collection and applying sentiment analysis, it offers a robust mechanism for recommending products based on an objective evaluation of customer sentiment. This ensures smarter and more informed buying decisions for consumers.

1.2 GENERAL

Review-wise is an end-to-end automated solution developed using UiPath that simplifies product review analysis. It combines web data extraction, sentiment analysis, and computational methods to generate meaningful insights. The workflow involves gathering user inputs, navigating online platforms to fetch product details, extracting reviews, and performing sentiment analysis to classify reviews as positive, negative, or neutral. Additionally, the tool quantifies customer sentiment using Weighted Sentiment Scores (WSS) and generates a Recommendation Score (RS). The results, along with all the processed data, are neatly organized in an Excel workbook for further reference, making it user-friendly and accessible for consumers and businesses alike.

1.2 OBJECTIVE

The primary objective of Review-wise is to provide an unbiased, automated analysis of product reviews to assist consumers in making well-informed purchasing decisions. Key goals include:

1. **Automating Review Analysis:** Eliminate the manual effort required to analyze product reviews by automating the extraction and sentiment evaluation process.

2. **Enhancing Decision-Making:** Offer a clear, data-driven recommendation system that classifies products into three categories—Recommended, Good, and Not Recommended.
3. **Providing Actionable Insights:** Generate detailed reports that summarize customer sentiment, making it easier for users to understand public opinion about a product.
4. **Simplifying Data Storage:** Consolidate the analysis into an Excel file for ease of access and future reference.
5. **Establishing Consistency:** Use consistent mathematical formulas, such as WSS and RS, to ensure accurate and objective product evaluation.

1.3 EXISTING SYSTEM

In the existing scenario, analysing online reviews involves significant manual effort and subjectivity. Users must manually read and interpret hundreds of reviews, which is tedious and inefficient. The interpretation of reviews can vary based on individual biases, potentially leading to inaccurate conclusions. The current process does not offer a quantitative evaluation of overall customer sentiment, making it difficult to assess the product's popularity objectively.

There is no centralized system for storing and referencing review analysis, leading to scattered information. These limitations emphasize the need for an automated, AI-driven solution like Review-wise to improve efficiency and accuracy.

1.4 PROPOSED SYSTEM

The proposed system, Review-wise, overcomes the limitations of the existing system by leveraging RPA and AI technologies:

1. **Automation of Tasks**: Review-wise uses UiPath to automate the process of data collection, review extraction, and sentiment analysis.
2. **Sentiment Classification**: The system evaluates reviews using sentiment analysis, categorizing them as Positive, Negative, or Neutral. This is further quantified using weights for a more nuanced analysis.

3. **Weighted Sentiment Score (WSS)**: By applying a weighted scoring system, the tool calculates a comprehensive WSS, considering the intensity of sentiments in the reviews.
4. **Recommendation System**: The system calculates the Recommendation Score (RS) and classifies products into categories based on a defined threshold, providing a clear verdict for consumers.
5. **Centralized Reporting**: All results are consolidated into an Excel workbook, ensuring the data is stored systematically for future reference.
6. **User-Friendly Interface**: From input collection to the final output, the system ensures ease of use, making it accessible even for non-technical users.

This automated approach ensures that consumers have a reliable and efficient tool for evaluating products, enabling smarter and quicker decision-making.

Chapter 2

LITERATURE REVIEW

Online reviews have become an integral part of the consumer decision-making process. Studies show that 92% of customers read online reviews before purchasing a product, highlighting the importance of understanding customer sentiment. Despite the growing reliance on reviews, manual analysis of such data remains a challenge due to its volume, complexity, and inherent biases. Advancements in Robotic Process Automation (RPA) have made it feasible to automate repetitive tasks such as web data extraction and report generation, significantly reducing manual effort.

2.1 GENERAL:

Sentiment analysis using pre-trained machine learning packages has revolutionized the way businesses and consumers interpret large volumes of text data. Unlike traditional machine learning models or deep learning frameworks, pre-built models in platforms like UiPath AI Centre simplify the process by offering ready-to-use functionality. These models are designed to process textual data and classify it based on sentiment categories such as positive, negative, or neutral.

UiPath AI Centre provides a streamlined approach to applying machine learning in automation workflows. Its built-in sentiment analysis model is pre-trained on large datasets, enabling it to classify text with high accuracy without requiring additional training. This makes it particularly useful for scenarios where users need quick and reliable results without the complexities of designing and training custom algorithms. Additionally, these models are integrated directly into UiPath Studio, ensuring seamless automation of tasks like extracting reviews from websites, analysing sentiments, and generating reports.

RPA tools like UiPath also add value by automating the repetitive and time-consuming tasks of data extraction and preparation. For instance, the "Table Extraction" activity in UiPath allows users to gather structured data such as product reviews efficiently. By combining this capability with AI Centre's pre-trained models, it becomes possible to perform sentiment analysis on a large scale with minimal manual intervention. This integration ensures that even non-technical users can leverage advanced AI functionalities for practical applications, making it a cornerstone of systems like Review-wise.

Chapter 3

SYSTEM DESIGN

3.1 SYSTEM FLOW DIAGRAM

This flow diagram outlines a process using UiPath Studio to extract product and review data from a user interface, analyse sentiment using AI Centre, save results in Excel, and generate recommendations based on calculated WSS and RS scores.

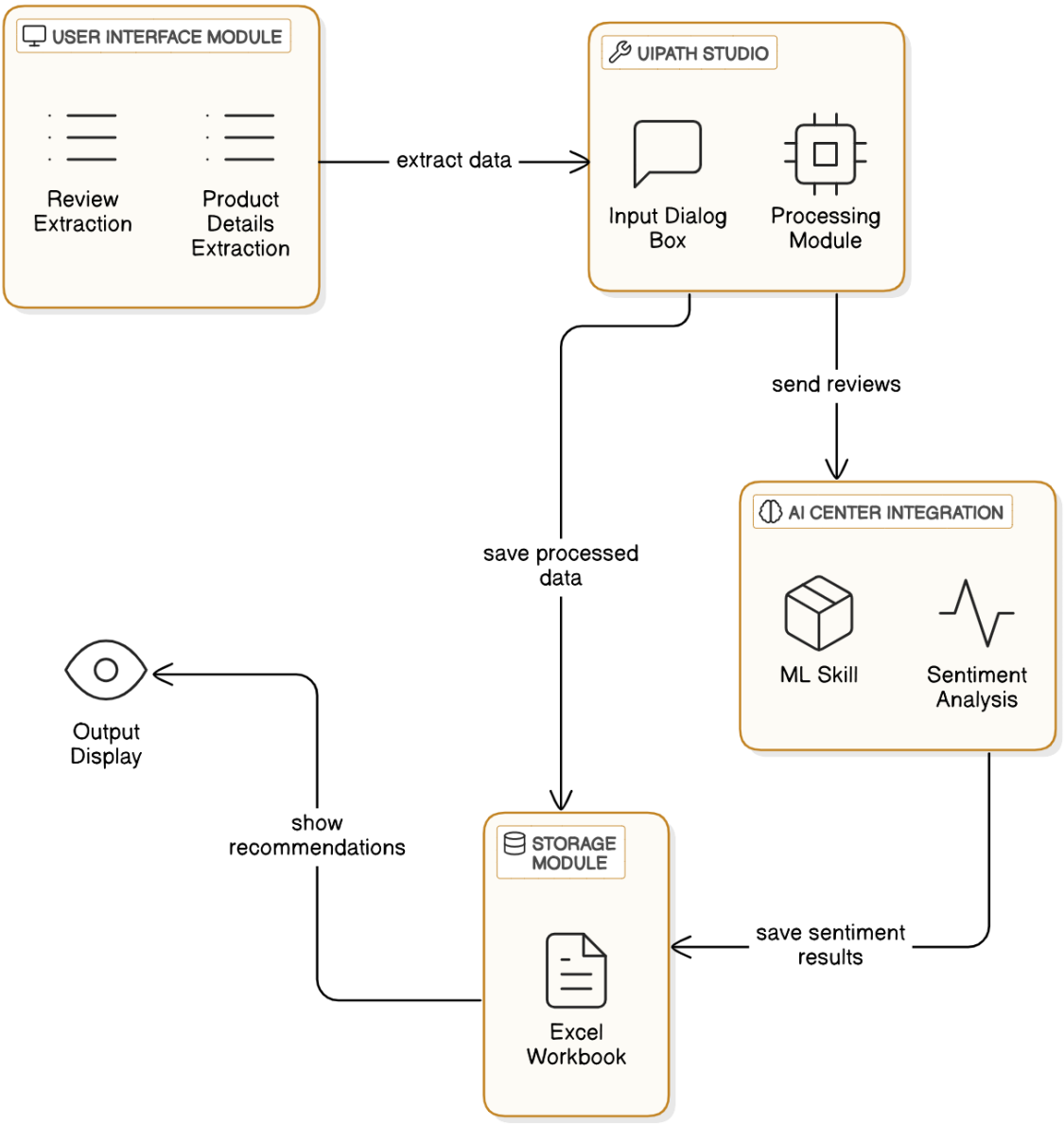


Fig 3.1 System Flow Diagram

3.1.2 ARCHITECTURE DIAGRAM

The architecture diagram showcases the integration of UiPath Studio with AI Center for sentiment analysis and Excel for data storage. It highlights key modules, including input processing, sentiment and score calculations, and result generation. Data flows between the user interface, AI models, and storage to produce actionable insights and recommendations.

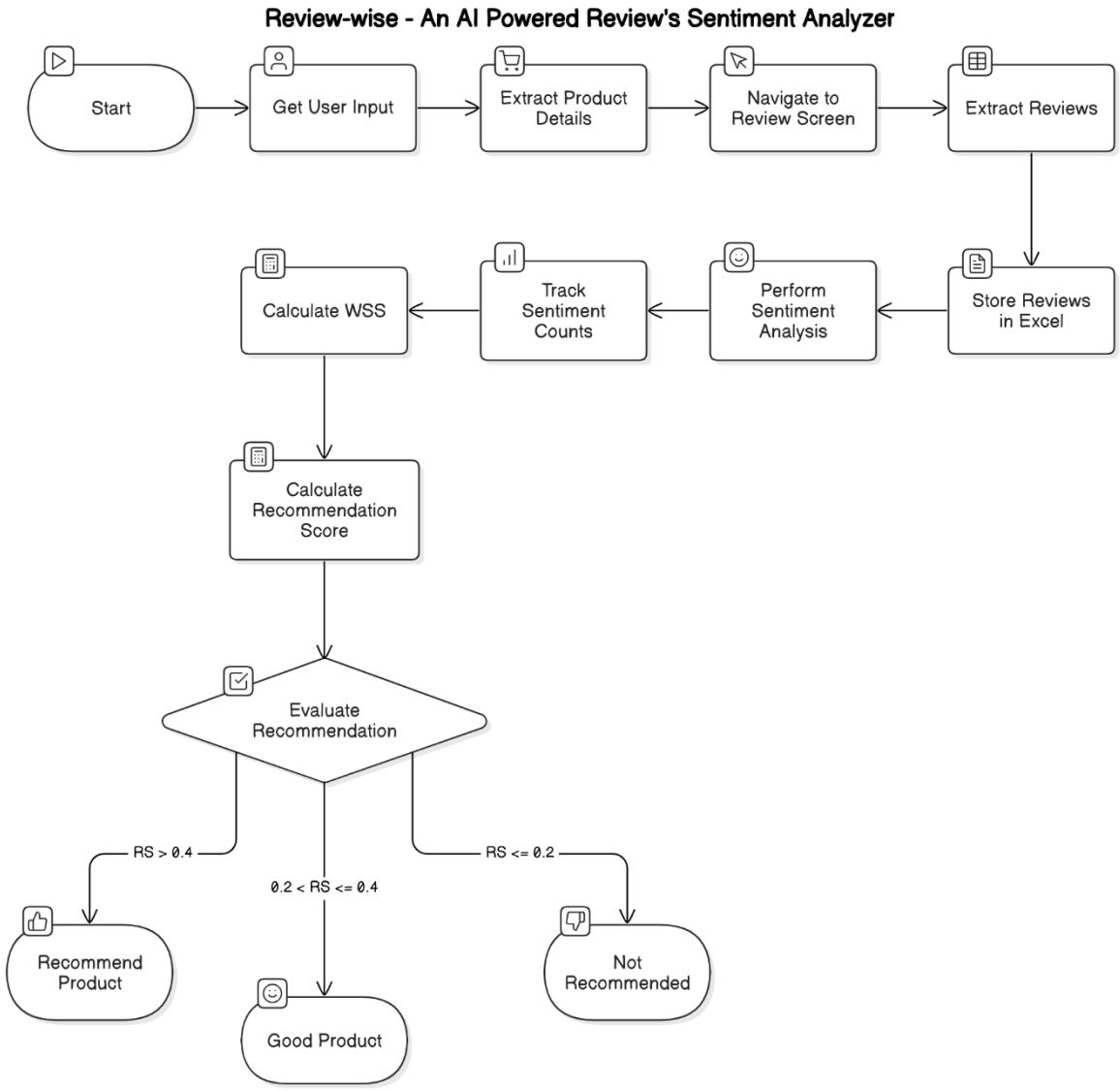


Fig 3.2 Architecture Diagram

3.1.3 SEQUENCE DIAGRAM

The sequence diagram details user interaction through UiPath, which extracts product data and reviews, processes sentiment using AI models, calculates scores, and stores outputs in Excel to classify products as recommended, good, or not recommended.

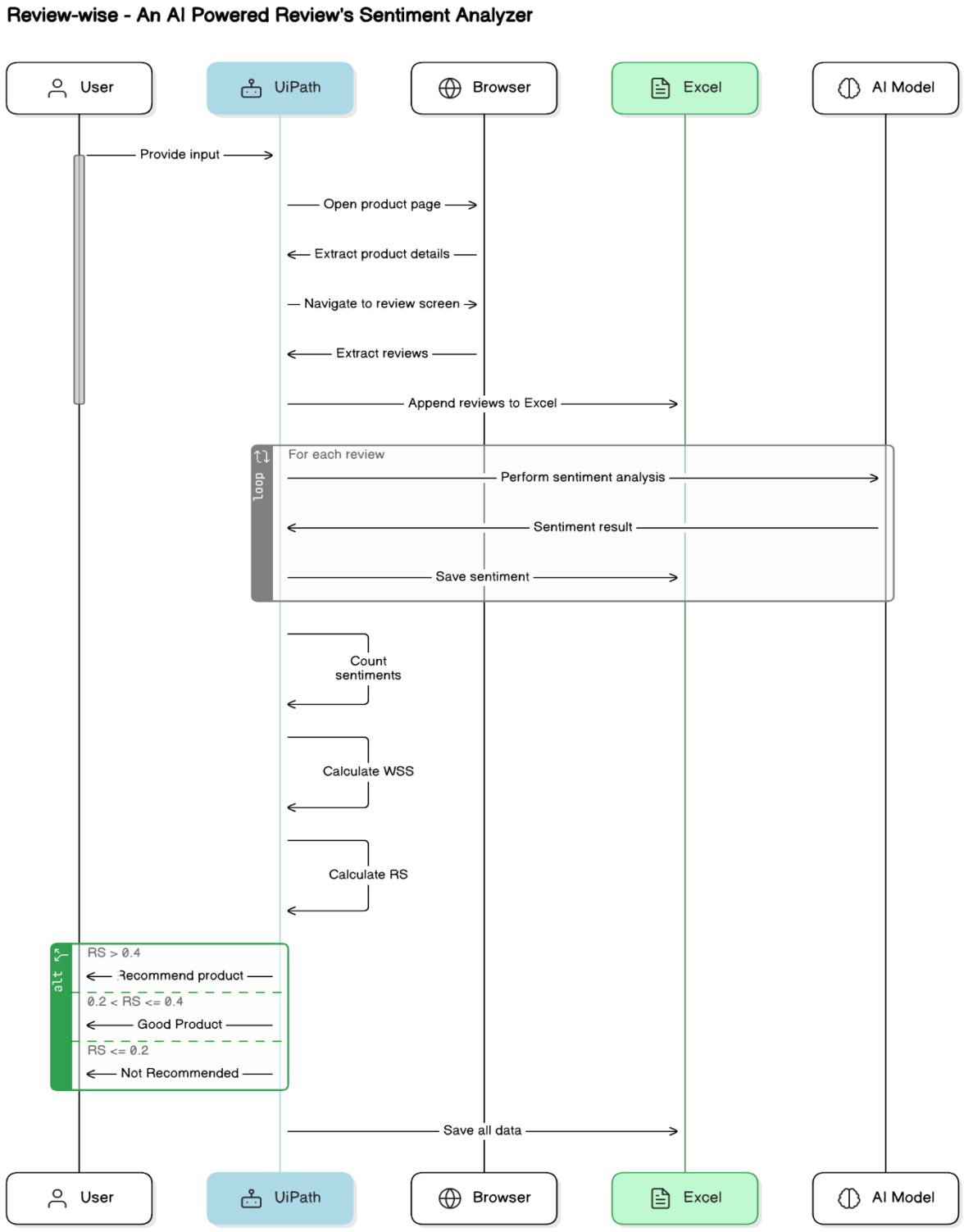


Fig 3.3 Sequence Diagram

Chapter 4

PROJECT DESCRIPTION

4.1 METHODOLOGY

4.1.1. User Input Collection

The process begins with an Input Dialog Box in UiPath Studio, where the user provides the URL of the product they want to analyze. This input serves as the starting point for the automation workflow.

4.1.2. Product Details Extraction

The Application Browser activity in UiPath navigates to the specified URL and extracts details like the product name, price, and rating. This information is stored for later use and included in the final report.

4.1.3. Review Collection

Using Click activities, the automation navigates to the product review section. The Table Extraction activity is then employed to collect up to 100 reviews, which are stored in a Data Table.

4.1.4. Sentiment Analysis

The extracted reviews are passed to UiPath AI Center's sentiment analysis model. The model evaluates each review and assigns a sentiment classification (positive, negative, or neutral), which is appended to the review data in an Excel file.

4.1.5. Sentiment Scoring and Recommendation

Using predefined weights for each sentiment type, a Weighted Sentiment Score (WSS) is calculated. Based on the WSS, a Recommendation Score (RS) is determined, classifying the product into one of three categories: Recommended, Good, or Not Recommended.

4.1.6. Report Generation

The entire dataset, including product details, reviews, sentiments, and scores, is saved in an Excel workbook for easy reference and reporting.

4.2 MODULES

4.2.1. Input and Navigation Module

This module begins the process by taking the product URL from the user through an Input Dialog Box. Using UiPath's Application Browser activity, the automation navigates to the specified URL and retrieves product details such as the name, price, and overall rating. This module ensures accurate and targeted data extraction from the user's chosen product.

4.2.2. Review Extraction Module

The review extraction module uses UiPath's Click and Table Extraction activities to navigate to the review section of the product page and extract up to 100 reviews. The extracted data is structured into a Data Table, ensuring consistency and readability. This module is critical for gathering the raw data needed for sentiment analysis.

4.2.3. Sentiment Analysis Module

This module integrates UiPath AI Centre's built-in sentiment analysis model to classify reviews. Each review is analysed, and its sentiment (positive, negative, or neutral) is determined. The results are appended to the corresponding review in an Excel workbook, providing a comprehensive sentiment mapping.

4.2.4. Scoring and Recommendation Module

In this module, a Weighted Sentiment Score (WSS) is calculated based on predefined weights assigned to each sentiment type. Using the WSS, a Recommendation Score (RS) is computed, which classifies the product into one of three categories: Recommended, Good, or Not Recommended. This module forms the core decision-making functionality of the project.

4.2.5. Report Generation Module

The final module compiles all extracted and processed data into an Excel workbook. This includes product details, reviews, sentiments, and scores, ensuring a clear and organized presentation of insights. This report provides users with actionable information in a user-friendly format.

Chapter 5

OUTPUT SCREENSHOT

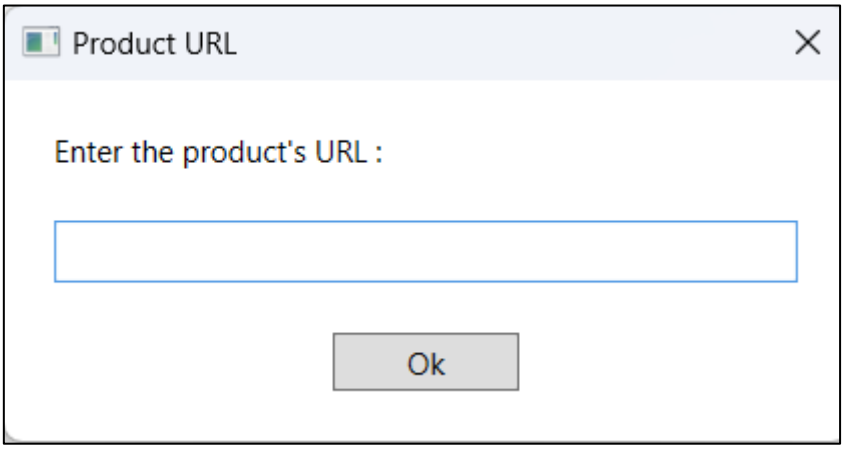


Fig 5.1 Input Dialog Box

A dialog box in UiPath prompts the user to input a product URL, enabling the automation to navigate to the product's page for data extraction.

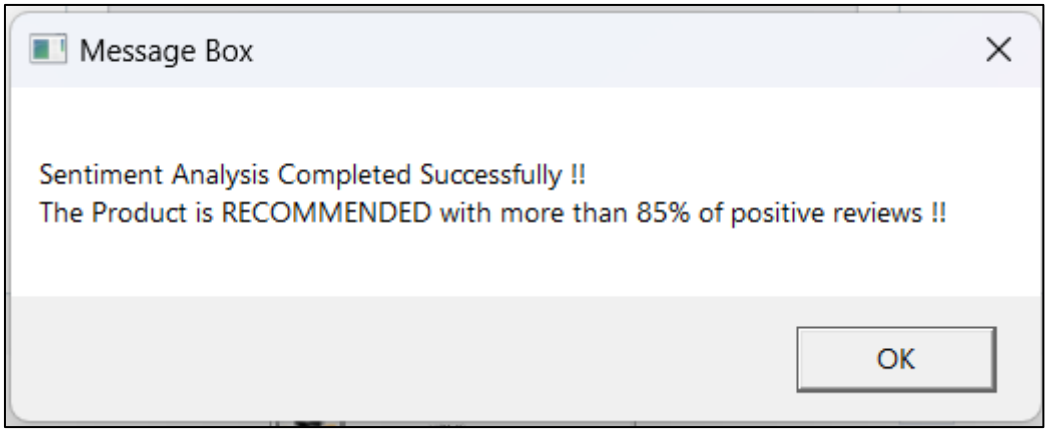


Fig 5.2 Recommendation Message Box

Displays whether the product is classified as "Recommended," "Not Recommended," or "Good" based on the calculated RS score.

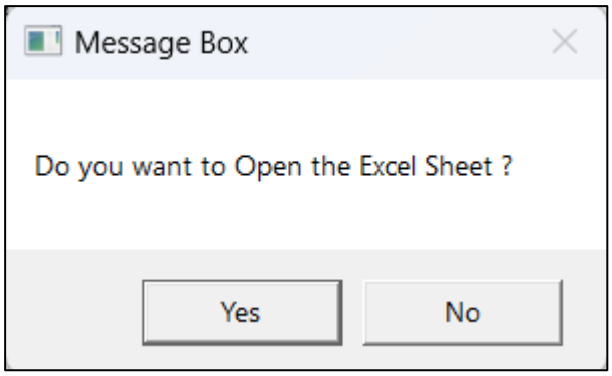


Fig 5.3 Excel Sheet Prompt Message Box

Asks the user via a Yes/No dialog if they want to open the final Excel sheet containing processed data and results.

Reviews	Description	Confidence	Sentiment Analysis
e Bag: A Must-Have for Travel and Organizati	The Boldfit Shoe Bag is compact, durable, keeps shoes clean, organizes luggag	0.91	Very Positive
able and Convenient Shoe Bag - Perfect for Tr	I recently bought a shoe bag from Bold Fit, and I am extremely satisfied with it	0.86	Positive
Nice Shoes Bag	Nice bag to carry your shoes and slippers, a good product at a reasonable price	0.95	Positive
A must to Have	Utility buy, nice storage for footwear, quality stuff,, good look & fit, comfortabl	0.93	Positive
Good product	Boldfit shoe bags for travel and package are of good quality , material thickne	1	Positive
Good quality/ good price	Very spacious for large shoes and good quality at this price	0.91	Neutral
Useful product in budget shoe protection	It helps in keeping the shoes clean and sut free. The material of the bag is not	0.92	Neutral
Useful product	Good quality	0.95	Neutral
Might not fit for plus size	The quality of these bags at this price point is really good, can fit loafers, form	0.4	Neutral
Good design	Good pc to carry your shoes with clothes.	0.41	Negative
Qwalit	Value for money and usefull.	1	Neutral
Useful product	You can keep chappals and shoes during travels. Also keep in shoe rack to pro	0.95	Neutral
Good one	I'll appreciate the product...	0.8	Neutral
Best for your shoes and slippers	Don't think twice before getting it for your precious shoes	0.5	Positive
Good quality products	Works fine	0.9	Positive
Good	Good Product	0.74	Neutral
Good one	Nice quality	0.8	Neutral
Worth it	Totally worth it.Easy to use, fits well for all different shoe sizes. Looks good an	1	Positive
Best for shoes	And we can use it gently	0.91	Neutral
Best in price	Nice one not much to say, it does the job good.	0.98	Neutral
Good	It is good quality wise and value for money. Though my sons shoes did not fit t	0.74	Neutral
Best per shoes accessories	Your wish shoes slippers or accessories	0.56	Positive
Nice	Very convenient to carry	1	Neutral
Must-Have Shoe Bag for Travelers!	I recently picked up the Boldfit Shoe Bag, and I'm loving it! If you're looking for	0.68	Very Positive

Fig 5.4 Excel Sheet Screenshot

Displays structured data with columns for Reviews, Product Descriptions, Sentiment Confidence Scores, and Sentiment Results.

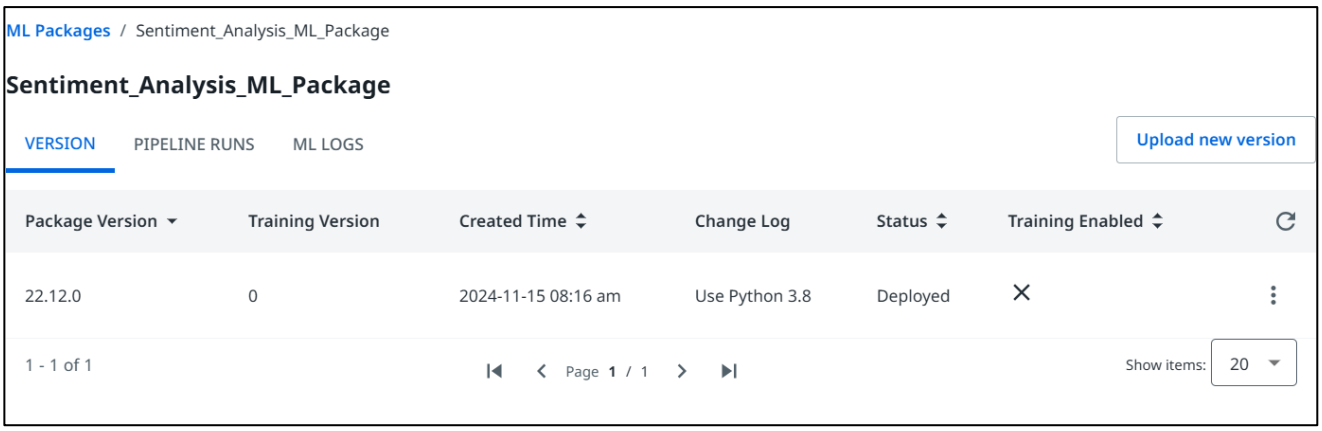


Fig 5.5 AI Center's ML Package

Represents the deployed machine learning model designed for sentiment analysis tasks.

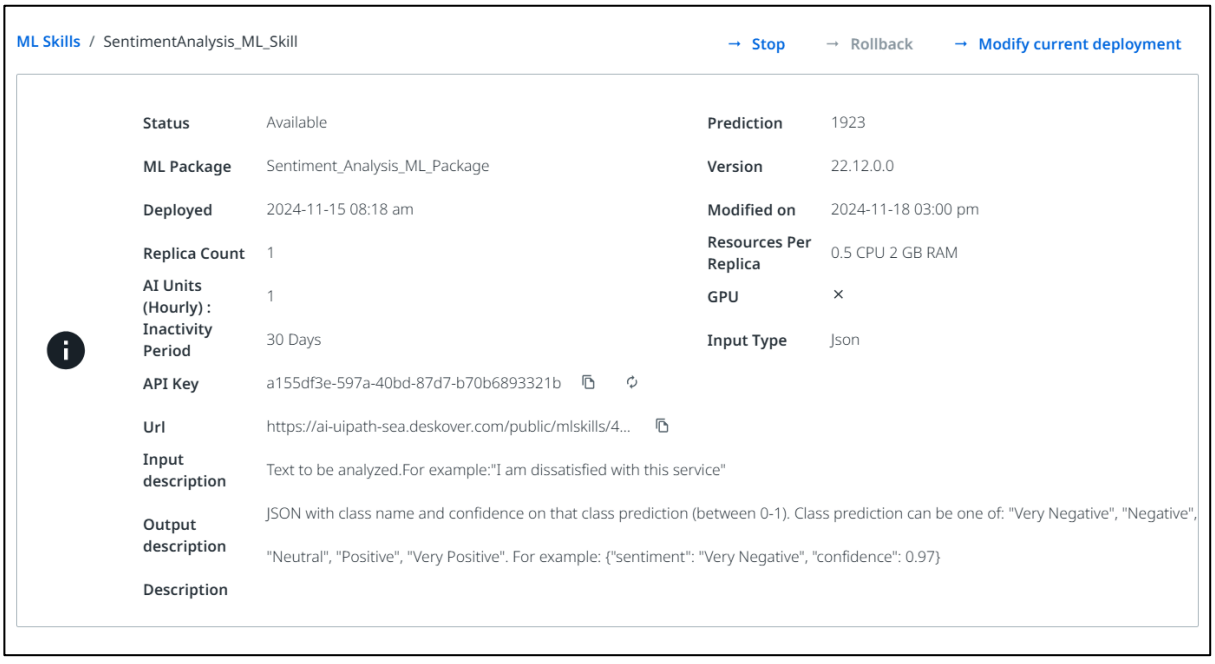


Fig 5.6 AI Center's ML Skill

The operational deployment of the ML package, enabling real-time sentiment analysis integration with UiPath workflows.

Chapter 6

CONCLUSIONS

"Review-wise: An AI-Powered Review Sentiment Analyzer" successfully demonstrates the integration of Robotic Process Automation (RPA) with pre-trained AI models for automating customer review analysis. The project addresses key challenges in the manual evaluation of large-scale reviews, such as inefficiency, subjectivity, and data overload. By utilizing UiPath Studio's automation capabilities and AI Center's built-in sentiment analysis model, the solution extracts, processes, and evaluates reviews with precision and speed.

The project showcases the practical application of AI in real-world scenarios, offering users clear recommendations based on Weighted Sentiment Scores (WSS) and Recommendation Scores (RS). With its ability to classify products into **"Recommended**," "**Good**," or "**Not Recommended**" categories, the system empowers users to make informed purchase decisions. The automated workflow, from data collection to report generation, not only saves time but also ensures consistency and accuracy.

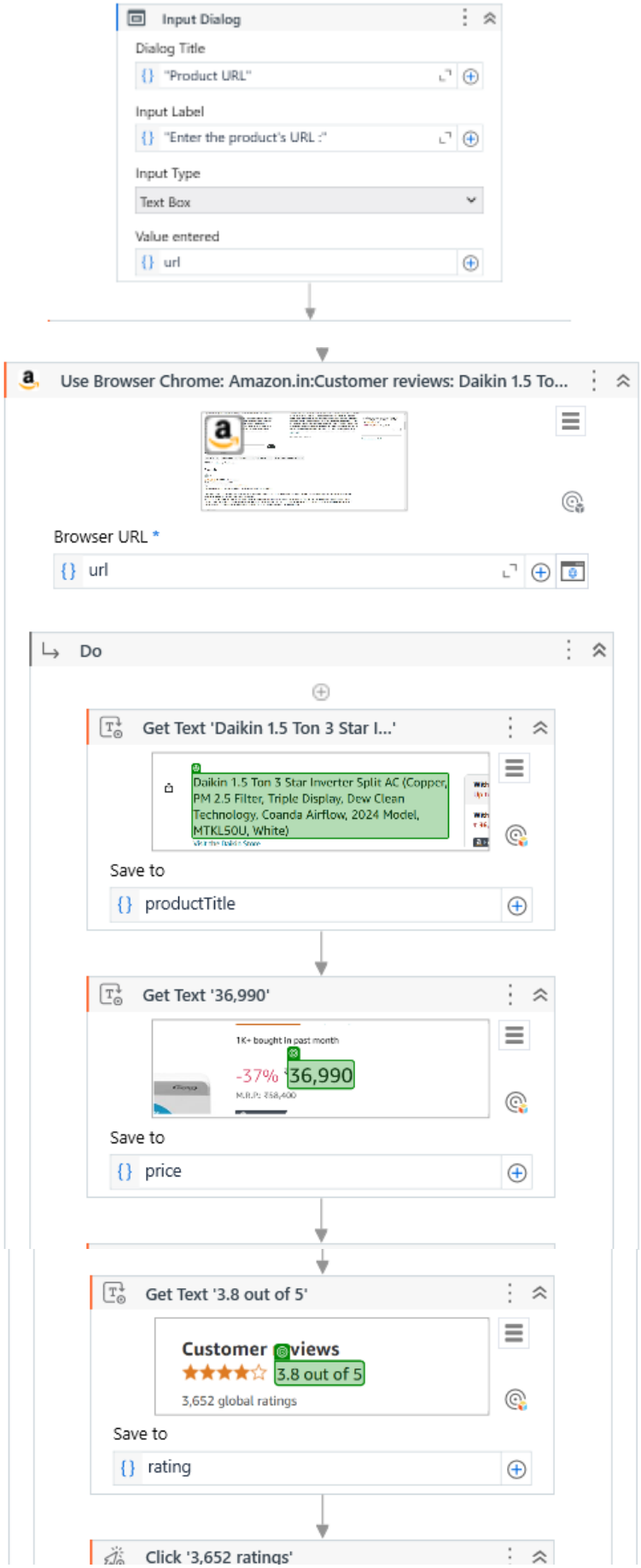
In conclusion, "Review-wise" exemplifies how RPA and AI can be leveraged together to solve common consumer problems effectively. The project lays the groundwork for future enhancements, such as multilingual sentiment analysis, real-time updates, and integration with multiple e-commerce platforms, making it a scalable and robust solution for modern consumer needs.

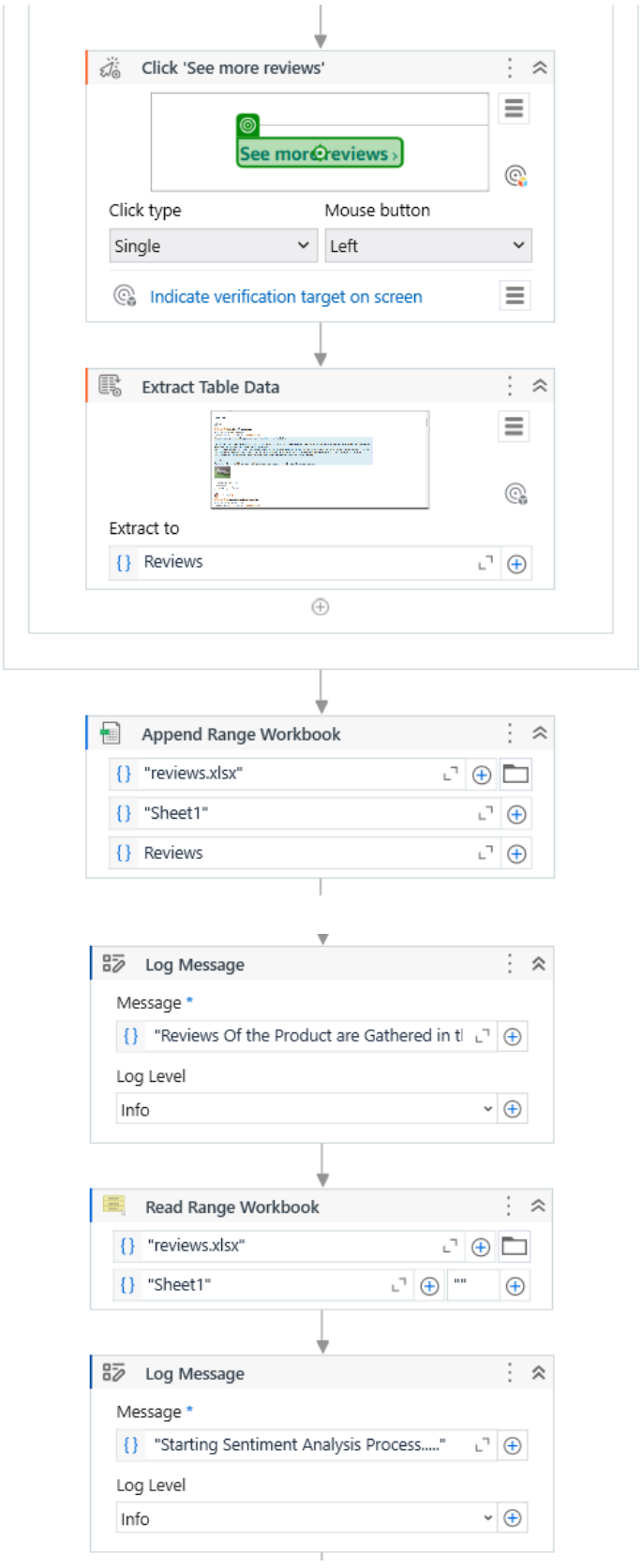
6.1 GENERAL

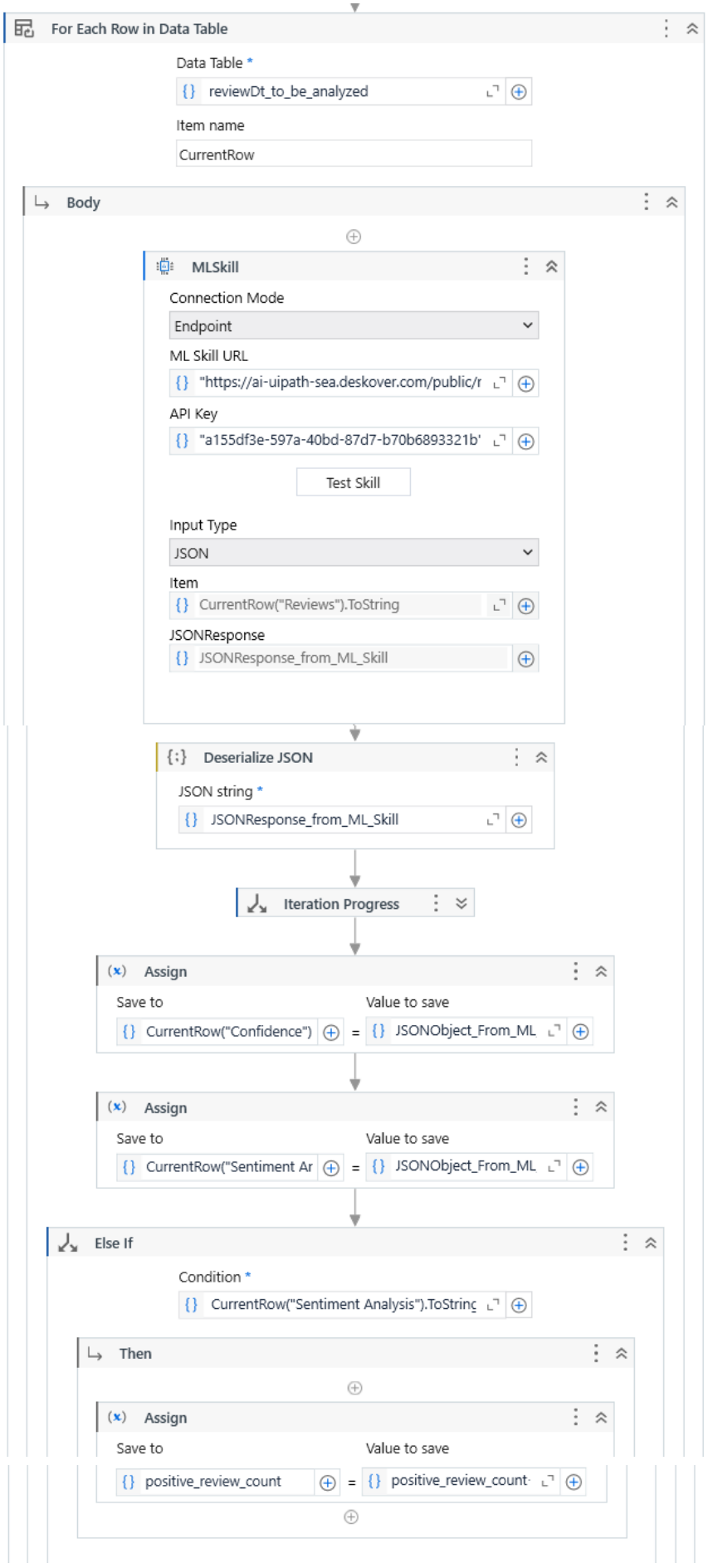
The need for tools that automate customer review analysis is more pressing than ever, as the volume of online feedback continues to grow exponentially. This project highlights the capabilities of UiPath Studio and AI Center in addressing this demand through an efficient and user-friendly approach. The integration of pre-trained AI models into RPA workflows ensures that even non-technical users can leverage advanced analytics for practical applications.

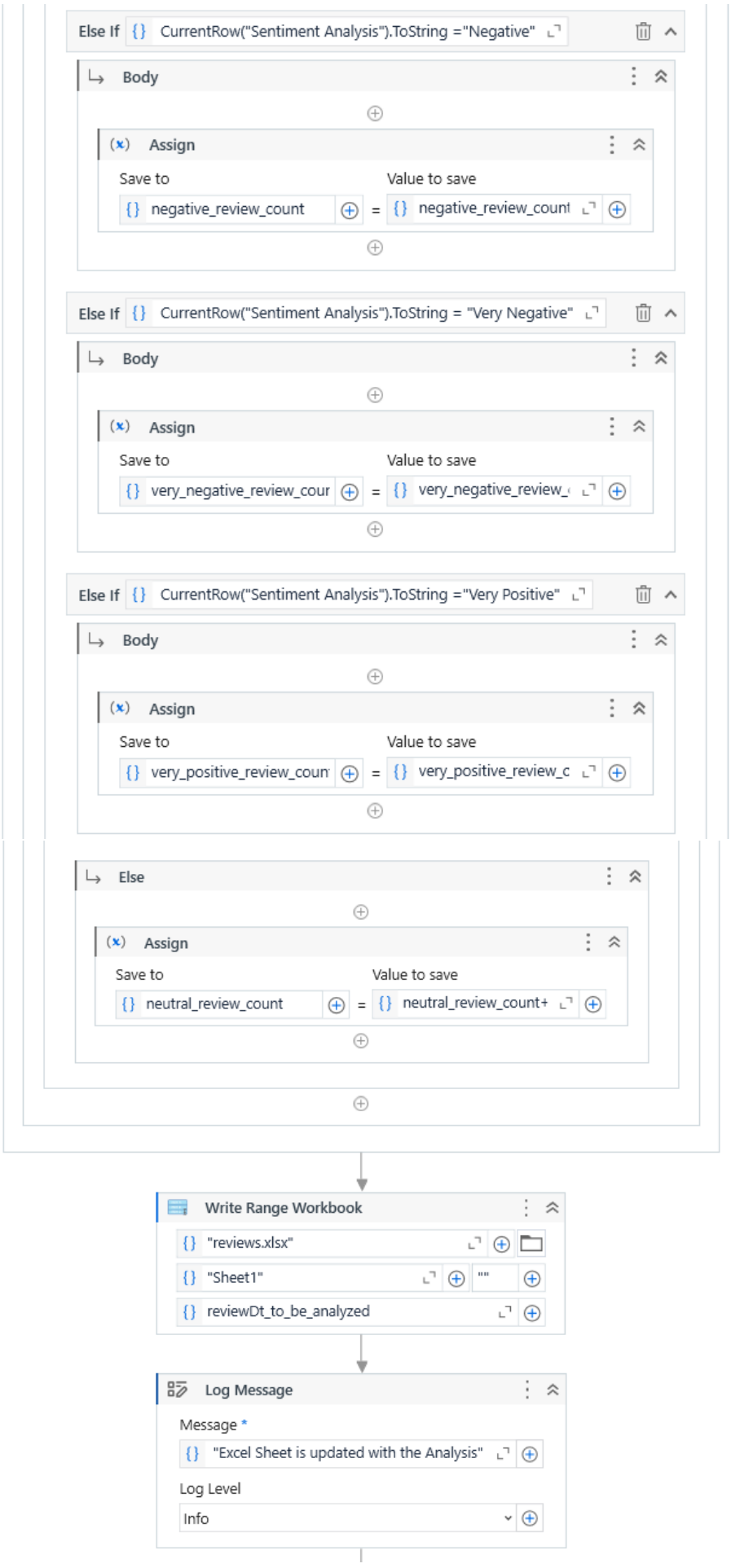
"Review-wise" demonstrates how automation can bridge the gap between complex AI functionalities and accessible solutions. By focusing on simplicity, accuracy, and efficiency, the project makes a strong case for adopting RPA and AI in various domains beyond e-commerce, such as healthcare, education, and customer service. The results achieved in this project underline the transformative potential of combining RPA with pre-trained AI models to automate tedious tasks and deliver actionable insights.

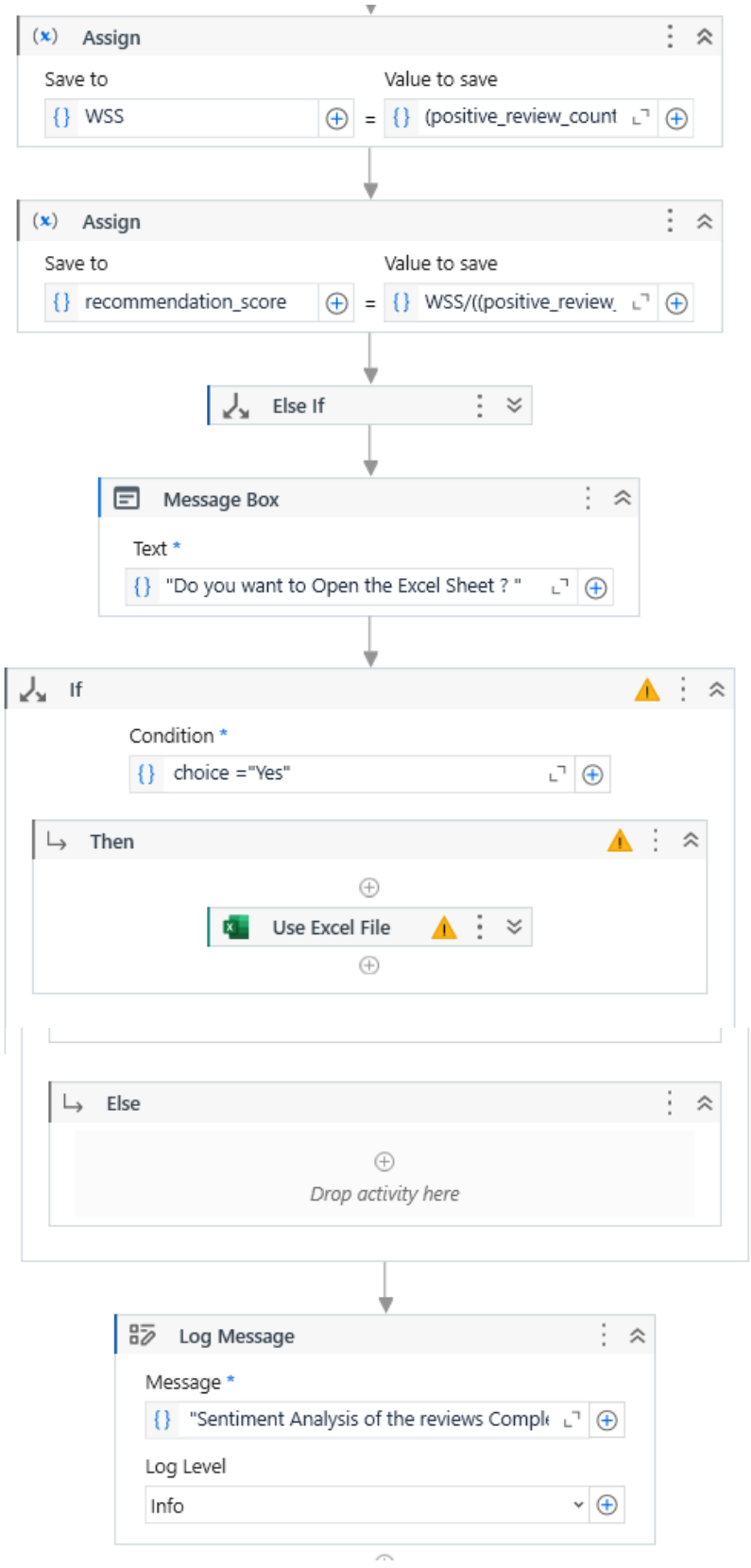
6.2. APPENDICES:




Click 'See more reviews'
See more reviews
Click type
Mouse button
Single
Left
Indicate verification target on screen
Extract Table Data
Extract to
Reviews
Append Range Workbook
"reviews.xlsx"
"Sheet1"
Reviews
Log Message
Message *
"Reviews Of the Product are Gathered in t
Log Level
Info
Read Range Workbook
"reviews.xlsx"
"Sheet1"
""
Log Message
Message *
"Starting Sentiment Analysis Process....."
Log Level
Info


For Each Row in Data Table
Data Table *
reviewDt_to_be_analyzed
Item name
CurrentRow
Body
MLSkill
Connection Mode
Endpoint
ML Skill URL
"https://ai-uipath-sea.deskover.com/public/r
API Key
"a155df3e-597a-40bd-87d7-b70b6893321b'
Test Skill
Input Type
JSON
Item
CurrentRow("Reviews").ToString
JSONResponse
JSONResponse_from_ML_Skill
Deserialize JSON
JSON string *
JSONResponse_from_ML_Skill
Iteration Progress
Assign
Save to
Value to save
CurrentRow("Confidence")
=
JSONObject_From_ML
Assign
Save to
Value to save
CurrentRow("Sentiment Ar
=
JSONObject_From_ML
Else If
Condition *
CurrentRow("Sentiment Analysis").ToStrinc
Then
Assign
Save to
Value to save
positive_review_count
=
positive_review_count


Else If CurrentRow("Sentiment Analysis").ToString ="Negative"
Body
Assign
Save to
Value to save
negative_review_count
negative_review_count
Else If CurrentRow("Sentiment Analysis").ToString = "Very Negative"
Body
Assign
Save to
Value to save
very_negative_review_cour
very_negative_review_
Else If CurrentRow("Sentiment Analysis").ToString ="Very Positive"
Body
Assign
Save to
Value to save
very_positive_review_coun
very_positive_review_c
Else
Assign
Save to
Value to save
neutral_review_count
neutral_review_count+
Write Range Workbook
"reviews.xlsx"
"Sheet1"
""
reviewDt_to_be_analyzed
Log Message
Message *
"Excel Sheet is updated with the Analysis"
Log Level
Info


Assign
Save to
WSS
=
(positive_review_count
Assign
Save to
recommendation_score
=
WSS/((positive_review_
Else If
Message Box
Text *
"Do you want to Open the Excel Sheet ? "
If
Condition *
choice ="Yes"
Then
Use Excel File
Else
Drop activity here
Log Message
Message *
"Sentiment Analysis of the reviews Compl
Log Level
Info

5.3. REFERENCES

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