

# **APP REVIEW SENTIMENT ANALYSIS BOT**

## **A MINI-PROJECT REPORT**

*Submitted By*

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**RAJALAKSHMI**  
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## **ABSTRACT**

The “App review sentiment analysis project” is a comprehensive IRPA (Intelligent Robotic Process Automation) project designed to simplify and enhance analysing feedbacks by automating the scraping and reviewing of feedbacks to generate an excel sheet. Developed using UiPath’s Robotic Enterprise (RE) Framework and Uipath’s AI center, the project ensures a structured and reliable automation flow, minimizing human intervention and errors. The process begins by reading data from apps available in play store. Reviews along with their date of posting and the helpful vote is scraped and further analysed. This analysis is then stored in an excel sheet in the given target area using UiPath's excel automation activities. The project incorporates a range of activities such as Table extraction, excel generation for storing output, and AI centre for communication with the robot, ensuring a seamless end-to-end workflow. The use of the RE Framework provides scalability, robust exception handling, and process consistency, making the solution reliable and adaptable for future enhancements. This automation significantly reduces the time and effort required for analysing each and every review, allowing professionals to focus on more strategic tasks. This project not only enhances operational efficiency but also sets a benchmark for leveraging technology to optimize repetitive and time-consuming tasks.

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### **LIST OF ABBREVIATIONS:**

<b>Abbreviation</b>	<b>Full Form</b>
<b>RPA</b>	<b>Robotic Process Automation</b>
<b>AI</b>	<b>Artificial Intelligence</b>
<b>SA</b>	<b>Sentiment Analysis</b>
<b>ML</b>	<b>Machine Learning</b>
<b>CL</b>	<b>Confidence Level</b>
<b>XML</b>	<b>eXtensible Markup Language</b>
<b>RE Framework</b>	<b>Robotic Enterprise Framework</b>

# **CHAPTER - 1**

## **INTRODUCTION**

### **1.1 GENERAL**

The rapid growth of online platforms has resulted in an abundance of user-generated content, including reviews and feedback. These reviews play a critical role in shaping customer decisions and influencing brand reputation. However, manually analyzing these reviews is time-consuming and error-prone. The RPA Sentiment Analysis Project leverages UiPath and AI Centre to automate this process, delivering real-time insights into customer sentiment efficiently and accurately.

### **1.2 OBJECTIVE**

The objective of this project is to automate sentiment analysis of customer reviews using UiPath and AI Centre, enabling businesses to classify feedback into positive, negative, or neutral categories efficiently. By automating the review extraction process from online platforms and integrating AI models for sentiment classification, this system aims to provide real-time insights and enhance decision-making with minimal manual intervention.

### **1.3 EXISTING SYSTEM**

The existing systems for sentiment analysis largely rely on manual methods or standalone AI tools, which are time-consuming, error-prone, and lack seamless integration with automation frameworks. These approaches struggle with scalability, especially when processing large volumes of data, and fail to deliver real-time insights, thereby limiting their effectiveness for modern business needs. The need for an automated and efficient solution to simplify and speed up the review analysis process, while ensuring accuracy and reducing administrative workload, is clear.

### **1.4 PROPOSED SYSTEM**

The proposed system leverages UiPath and AI Center to automate sentiment analysis, addressing the limitations of manual and standalone methods. This system integrates robotic process automation (RPA) with artificial intelligence (AI) to extract, process, and analyze customer reviews efficiently. Reviews are collected from multiple online platforms using



UiPath's web scraping capabilities. This eliminates the need for manual data collection, ensuring speed and accuracy. Pre-trained AI models or custom-trained models hosted in UiPath AI Centre are used to classify the reviews into Positive, Negative, or Neutral sentiments. The sentiment results are stored in structured formats such as Excel, CSV, or a database. Dashboards or reports are generated to visualize the sentiment distribution and provide actionable insights.

## **CHAPTER - 2**

### **LITERATURE REVIEW**

#### **2.1 GENERAL**

Sentiment analysis has emerged as a critical tool for understanding customer feedback, with numerous studies highlighting its significance in modern business intelligence. Traditional methods often rely on manual interpretation or standalone AI models, which, while effective in small-scale applications, lack the efficiency and scalability required for large datasets. Research suggests that integrating robotic process automation (RPA) with artificial intelligence (AI) provides a robust solution to these challenges.

Studies by Kaur and Gupta (2020) emphasize the value of pre-trained sentiment analysis models, such as those built using natural language processing (NLP) frameworks like BERT and GPT, in achieving high accuracy levels for sentiment classification tasks. These models are often fine-tuned to align with specific business requirements, making them versatile for various domains. However, a significant drawback highlighted in the literature is the difficulty in integrating these models into automated workflows, which limits their real-time applicability.

Further research by Zhang et al. (2021) discusses the integration of RPA tools like UiPath with AI models to address these issues. Their findings reveal that RPA enhances the efficiency of data collection, preprocessing, and visualization, while AI models handle the core classification tasks. This synergy enables seamless automation, improving the speed and accuracy of sentiment analysis.

Additionally, Gupta et al. (2019) explore the scalability of such systems, noting that cloud-based platforms, such as UiPath AI Center, provide the necessary infrastructure for hosting and managing AI models. These platforms allow for real-time data processing and support retraining of models to improve performance over time.

Collectively, the literature underscores the potential of combining RPA and AI for sentiment analysis. This approach addresses the limitations of traditional methods by automating data extraction and analysis, enabling businesses to derive actionable insights in real time while maintaining scalability and adaptability.

## CHAPTER – 3

### SYSTEM DESIGN

#### 3.1.1 SYSTEM FLOW DIAGRAM

The System Flow Diagram outlines the overall flow of data and processes in the system. It demonstrates how user inputs, system processing, and outputs interact.

##### Description:

1. **Input and Collection:** The process begins with the user specifying review sources, followed by collecting app reviews for analysis.
2. **Processing and Analysis:** Reviews are pre-processed and passed to a Machine Learning (ML) skill to evaluate sentiment and confidence levels.
3. **Aggregation and Output:** The results are aggregated, useful reviews are counted, and a feedback report is generated in an Excel sheet for final output.

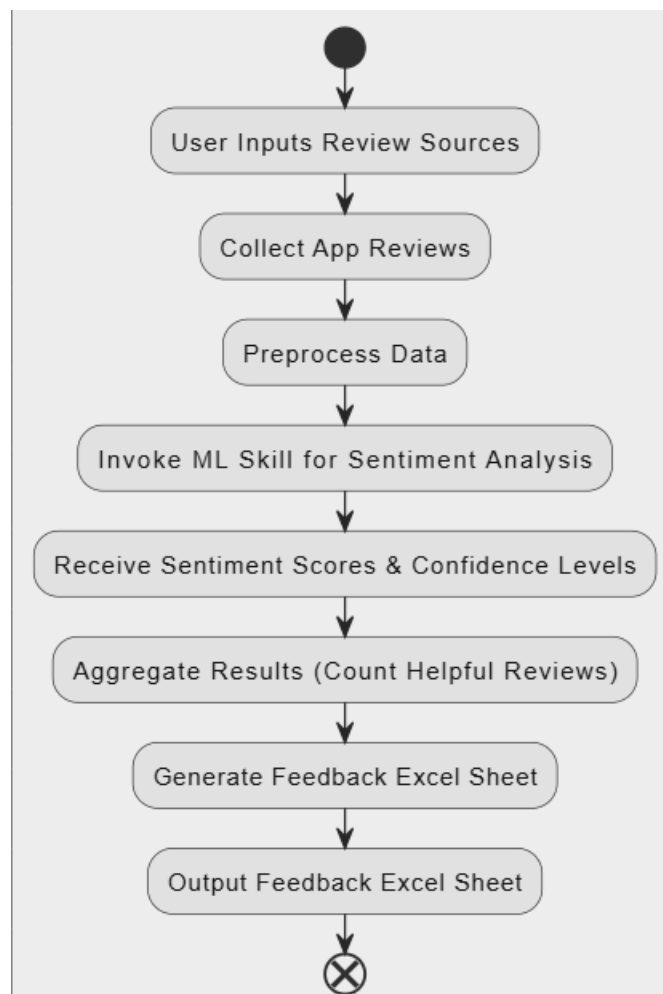


Figure 3.1.1 SYSTEM FLOW DIAGRAM

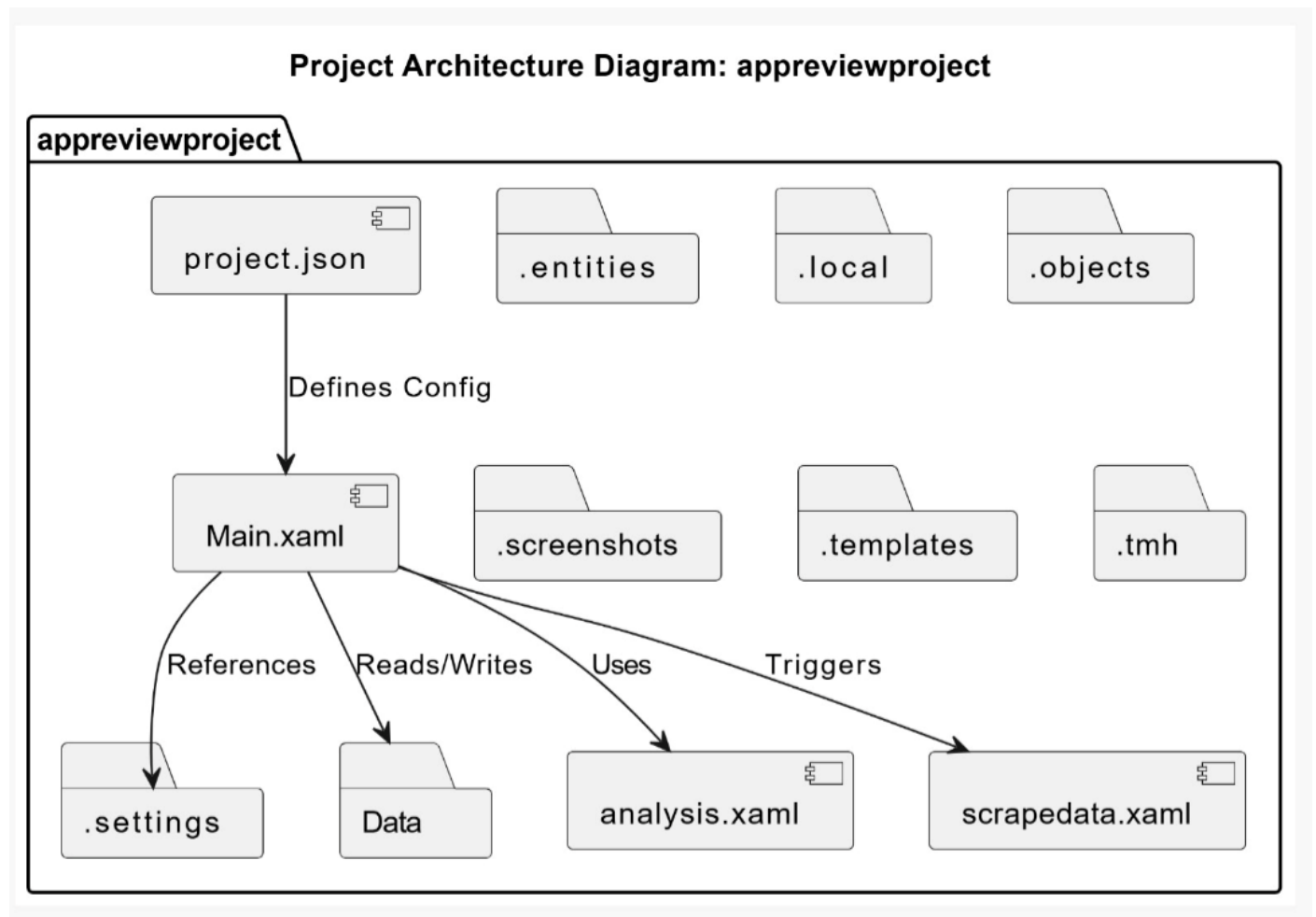
### 3.1.2 ARCHITECTURE DIAGRAM

The Architecture Diagram provides a high-level view of the system's structure and its components.

#### Components:

The architecture of the Sentiment Analysis project consists of three key components:

1. **Data Collection Layer:** Scrapes reviews from online platforms (e.g., Amazon, Flipkart) using UiPath Web Scraping.
2. **Processing and Analysis Layer:** Preprocesses data and uses AI Center's Machine Learning model to classify sentiments.
3. **Output Layer:** Aggregates results, generates reports in Excel, and provides actionable insights for the user.



**Figure 3.1.2 ARCHITECTURE DIAGRAM**

### 3.1.3 SEQUENCE DIAGRAM

The Sequence Diagram shows the interaction between actors (HR personnel) and the system components in a sequential manner.

#### Steps :

1. The bot scrapes reviews from the data source (e.g., a website or API).
2. The scraped data is cleaned and formatted for sentiment analysis
3. The clean data is sent to the AI Centre, where the sentiment analysis model is invoked to classify the reviews into categories (positive, negative, neutral)
4. The aggregated data is compiled into an Excel file, formatted as a feedback sheet, and saved for reporting.

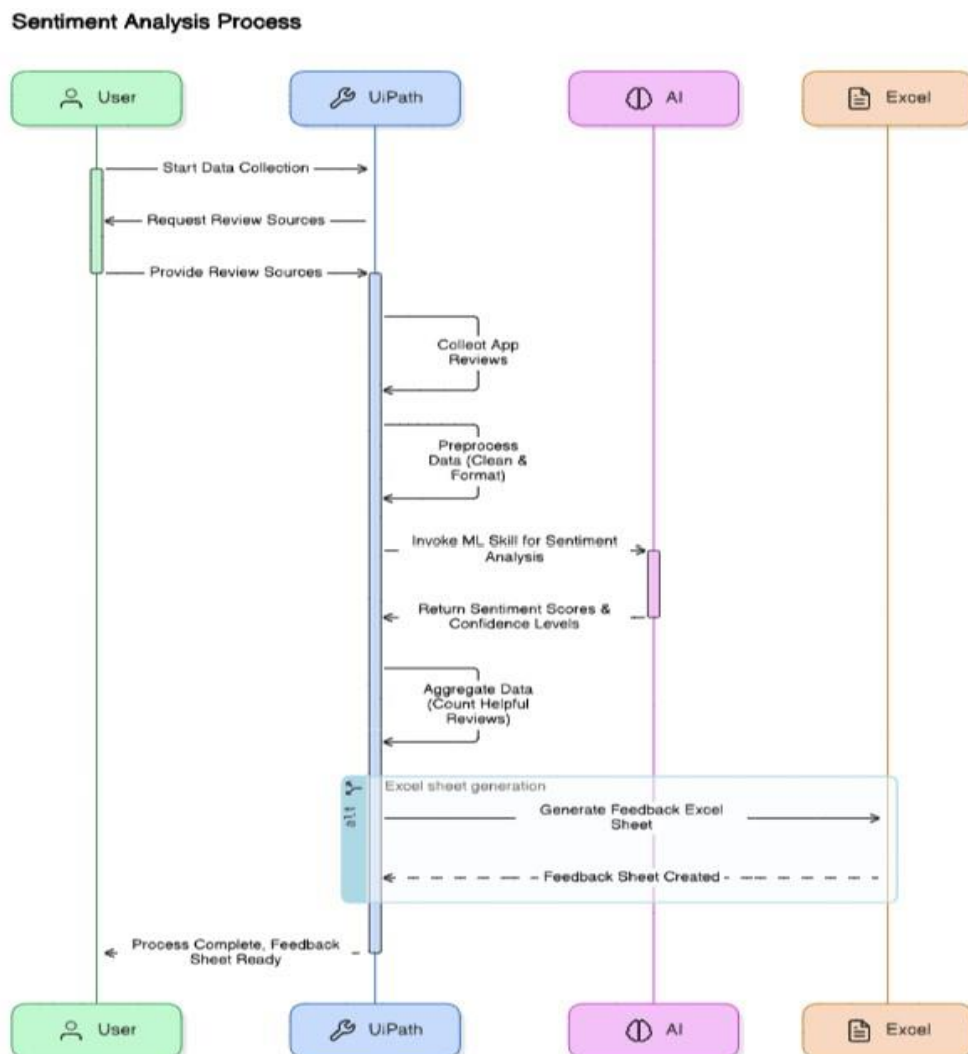


Figure 3.1.3 SEQUENCE DIAGRAM

## CHAPTER – 4

### PROJECT DESCRIPTION

The **Sentiment Analysis of Reviews** project aims to automatically process and analyze user reviews from various sources (e.g., e-commerce websites, service feedback forms) to determine the overall sentiment of the feedback. The project involves scraping reviews, preprocessing data, conducting sentiment analysis using machine learning models, and generating insights. These insights are then compiled into a feedback report, in the form of an Excel sheet, to assist businesses in understanding customer opinions, improving products, and making data-driven decisions.

#### 4.1 METHODOLOGIES

1. **Data Collection:** The first step involves gathering review data from various sources. Web scraping techniques can be used to extract reviews from websites or APIs.
2. **Data Preprocessing:** Once the reviews are collected, the next step is to preprocess the data. Removing unwanted characters, such as HTML tags or special symbols, and correcting any spelling errors. Structuring the data for easy analysis (e.g., converting text into lowercase, removing stop words).
3. **Sentiment Analysis using Machine Learning:** After preprocessing, the cleaned data is passed into a machine learning model for sentiment analysis. This step classifies the reviews into different sentiment categories (positive, negative, or neutral) based on the content of the review.
4. **Data Aggregation:** Once the sentiment analysis is completed, the results are aggregated. This step involves summarizing the sentiment results, such as:
  - Counting how many reviews fall under each sentiment category (positive, negative, neutral).
  - Calculating the overall sentiment score (if applicable).
  - Aggregating sentiments by product or service to provide more detailed insights.
5. **Feedback Report Generation:** Finally, the aggregated sentiment data is compiled into an Excel sheet. This report includes detailed information on the sentiment distribution of the reviews and any other insights (e.g., product-specific feedback). The Excel sheet is formatted for easy analysis and reporting, which can be used by stakeholders to improve product offerings or services.
6. **Testing & Deployment:** After building the system, we tested it to make sure it worked as expected. Once confirmed, it was deployed for real use.

#### **4.1.1 MODULES:**

- 1. Data Collection Module:** Collects reviews through web scraping or manual input, storing them in a structured format (CSV, Excel, or database) for further analysis.
- 2. Data Preprocessing Module:** Cleans and formats review data by removing unnecessary elements and standardizing text for analysis.
- 3. Sentiment Analysis Module:** Analyses the sentiment of each review, classifying them as positive, negative, or neutral using machine learning or NLP models.
- 4. Sentiment Aggregation Module:** Aggregates sentiment results to generate insights, such as sentiment percentages or trends over time or by product.
- 5. Report Generation Module:** Compiles the aggregated sentiment data into a professional report, including visualizations and insights.
- 6. Notification and Alert Module:** Sends notifications or alerts to stakeholders when specific sentiment thresholds (e.g., high negative feedback) are exceeded.
- 7. Data Storage and Management Module:** Manages and stores raw review data, sentiment results, and reports, ensuring easy access and secure archiving for future analysis.

## CHAPTER – 5

### OUTPUT SCREENSHOTS

Name	Status	Date modified	Type	Size
.entities	✓	11/3/2024 4:18 PM	File folder	
.objects	✓	11/3/2024 4:18 PM	File folder	
.screenshots	✓	11/3/2024 4:40 PM	File folder	
.settings	✓	11/3/2024 4:18 PM	File folder	
.templates	✓	11/3/2024 4:18 PM	File folder	
.tmh	✓	11/3/2024 4:18 PM	File folder	
Data	✓	11/19/2024 8:23 PM	File folder	
analysis.xaml	✓	11/3/2024 6:21 PM	Windows.XamlDo...	15 KB
Main.xaml	✓	11/3/2024 6:25 PM	Windows.XamlDo...	6 KB
project.json	✓	11/4/2024 2:14 PM	JSON File	2 KB
scrapedata.xaml	✓	11/10/2024 5:08 PM	Windows.XamlDo...	15 KB

**Figure 5.1 SELECTED FOLDER CONTAINING INPUT FILES**

The selected folder contains all the required input files, as shown in **Fig. 5.1**.

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Datasets  
Data Labeling  
**ML Packages**  
Pipelines  
ML Skills  
ML Logs

**Create a new package**

- Upload zip file (only for non-AIC exported packages)**  
I already have a prepared zip file.
- Out of the box Packages**  
I want to use an ML Package developed by UiPath (including Document Understanding) or the Open Source community.
- Import ML Package (for importing models from other AIC tenants)**  
Use this option to import an ML Package that was exported from AI center previously.

**ML Packages**

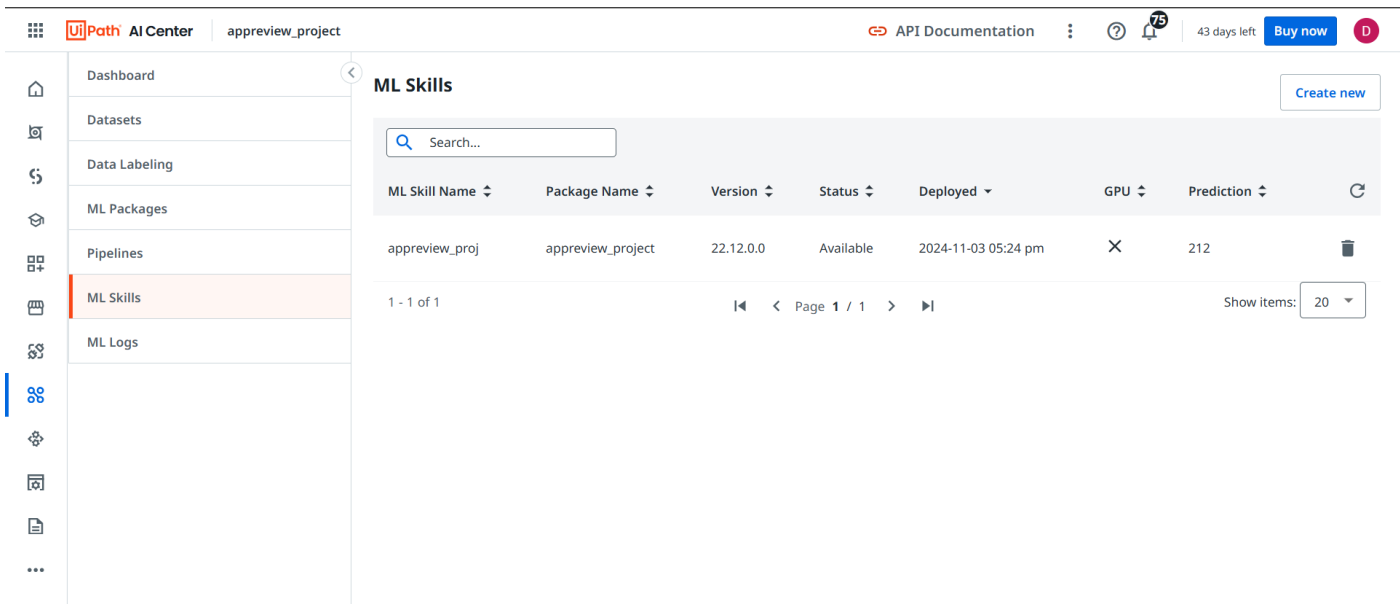
Name	Description	Status	Modified Date	Modified By
appreview_project	This model was open sourced by F...	Deployed	2024-11-03 05:27 pm	220701055@rajalakshmi.edu.in

1 - 1 of 1 Page 1 / 1 Show items: 20

**Figure 5.2 ML PACKAGE DEPLOYED IN THE AI CENTER**

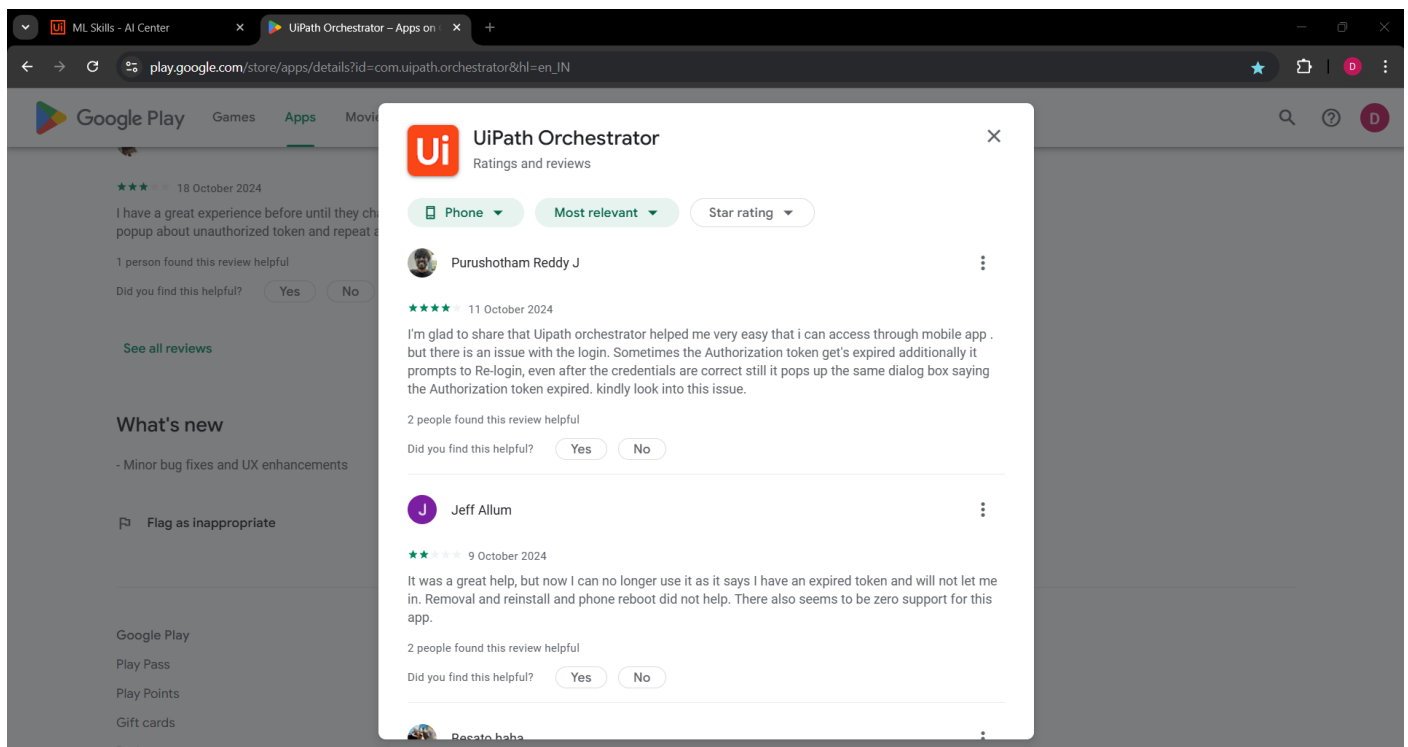
The ML package is used to deploy the SA ML robot for SA as shown in **Fig. 5.2**.







**Figure 5.3 ML SKILL MADE AVAILABLE IN AI CENTER**

This ML skill is made available by deploying the sentiment analysis ML package



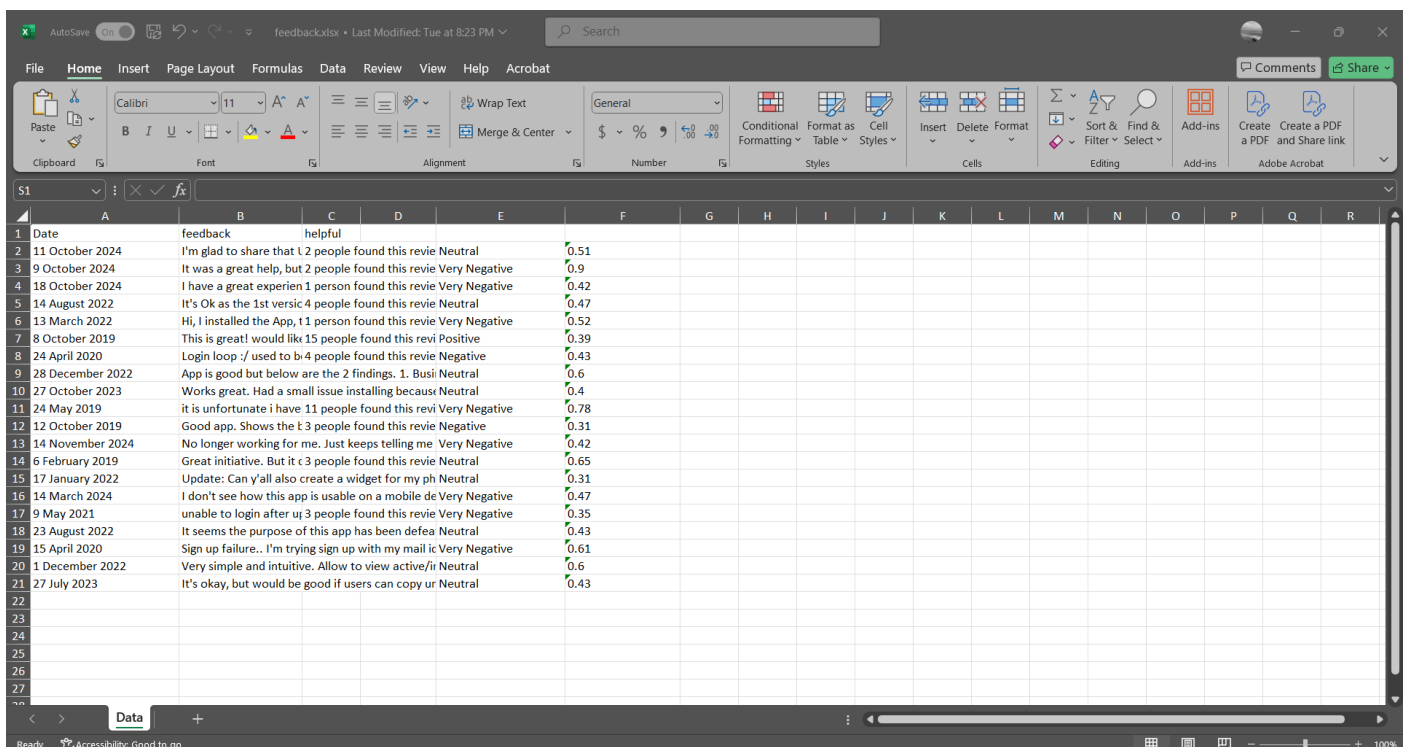
**Figure 5.4 EXAMPLE APP USED IN PLAY STORE**

The UiPath orchestrator app in google play store is used as an example in this project as shown in **Fig. 5.4**.

Name	Status	Date modified	Type	Size
 feedback.xlsx		11/19/2024 8:23 PM	Microsoft Excel W...	12 KB

**Figure 5.5 EXCEL SHEET CONTAINING ANALYSIS DETAILS**

This Excel sheet contains the analysis details inside the data folder of the project main folder as shown in **Fig.5.5**.



Date	feedback	helpful	
11 October 2024	I'm glad to share that U 2 people found this revie	Neutral	0.51
9 October 2024	It was a great help, but 2 people found this revie	Very Negative	0.9
18 October 2024	I have a great experien 1 person found this revie	Very Negative	0.42
14 August 2022	It's Ok as the 1st versic 4 people found this revie	Neutral	0.47
13 March 2022	Hi, I installed the App, t 1 person found this revie	Very Negative	0.52
8 October 2019	This is great! would lik 15 people found this revi	Positive	0.39
24 April 2020	Login loop ./ used to b 4 people found this revie	Negative	0.43
28 December 2022	App is good but below are the 2 findings. 1. Busi	Neutral	0.6
27 October 2023	Works great. Had a small issue installing becaust	Neutral	0.4
24 May 2019	it is unfortunate i have 11 people found this revi	Very Negative	0.78
12 October 2019	Good app. Shows the t 3 people found this revie	Negative	0.31
14 November 2024	No longer working for me. Just keeps telling me	Very Negative	0.42
6 February 2019	Great initiative. But it c 3 people found this revie	Neutral	0.65
15 January 2022	Update: Can y'all also create a widget for my ph	Neutral	0.31
14 March 2024	I don't see how this app is usable on a mobile de	Very Negative	0.47
9 May 2021	unable to login after u 3 people found this revie	Very Negative	0.35
23 August 2022	It seems the purpose of this app has been defea	Neutral	0.43
15 April 2020	Sign up failure.. I'm trying sign up with my mail ic	Very Negative	0.61
1 December 2022	Very simple and intuitive. Allow to view active/i	Neutral	0.6
27 July 2023	It's okay, but would be good if users can copy ur	Neutral	0.43

**Figure 5.6 FINAL OUTPUT IN EXCEL SHEET**

This screenshot shows the final excel sheet along with reviews, date of reviews that are fetched and underwent SA along with CL of the review.

## **CHAPTER – 6**

### **CONCLUSIONS**

#### **6.1 GENERAL**

This project aimed to develop a Sentiment Analysis System for analyzing user reviews, leveraging natural language processing (NLP) and machine learning (ML) to provide insights into customer opinions. By automating the review data collection, preprocessing, and sentiment analysis process, the project offers businesses a scalable and efficient method for assessing customer feedback. This system analyzes large volumes of reviews, providing valuable insights such as overall sentiment trends, key topics in customer feedback, and potential areas for improvement.

The system begins by collecting data, either through manual input or automated web scraping from sources like product review sites. The data is then preprocessed to remove noise and standardize the format, making it ready for analysis. Afterward, a sentiment analysis model classifies the reviews into positive, negative, or neutral categories, which are aggregated to offer meaningful insights. This aggregated data is then formatted into a professional report, which can be shared with stakeholders.

The key benefit of this project is the ability to perform sentiment analysis on customer feedback at scale, something that would be time-consuming and error-prone if done manually. By automating this process, businesses can monitor customer sentiment in real-time, making it easier to act on feedback quickly. For example, negative reviews can trigger immediate action to address customer concerns, improving customer satisfaction and brand reputation.

Overall, the system helps streamline the review analysis process, enhances decision-making, and improves customer engagement. Future improvements could involve the integration of more advanced NLP techniques and machine learning models, enabling deeper insights and further automation in customer feedback management.

## **APPENDICES**

### **Appendix 1: Project Architecture Diagram**

This appendix includes the overall system architecture that demonstrates how data flows through the sentiment analysis process, from data collection to report generation. The architecture provides a clear visualization of the various modules interacting within the system.

### **Appendix 2: Sample Sentiment Analysis Report**

This appendix includes a sample output report generated by the system after processing review data. The report includes sentiment breakdowns, insights, and graphical representations of the data, providing an example of how results are presented to users.

### **Appendix 3: Table Scraping Script**

This appendix includes the Python script used for extracting tabular data from web pages, specifically designed to collect product review data.

## REFERENCES

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- [7] <https://www.uipath.com/support>