SENTIMENT ANALYSIS OF PRODUCT REVIEWS

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INTRODUCTION:

Robotic process automation (or RPA) is a form of business process automation technology based on metaphorical software robots (bots) or on artificial intelligence (AI)/digital workers.[1] It is sometimes referred to as software robotics.

Sentiment Analysis

Sentiment analysis (or opinion mining) is a natural language processing technique used to determine whether data is positive, negative or neutral. Sentiment analysis is often performed on textual data to help businesses monitor brand and product sentiment in customer feedback, and understand customer needs.

Problem Statement:

Conduction of sentiment analysis on the user reviews of a product from an e-commerce website, using the concepts of machine learning, and Robotic Process Automation.

Existing Methodology/System:

In order to perform sentiment analysis without using automation, we first need to write a machine learning/ deep learning model, collect a huge number of sentences in order to create a dataset, train the model using the gathered data, and perform validation.
Then we pass the sentences to the model as input, of which we want to find the sentiments.
Then the model predicts the sentiment, with a certain amount of accuracy, precision, etc.

Problems with the existing system:

The existing system needs a lot of human supervision, and is also considerably more error prone. This is because we need to keep updating the ML/DL model continuously, in order to maintain a

high level of performance. Also, the existing system to predict the sentiments is not much user-friendly.

OBJECTIVES:

Our objective is to perform sentiment analysis on the user reviews of a product from an e-commerce website using the concept of automation, and store it in an excel file, in order to access it easily.

We intend to utilize automation tools such as UiPath Studio, UiPath Orchestrator, and UiPath AI Center. We intend to lesser the influence of human factor to the said technological process, improved analysis' reliability, and increase prediction and analysis speed and quality.

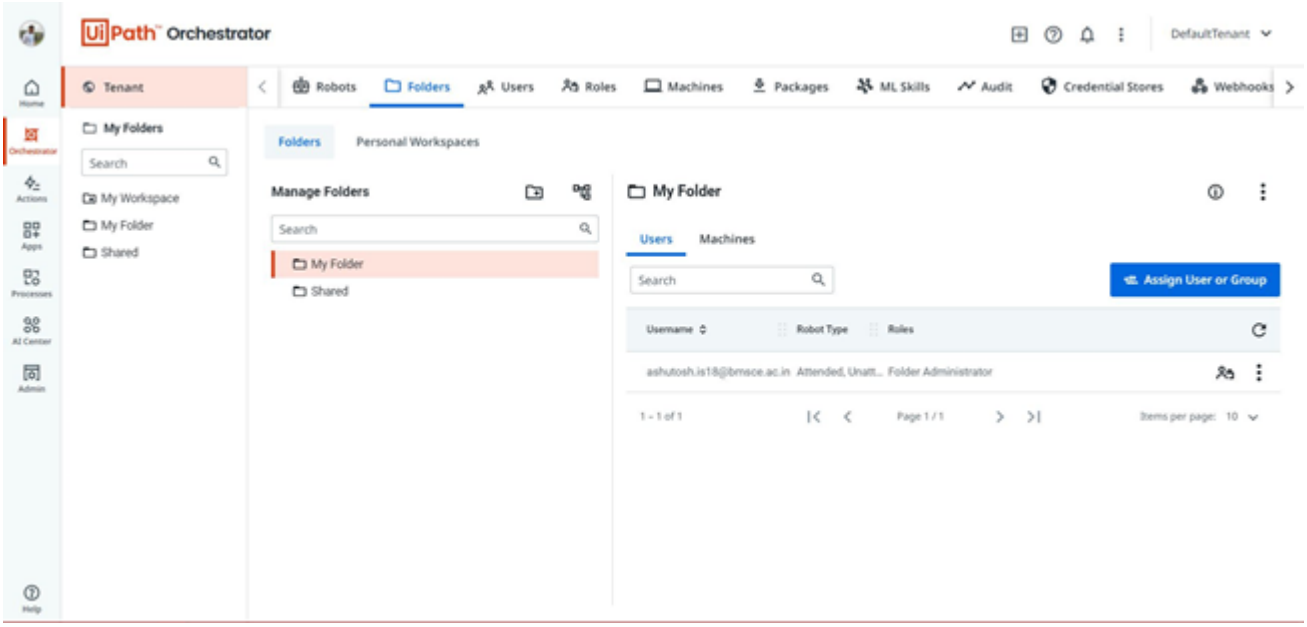
UiPath Studio: UiPath Studio is advanced automation software that gives everyone, from business users to advanced RPA developers, the right automation canvas to build great software robots—and organizations the right governance tools to manage them all.

UiPath Orchestrator: It is a web application that enables you to orchestrate your UiPath Robots in executing repetitive business processes. Orchestrator lets you manage the creation, monitoring, and deployment of resources in your environment. It acts as an integration point with third-party solutions and applications.

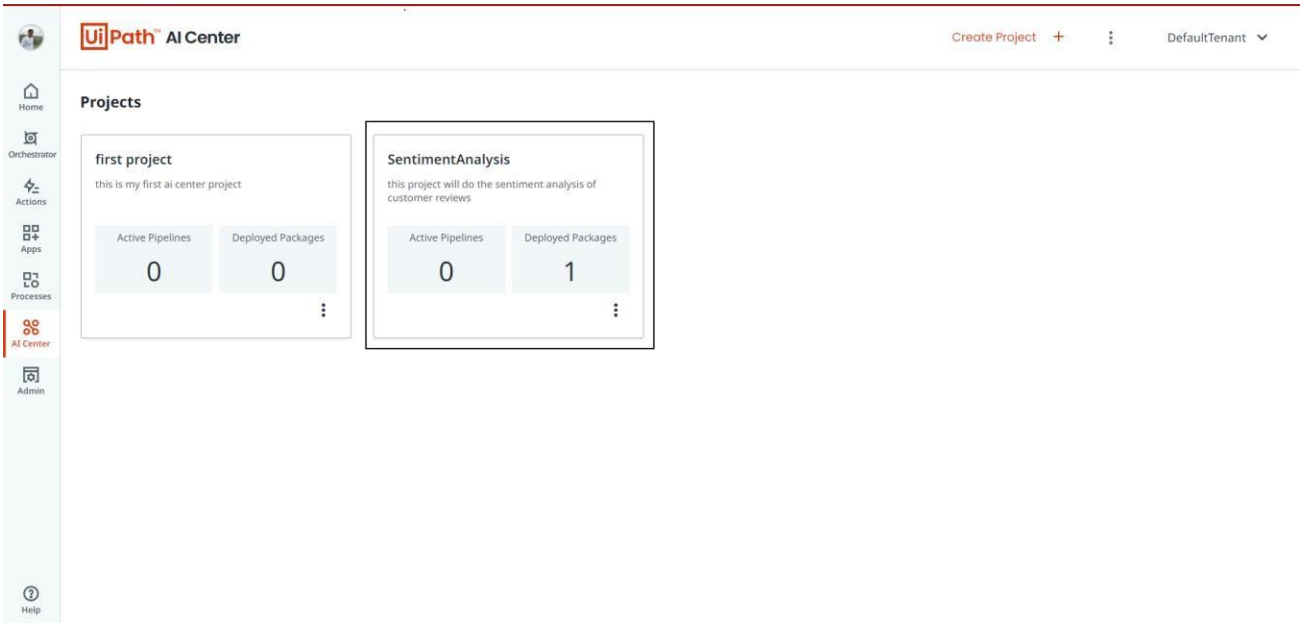
UiPath AI Center: AI Center is a service that allows you to deploy, manage, and continuously improve Machine Learning models and consume them within RPA workflows in Studio. The ML models can be built in a Python IDE or using an AutoML platform such as H20 Driverless AI.

IMPLEMENTATION AND RESULTS:

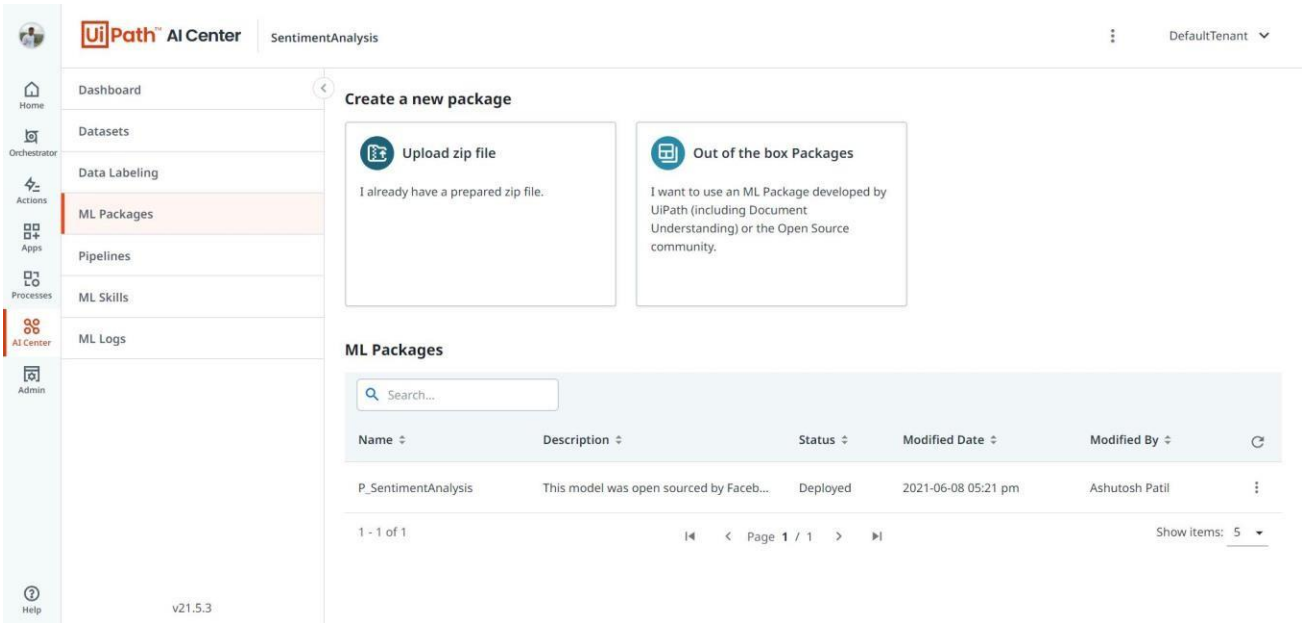
1. Open UiPath orchestrator, sign in, and create a folder, and a robot, as shown below:



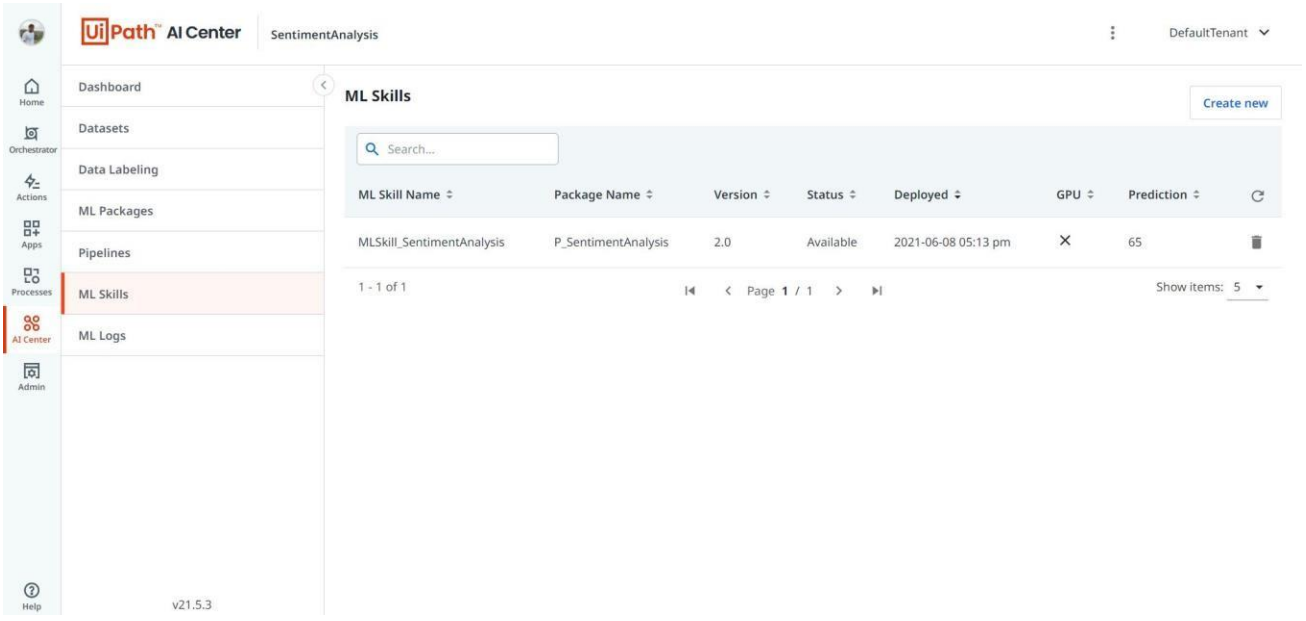
2. Open UiPath AI Center, create a new project with a name of your choice:



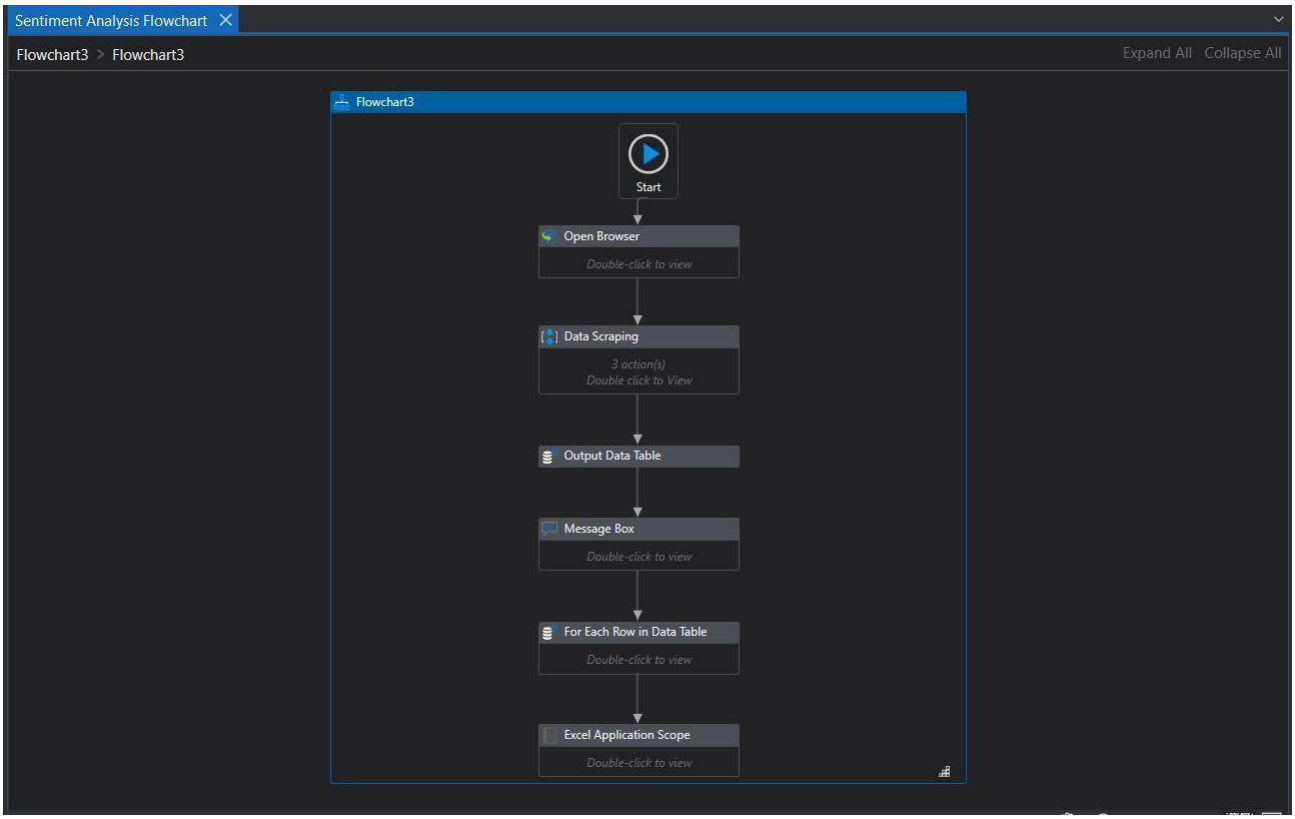
3. Click on the newly created project,click on ML packages, then click on “Out of the box Packages”, then click on “Language Analysis”. Then click on “SentimentAnalysis”. After that click on submit button, write a package name, and then click submit. You will have a ML package as shown below:

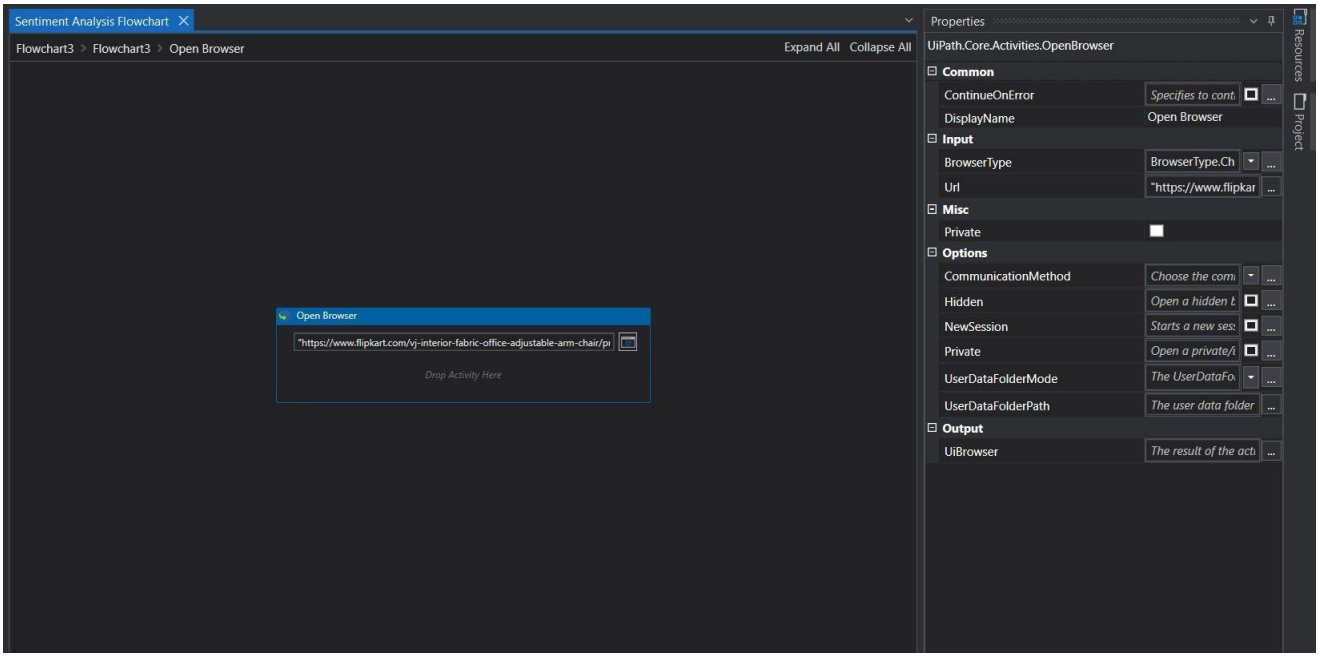


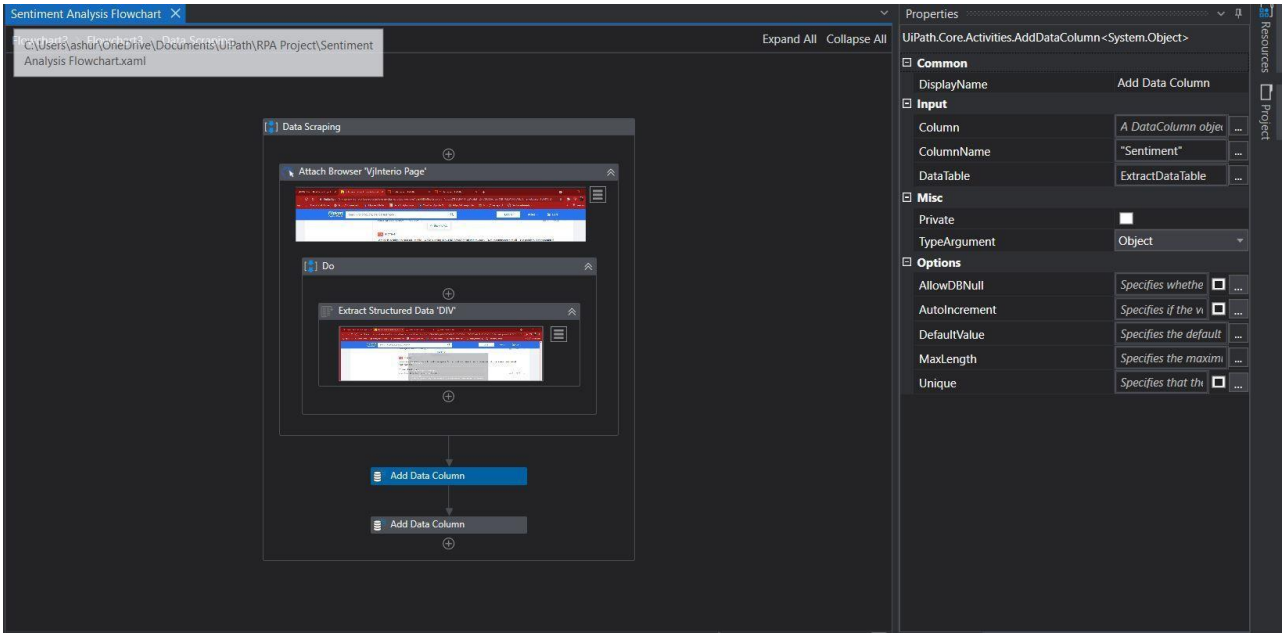
4. Click on ML skills, then click on “create new”. Give the skill a name, choose the previously created ML package, choose the correct versions, and click create. You will have created an ML skill as shown below:

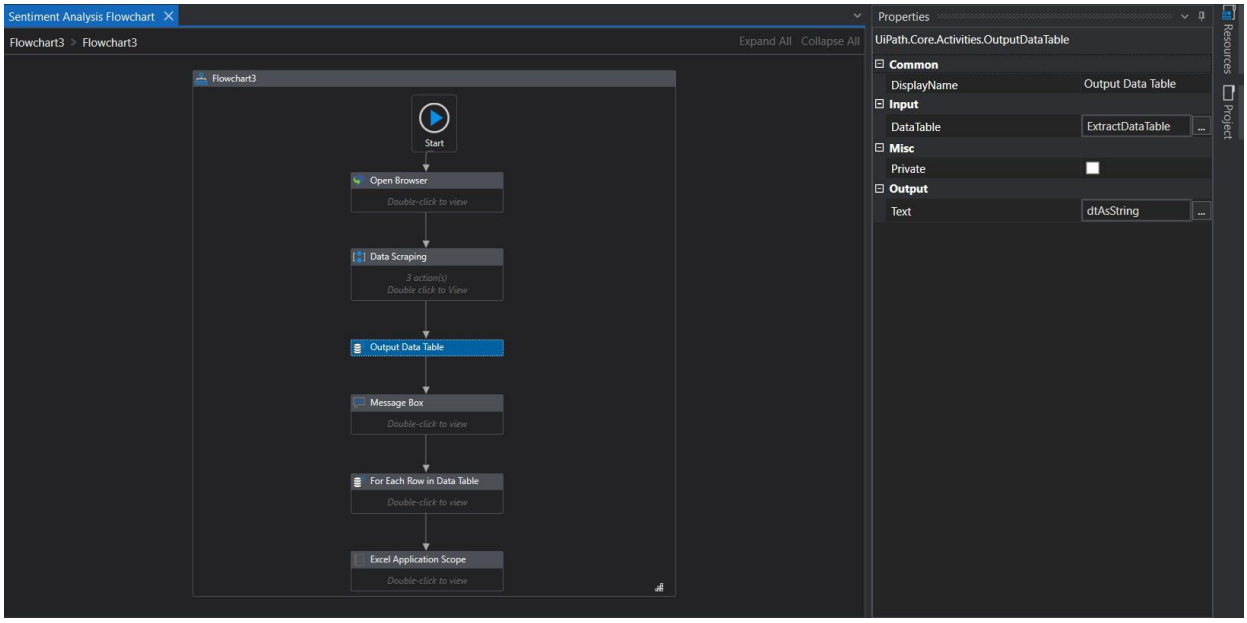


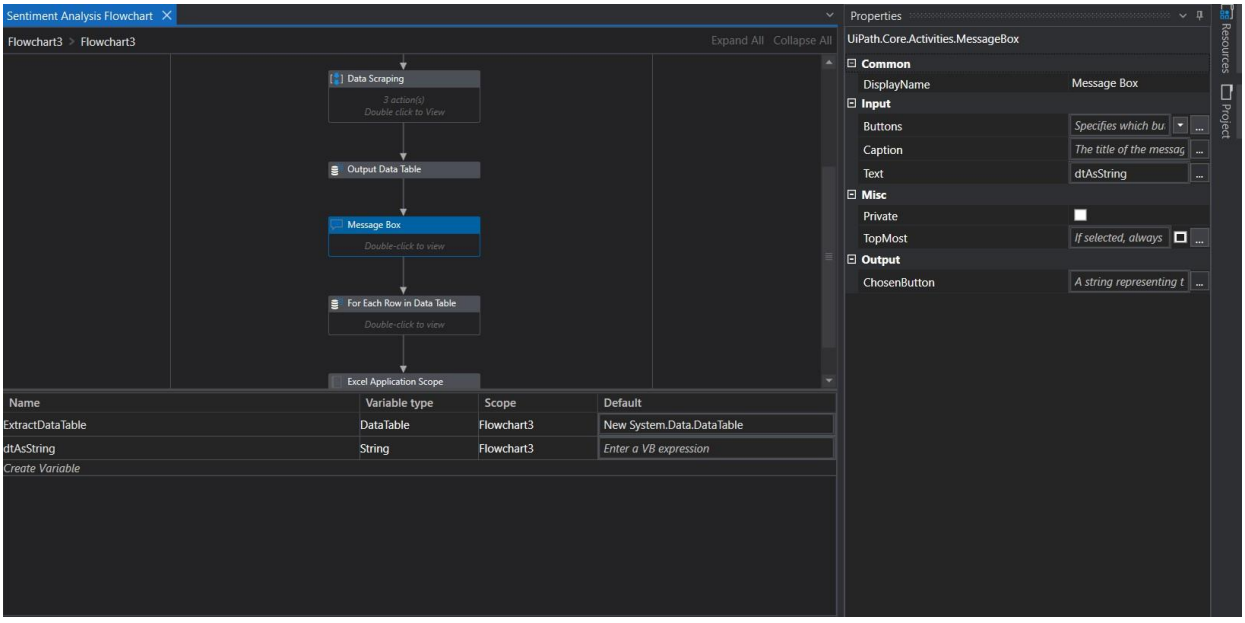
5. Open UiPath Studio, create a new blank process and name it. Install 2 packages, uipath.MLServices.Activities, and uipath.WebAPI.Activities. Create a new flowchart, with the elements as shown below:

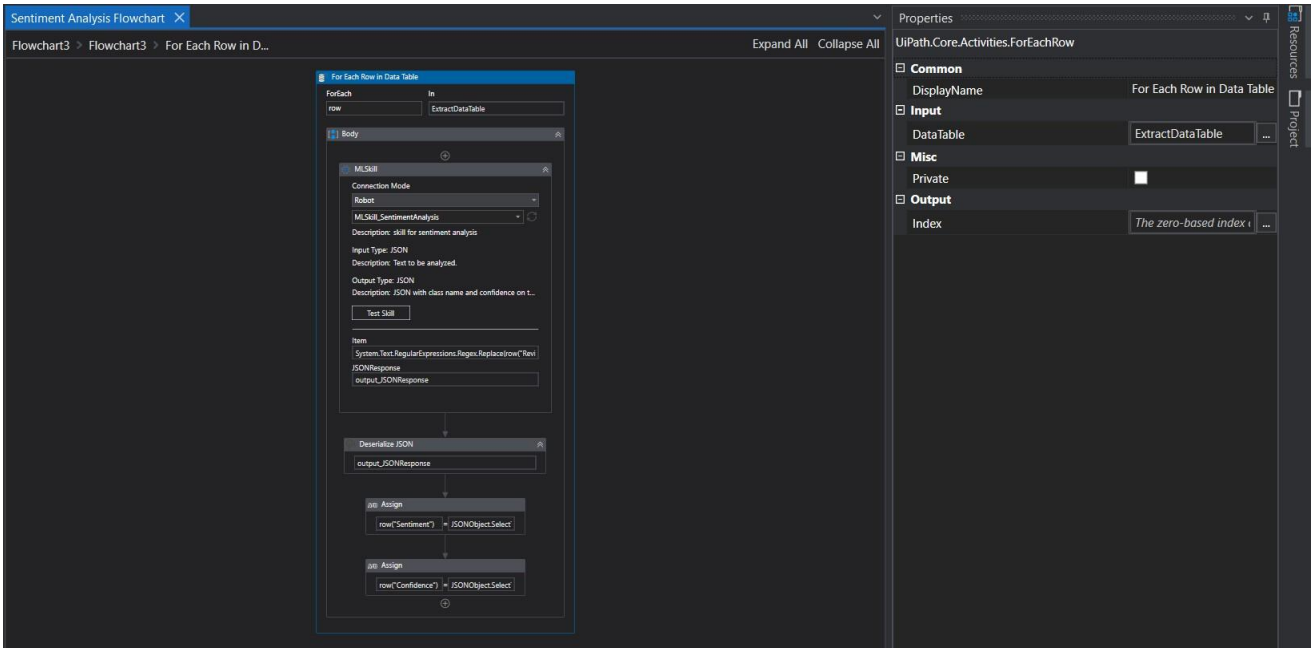


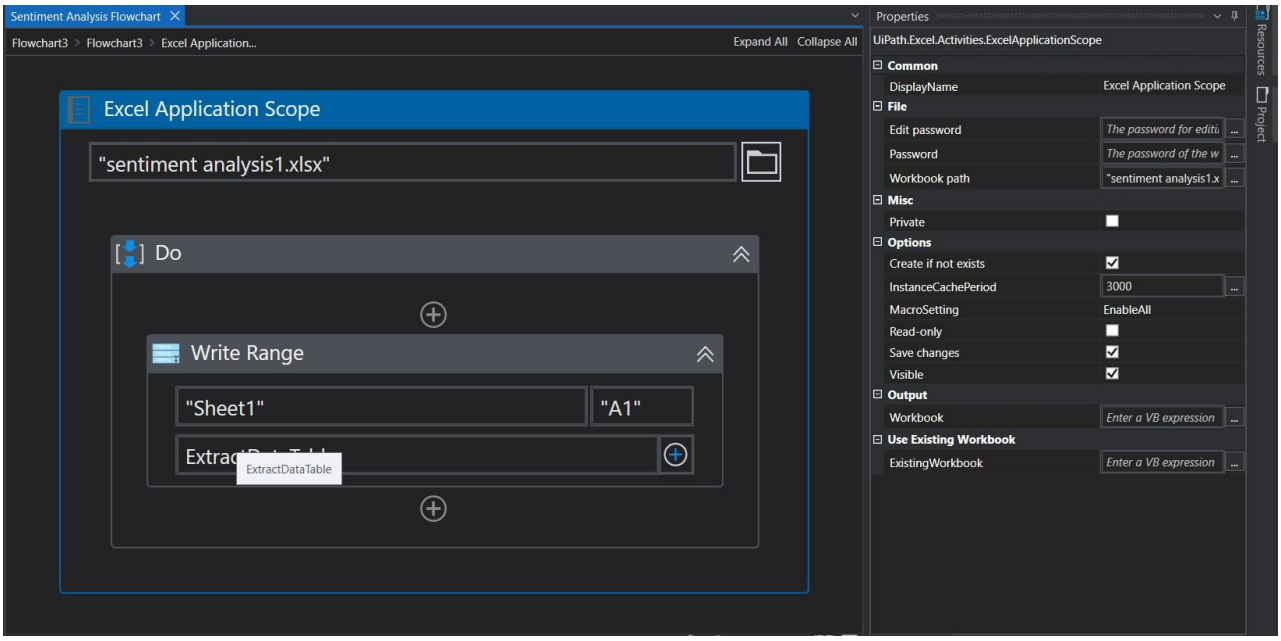



Sentiment Analysis Flowchart
C:\Users\ashur\OneDrive\Documents\UiPath\RPA Project\Sentiment Analysis Flowchart.xaml
Expand All
Collapse All
Data Scraping
Attach Browser 'VjInterio Page'
Do
Extract Structured Data 'DIV'
Add Data Column
Add Data Column
Properties
UiPath.Core.Activities.AddDataColumn<System.Object>
Common
DisplayName
Add Data Column
Input
Column
ColumnName
"Sentiment"
DataTable
ExtractDataTable
Misc
Private
TypeArgument
Object
Options
AllowDBNull
AutoIncrement
DefaultValue
MaxLength
Unique
Resources
Project


Sentiment Analysis Flowchart
Flowchart3 > Flowchart3
Expand All
Collapse All
Flowchart3
Start
Open Browser
Double-click to view
Data Scraping
3 action(s)
Double click to View
Output Data Table
Message Box
Double-click to view
For Each Row in Data Table
Double-click to view
Excel Application Scope
Double-click to view
Properties
UiPath.Core.Activities.OutputDataTable
Common
DisplayName
Output Data Table
Input
DataTable
ExtractDataTable
Misc
Private
Output
Text
dtAsString
Resources
Project

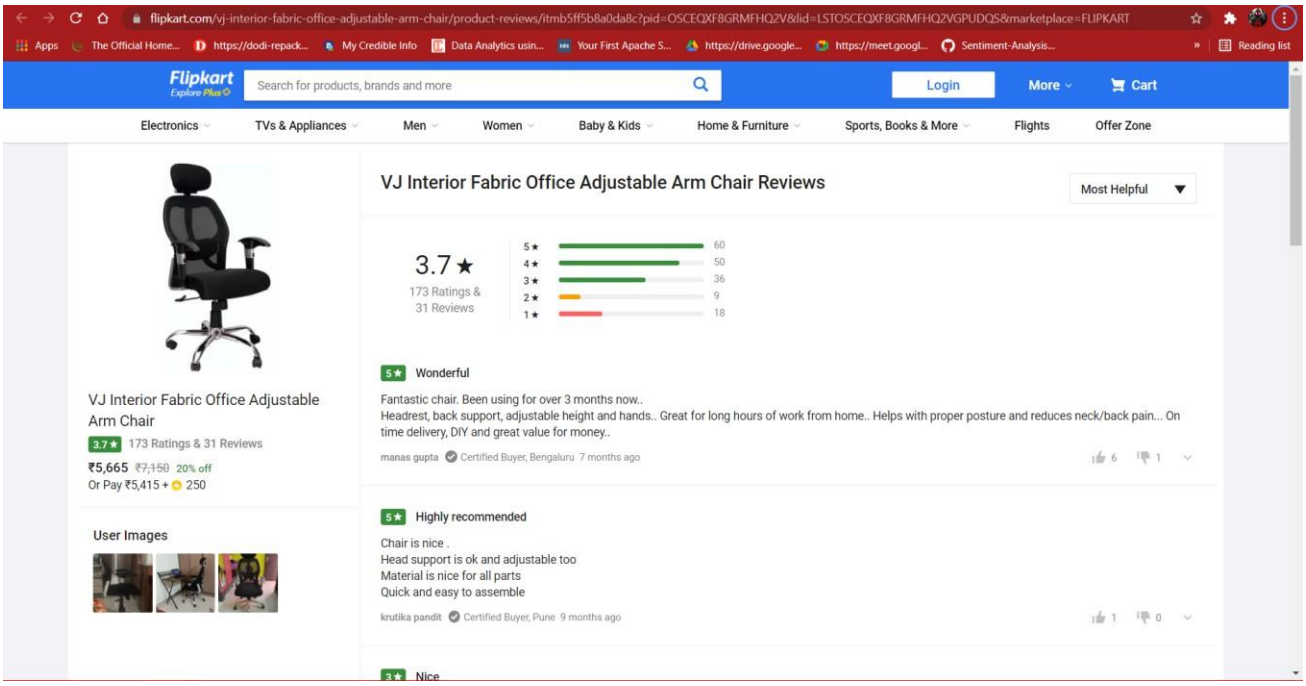

Sentiment Analysis Flowchart
Flowchart3 > Flowchart3
Expand All
Collapse All
Data Scraping
3 action(s)
Double click to View
Output Data Table
Message Box
Double-click to view
For Each Row in Data Table
Double-click to view
Excel Application Scope
Name
Variable type
Scope
Default
ExtractDataTable
DataTable
Flowchart3
New System.Data.DataTable
dtAsString
String
Flowchart3
Enter a VB expression
Create Variable
Properties
UiPath.Core.Activities.MessageBox
Common
DisplayName
Message Box
Input
Buttons
Caption
Text
dtAsString
Misc
Private
TopMost
Output
ChosenButton
Resources
Project


Sentiment Analysis Flowchart
Flowchart3 > Flowchart3 > For Each Row in D...
Expand All Collapse All
For Each Row in Data Table
ForEach
row
In
ExtractDataTable
Body
MLSkill
Connection Mode
Robot
MLSkill_SentimentAnalysis
Description: skill for sentiment analysis
Input Type: JSON
Description: Text to be analyzed.
Output Type: JSON
Description: JSON with class name and confidence on t...
Test Skill
Item
System.Text.RegularExpressions.Regex.Replace(row("Revi
JSONResponse
output_JSONResponse
Deserialize JSON
output_JSONResponse
Assign
row("Sentiment") = JSONObject.Select
Assign
row("Confidence") = JSONObject.Select
Properties
UiPath.Core.Activities.ForEachRow
Common
DisplayName
For Each Row in Data Table
Input
DataTable
ExtractDataTable
Misc
Private
Output
Index
The zero-based index
Resources
Project

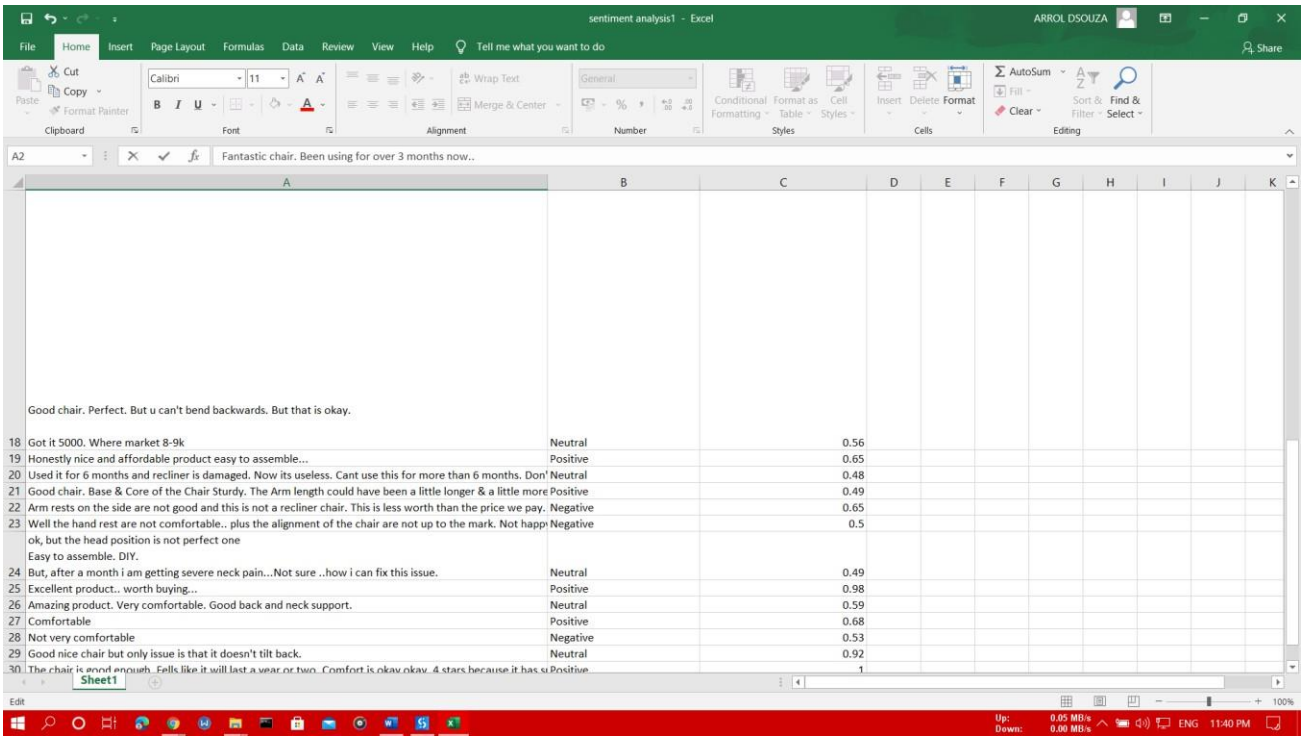

Sentiment Analysis Flowchart
Flowchart3 > Flowchart3 > Excel Application...
Expand All Collapse All
Excel Application Scope
"sentiment analysis1.xlsx"
Do
Write Range
"Sheet1"
"A1"
ExtractDataTable
Properties
UiPath.Excel.Activities.ExcelApplicationScope
Common
DisplayName
Excel Application Scope
File
Edit password
The password for editi
Password
The password of the w
Workbook path
"sentiment analysis1.x
Misc
Private
Options
Create if not exists
InstanceCachePeriod
3000
MacroSetting
EnableAll
Read-only
Save changes
Visible
Output
Workbook
Enter a VB expression
Use Existing Workbook
ExistingWorkbook
Enter a VB expression
Resources
Project

Final Output:

We are taking reviews from this product from flipkart.com website:



The sentiment predictions, and confidence scores of the reviews are stored in an excel sheet as follows:



CONCLUSION:

We were successfully able to predict the sentiments of the user reviews using the concepts of RPA. We were able to predict the sentiments and estimate the confidence of predictions, and store the results in an excel sheet.

The predictions were highly accurate, although, there were some wrong predictions, but they were mostly because of gramatical and spelling mistakes within the reviews.