TRAIN TRACKING SYSTEM

A PROJECT REPORT

Submitted by

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OAI1903 - INTRODUCTION TO ROBOTIC PROCESS AUTOMATION

for the degree of

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in

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THANDALAM CHENNAI – 602 105

NOVEMBER 2023

RAJALAKSHMI ENGINEERING COLLEGE
CHENNAI - 602105

BONAFIDE CERTIFICATE

Certified that this project report **"TRAIN TRACKING SYSTEM"** is the bonafide work of **"KANIMOZHI A (210701104)"** 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

ABSTRACT

This system aimed at monitoring and tracking trains in real-time within a railway network. The increasing demand for efficient transportation services underscores the need for precise tracking and management of trains to ensure timely operations, passenger safety, and infrastructure optimization. The Train Tracking Bot leverages advanced technologies such as GPS, machine learning algorithms, and data analytic to gather, process, and present comprehensive information about train movements.

The system operates by collecting live data from sensors installed on trains and along railway tracks, allowing for continuous monitoring of train positions, speeds, and schedules. Utilizing machine learning models, the bot predicts potential delays or deviations from the planned routes, enabling proactive measures to mitigate disruptions. Additionally, it offers a user-friendly interface accessible via web or mobile platforms, providing railway operators, passengers, and relevant stakeholders with real-time updates on train statuses, estimated arrival times, and potential incidents.

ACKNOWLEDGEMENT

Initially we thank the Almighty for being with us through every walk of our life and showering his blessings through the endeavour to put forth this report.Our sincere thanks to our Chairman **Mr. S.Meganathan, B.E, F.I.E.,** our Vice Chairman **Mr. Abhay Shankar Meganathan, B.E., M.S.,** and our respected Chairperson **Dr. (Mrs.) Thangam Meganathan, Ph.D.,** for providing us with the requisite infrastructure and sincere endeavouring in educating us in their premier institution.

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KANIMOZHI A (210701104)

TABLEOFCONTENTS

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABBREVIATION	ACCRONYM
RPA	Robotic Process Automation
URL	Uniform Resource locator

CHAPTER 1

INTRODUCTION

1.1 DESCRIPTION

The efficient and seamless operation of railway systems is a cornerstone of modern transportation networks.The need for precision, reliability, and safety within these systems has spurred the development of sophisticated technologies aimed at enhancing train tracking and monitoring. In this context, the advent of the Train Tracking Bot represents a significant leap forward in the realm of automated railway management.

With the steady increase in global travel demands, the effective monitoring and management of train movements have become paramount. Delays, unexpected halts, and safety concerns pose challenges that traditional systems struggle to address comprehensively. The Train Tracking Bot emerges as a solution harnessing the power of real-time data analytics, machine learning algorithms, and advanced sensor technologies to revolutionize how we track and manage trains within railway networks.

This paper explores the design, functionality, and implications of the Train Tracking Bot, offering acomprehensive insight into its capabilities and the transformative impact it holds for the railway industry. By amalgamating cutting-edge technologies, this automated system aims to provide precise, real-time information on train positions, schedules, and potential deviations, thereby optimizing operations, ensuring passenger safety, and minimizing disruptions.

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1.2 OBJECTIVE

The objective of the Train Tracking Bot built with UiPath is to streamline and automate the process of providing users with comprehensive travel details for their train journeys. By integrating a user-friendly interface, data retrieval mechanisms, and email functionality, the bot aims to offer a seamless experience for users seeking information about train schedules, departure and arrival times, as well as ticket availability.

The Train Tracking Bot represents a trans-formative leap in railway management, aiming to revolutionize the industry through real-time monitoring, predictive analysis, and operational optimization of trains within a network. This system is designed to offer actionable insights for operators, enhancing efficiency,and ensuring passenger Safety. By leveraging cutting- edge technologies like machine learning and advanced sensors, the bot provides a user- friendly interface for stakeholders, promising an improved travel experience. This report aims to explore the comprehensive functionality, impact, and future scalability of the Train Tracking Bot in reshaping and innovating railway infrastructure.

This automation solution aims to enhance efficiency by reducing manual effort in gathering and disseminating travel information. Its primary goal is to empower users to effortlessly access pertinent details for their planned train trips through a simplified interface, allowing them to receive precise and timely information via email, thereby enhancing their travel planning and convenience.

1.3 EXISTING SYSTEM

In many traditional railway systems, tracking and managing trains rely on manual methods or legacy systems that often lack real-time capabilities and predictive analysis. These systems typically employ fixedschedules and limited monitoring, leading to inefficiencies, delays, and increased safety risks. Manual interventions for incident management and schedule adjustments are reactive, causing disruptions and inconvenience to passengers and operators. Moreover, the absence of robust predictive analysis tools results in a lack of foresight into potential issues, hampering proactive decision-making.Existing systems often face challenges in integrating diverse data sources, making it difficult to create a comprehensive viewof train movements. This fragmented approach hinders the ability to optimize routes, schedules, and resource allocation effectively. Passenger information dissemination tends to be inconsistent and reliant on outdated communication channels, leading to uncertainties and dissatisfaction among travelers. Overall, thelimitations of the existing systems underscore the critical need for a modernized, automated solution capable of real-time tracking, predictive analysis, and user-centric information dissemination to transform the railway management landscape.

1.4 PROPOSED SYSTEM

The proposed Train Tracking Bot redefines railway management by integrating real-time monitoring, predictive analysis, and user-centric interfaces. Leveraging advancedtechnologies like machine learning and live sensor data, this system offers railway operators actionable insights to optimize schedules, prevent disruptions, and ensure passenger safety. With a focus on enhancing the passenger experience through accurate real- time information dissemination, this comprehensive solution paves the way for a more efficient, proactive, and scalable approach to modernizing railway infrastructure

CHAPTER 2

LITERATURE REVIEW

Introduction

A literature review on a train tracking system provides an in-depth examination of existing research, studies, and developments related to the monitoring and management of train movements. This critical analysis serves as the foundation for understanding the current state of the field, identifying gaps in knowledge, and determining the key challenges and opportunities in train tracking systems.

The review begins by exploring the historical context of train tracking, tracing the evolution of technologies used for monitoring and managing train movements. This historical perspective helps establish a baseline for understanding the progression of train tracking systems over time.

Subsequently, the literature review delves into the various methodologies, technologies, and frameworks employed in train tracking systems. This includes an exploration of traditional methods, such as trackside signaling, as well as modern advancements like GPS-based systems, sensors, and communication networks. By synthesizing this information, the review aims to provide a comprehensive overview of the strengths and limitations of existing technologies in the context of train tracking.

Furthermore, the literature review assesses the impact of train tracking systems on operational efficiency, safety, and overall transportation infrastructure. It examines case studies and real-world implementations to gauge the practical implications of these systems in different geographical and operational settings.

1.UiPath and RPA in Transportation:

Explore research or articles that discuss the application of UiPath and Robotic Process Automation (RPA) in the transportation sector, especially in tracking systems or logistics management.

2.Web Scraping Techniques with UiPath:

Review articles or documentation on UiPath's capabilities for web scraping and data extraction from browser-based applications. Focus on extracting specific data relevant to train schedules, delays, and routes.

3.Email Automation with UiPath:

Investigate resources that detail the process of setting up SMTP email automation using UiPath. Look for information on configuring email servers, sending formatted emails, and handling attachments.

4.Data Security and Compliance in Automation:

Consider literature that addresses data security measures and compliance standards when automating processes that involve sensitive information like transportation schedules or user notifications.

5.Historical Evolution:

Trace the historical development of train tracking systems, starting from traditional methods like trackside signaling.Discuss significant milestones, technological

advancements, and paradigm shifts that have shaped the evolution of train tracking.

Identify key challenges faced by early tracking systems and how these challenges have been addressed over time.

6. Methodologies and Technologies in Train Tracking:

Explore the various methodologies employed in train tracking, ranging from traditional signaling to modern GPS-based systems.Review the role of technologies such as sensors, communication networks, and data analytics in enhancing the accuracy and reliability of train tracking.

Evaluate the strengths and limitations of different methodologies and technologies in diverse operational environments.

7. Impact on Operational Efficiency and Safety:

Investigate how effective train tracking systems contribute to improved operational efficiency in terms of scheduling, route optimization, and resource utilization.Assess the impact of train tracking on safety, including the prevention of collisions, derailments, and other potential hazards.Examine case studies and empirical evidence demonstrating the tangible benefits of advanced train tracking systems.

8. Regulatory and Policy Frameworks:

Analyze the regulatory landscape governing train tracking systems, considering international standards, industry guidelines, and government regulations.Discuss how regulatory frameworks influence the design, implementation, and operation of train tracking systems.Highlight any emerging trends or changes in regulations that impact the deployment of train tracking technologies.

9. Case Studies and Real-World Implementations:

Present detailed case studies of successful train tracking system implementations in

various geographical and operational contextsExplore challenges faced during the deployment of train tracking systems and lessons learned from these real-world experiences.Discuss the scalability and adaptability of different tracking solutions to diverse transportation infrastructures.

10. Research Gaps and Future Directions:

Identify gaps in the current research and literature related to train tracking systems.Propose potential areas for future research and innovation, considering technological advancements, operational challenges, and evolving industry needs.Discuss the importance of addressing these research gaps to further enhance the capabilities and effectiveness of train tracking systems.

Conclusion:

The literature review on train tracking systems has provided a comprehensive exploration of the historical evolution, methodologies, technologies, impacts, regulatory frameworks, and real-world implementations associated with the monitoring and management of train movements. As we conclude this review, several key insights and implications emerge.The historical journey from traditional trackside signaling to modern GPS-based and sensor-driven systems reflects a continuous effort to enhance the accuracy, reliability, and efficiency of train tracking. Over time, technological advancements have played a pivotal role in overcoming challenges and improving the overall safety of rail transportation.The diverse range of methodologies and technologies in train tracking, including GPS, sensors, and communication networks, offers a wealth of options for system designers. However, the literature also underscores the challenges associated with interoperability, standardization, and the need for seamless integration across different technological platforms.

The impact of effective train tracking systems on operational efficiency and safety is evident. From optimized scheduling to proactive hazard prevention, these systems have demonstrated their ability to enhance the overall performance of rail networks. Case studies emphasize real-world successes, further reinforcing the importance of continued investment in advanced tracking technologies.The regulatory and policy landscape governing train tracking systems has a significant influence on their design, deployment, and operation. Compliance with international standards and adherence to industry guidelines are critical factors in ensuring the seamless integration of tracking technologies into existing rail infrastructure.The literature review has identified several research gaps, emphasizing the need for further investigation into areas such as improved interoperability, cybersecurity, and the integration of emerging technologies. As the rail transportation landscape evolves, future research should focus on addressing these gaps to ensure the continued advancement of train tracking

systems.In conclusion, the literature review highlights the dynamic nature of train tracking systems and their crucial role in shaping the future of rail transportation. The synthesis of historical context, technological advancements, operational impacts, and regulatory considerations provides a foundation for future research and development in this field. As the demand for efficient, safe, and adaptive rail networks grows, the insights gained from this literature review will serve as a valuable guide for researchers, practitioners, and policymakers involved in the evolution of train tracking systems**.**

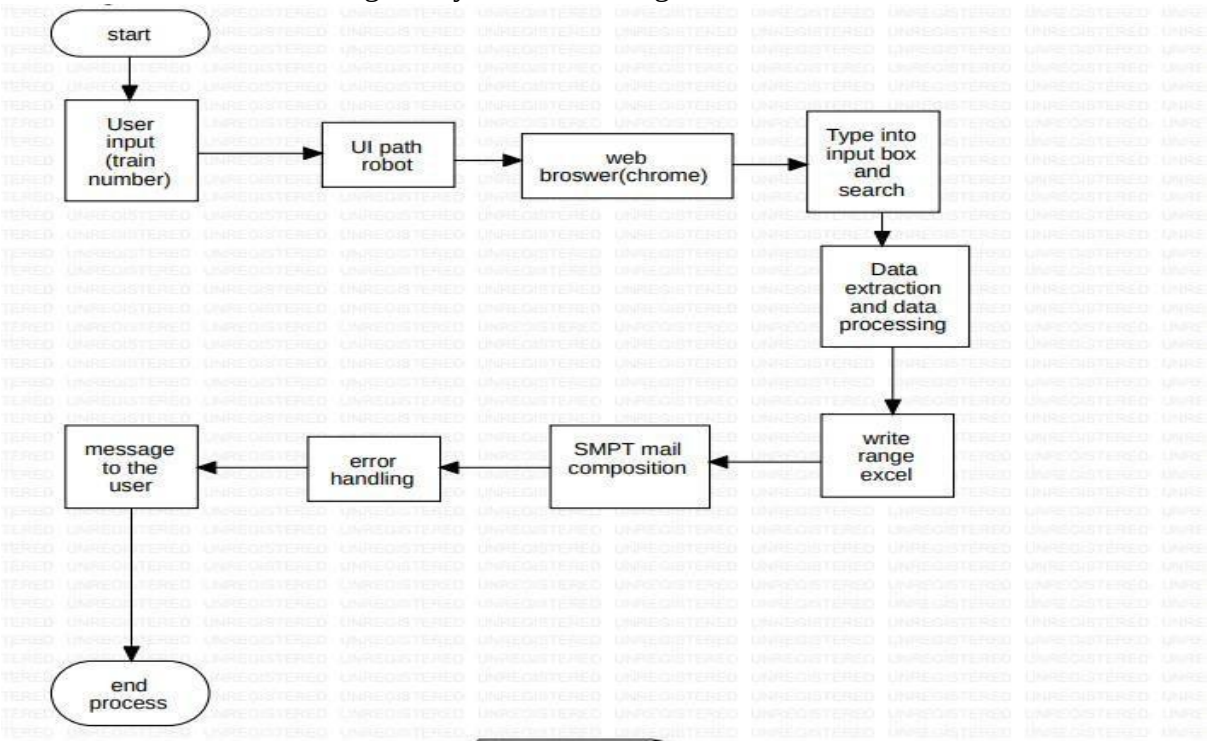
CHAPTER 3

SYSTEM DESIGN

3.1 SYSTEM FLOW DIAGRAM

A flowchart is a type of diagram that represents an algorithm, workflow or process. The flowchart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows. This diagrammatic representation illustrates a solution model to a given problem.

Fig 3.1 System Flow Diagram



3.2 ARCHITECTURE DIAGRAM

An architecture diagram is a graphical representation of a set of concepts, that are part of an architecture, including their principles, elements and components.

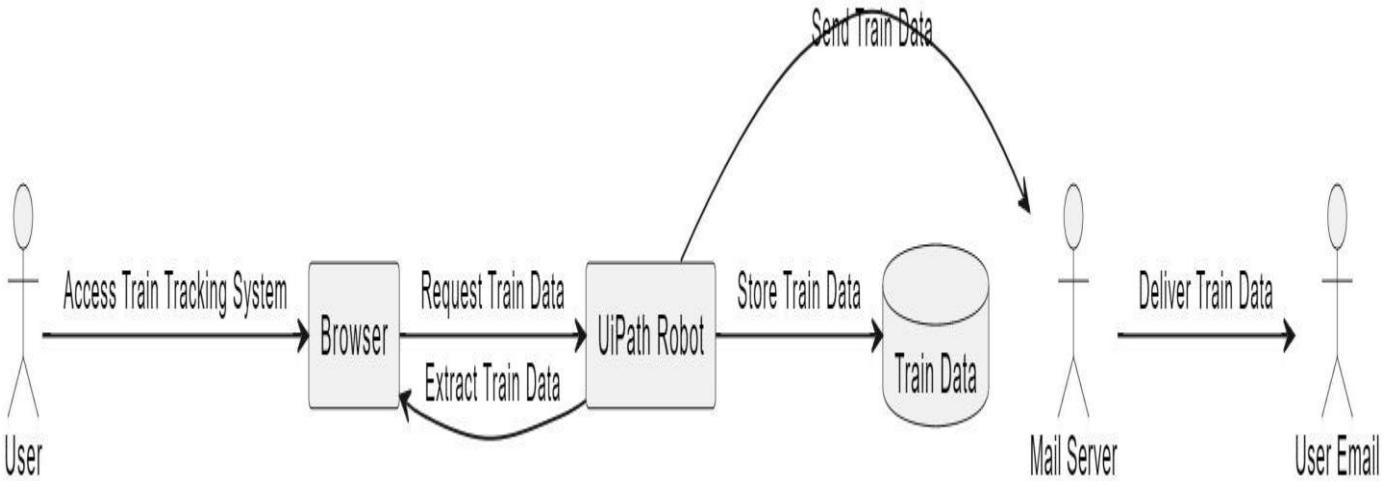


Fig 3.2 Architecture Diagram

3.3 SEQUENCE DIAGRAM

A sequence diagram is a type of interaction diagram because it describes how and in what order a group of objects works together.

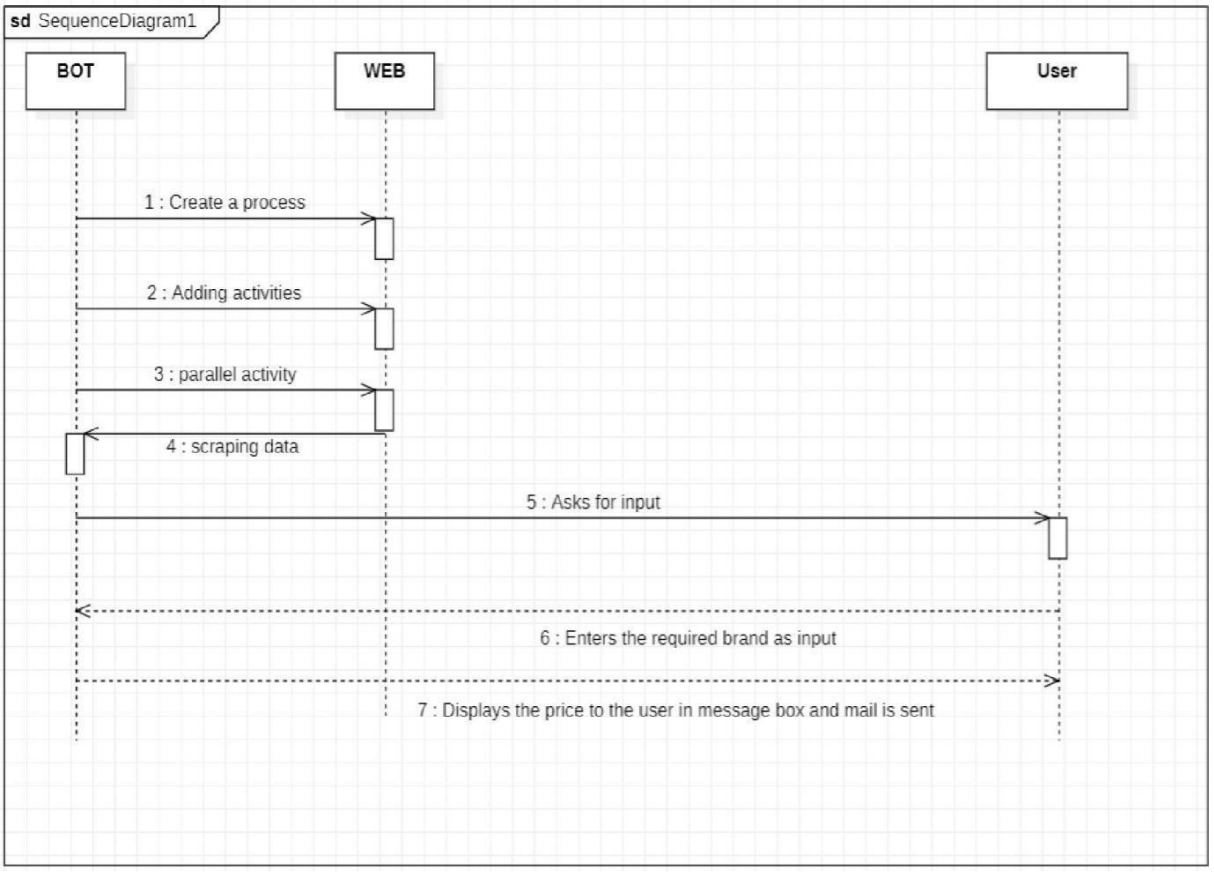


Fig 3.3 Sequence Diagram

CHAPTER 4
PROJECT DESCRIPTION

4.1 METHODOLOGIES

Our proposed system does not always have a priori information about the future motion of a user. In other words, in contrast to other enterprise systems discussed so far, a user does not need to provide his/her destination. Location prediction is important in other applications such as wireless bandwidth allocation (in a cellular architecture, location prediction enables optimizing allocation of bandwidth to cells). We have developed methods of motion prediction based on historical trajectories of moving objects.Our prediction methodology is since often-moving objects have some degree of regularity intheir motion.

IMAP: The project successfully integrated IMAP functionalities within the Train Tracking Bot, leveraging the protocol to streamline email interactions. IMAP facilitated seamless email retrieval, enabling the bot to access, process, and utilize email content for user-specific requests, enhancing the accuracy of travel details provided. Through IMAP's synchronized access to server folders, the bot efficiently managed email communications, ensuring precise delivery of train schedules and travel information directly to users' inboxes. This implementation significantly improved the bot's functionality, enabling it to interact with email content dynamically, ultimately enhancing the user experience by delivering timely and tailored travel updates..

Excel Automation: UiPath offers a deep integration with Microsoft Excel and ships with several activities that automate the tasks you perform in Excel.This option enables you to enter cell and range references, table names, or sheet names, which can be useful when you are working with Excel files with dynamic names, o with files that don't exist at design time and no template file is available.

Data Table: Data Table variables represent a type of variable that can store big pieces of information, and act as a database or a simple spreadsheet with rows and columns. They can be found in the Browse and Select a.Net Type window, under the System. Data namespace (System.Data.DataTable). These variables can be useful to migrate specificdata from a database to another, extract information from a website and store it locally in a spreadsheet and many others.

Create a Folder: Creates a folder in the specified location. If a folder with the same name already exists at the specified path, the activity does nothing.

MODULES

1. Get IMAP Mail Messages

First the bot accesses the given mail's inbox. All the unread emails are read and stored in a defined mail variable.

2. Assign

"Assign" block is used to assign a random and unique number to the mail which will act as an UID.

3. UiPath.Excel.Activities

With UiPath Excel Automation, manipulating Excel databecomes has lean error-free. It's a valuable time and relieve sand error free.

4. Uipath.Mail.Activities

The UiPath.Mail.Activities package includes all the activities related to email.They enable you to send email via the SMTPprotocol, or read them via the POP3.

5. Uipath.System.Activities

There are various numbers of Activities in UiPath, foreach and every functionality.

6. Uipath.Testing.Activities

Test Activity can be used in two ways: Add default values to properties and test.

CHAPTER 5

SCREENSHOTS

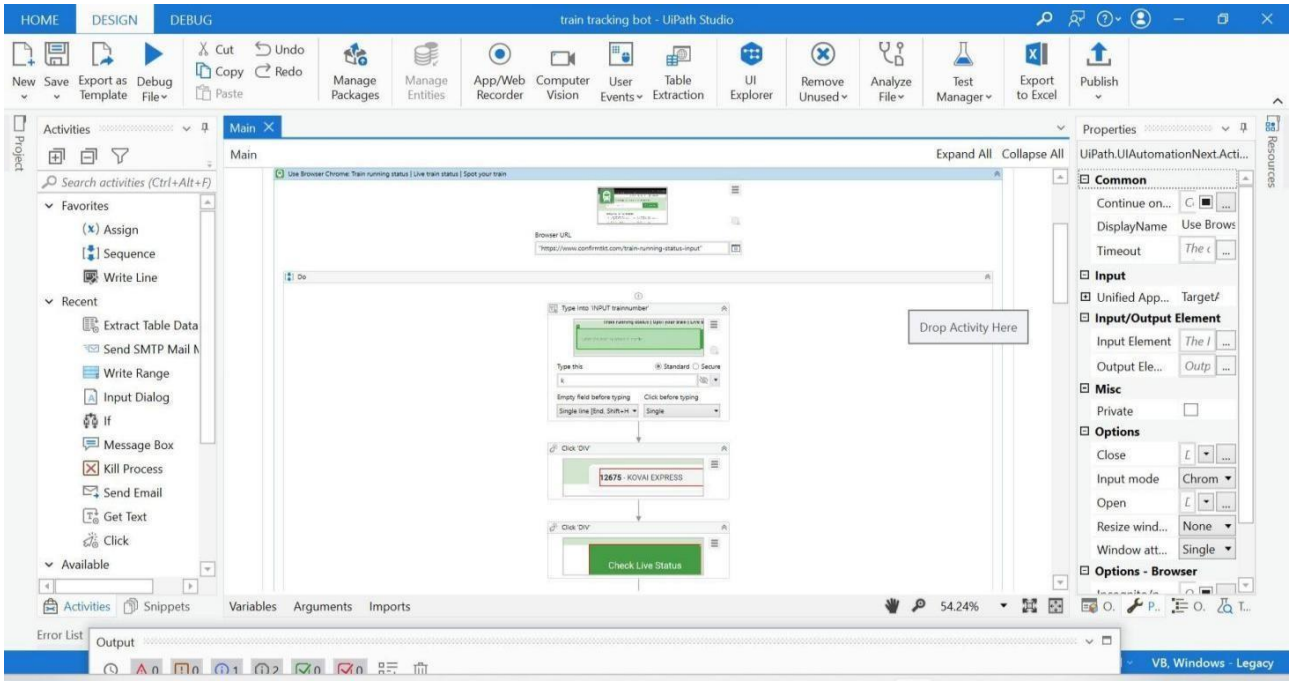


Fig 5.1 open browser

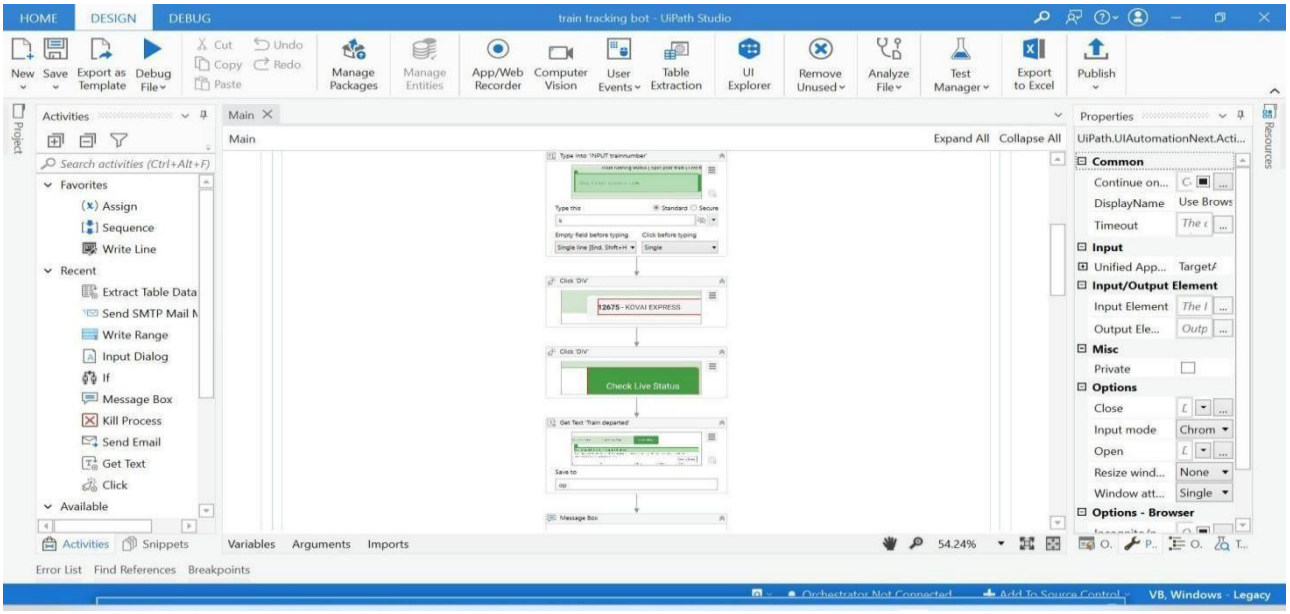


Fig 5.2 Type into the source

CHAPTER 6

CONCLUSION

The implementation of the train tracking bot using UiPath marks a significant advancement in automating data extraction and dissemination from train tracking websites. This project successfully streamlined the process by efficiently extracting relevant information, processing it into an Excel format, and delivering concise, accurate updates to users via email. The achieved efficiency gains, accuracy improvements, and enhanced accessibility underscore the transformative potential of automation. Looking ahead, opportunities exist to further enrich reporting capabilities, enable real-time updates, and incorporate user interaction, setting the stage for continued evolution and optimization of this innovative solution.

APPENDIX

SAMPLE PROCESS

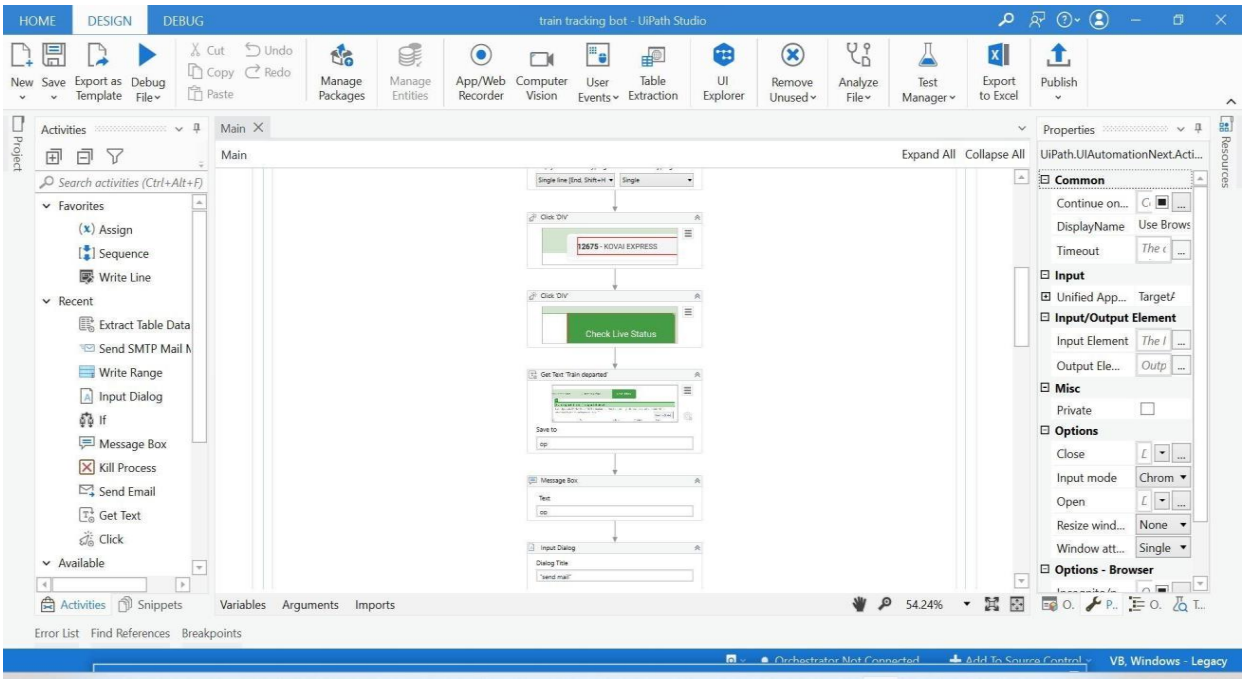


Fig 6.1 Select the input box in browser

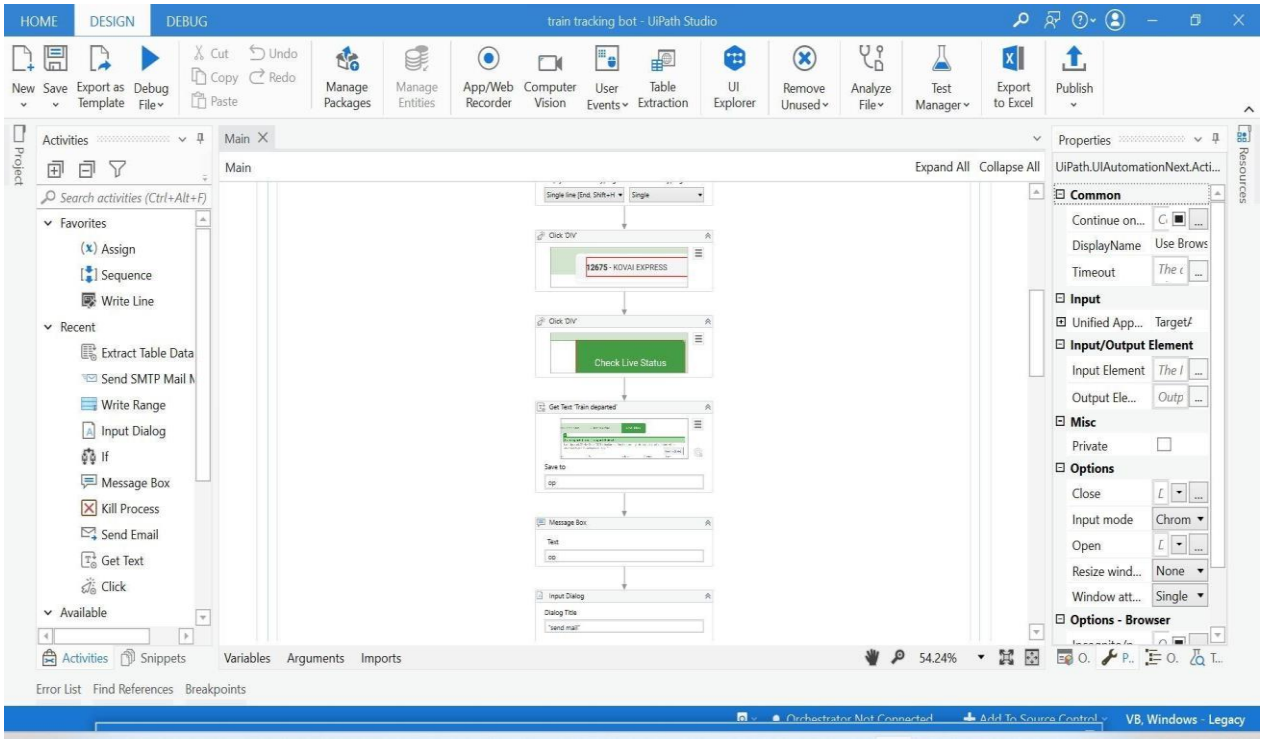


Fig 6.2 click the search button in browser

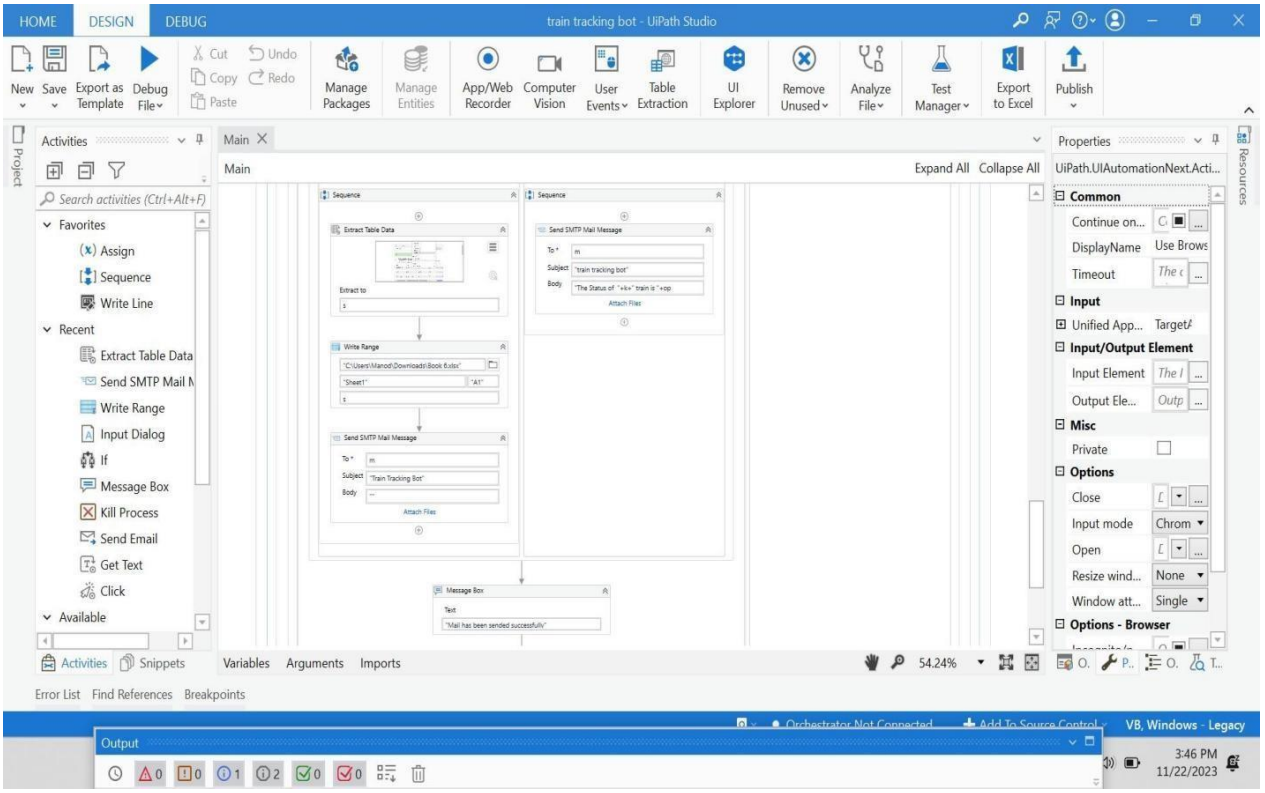


Fig 6.3 Extract data from the browser.

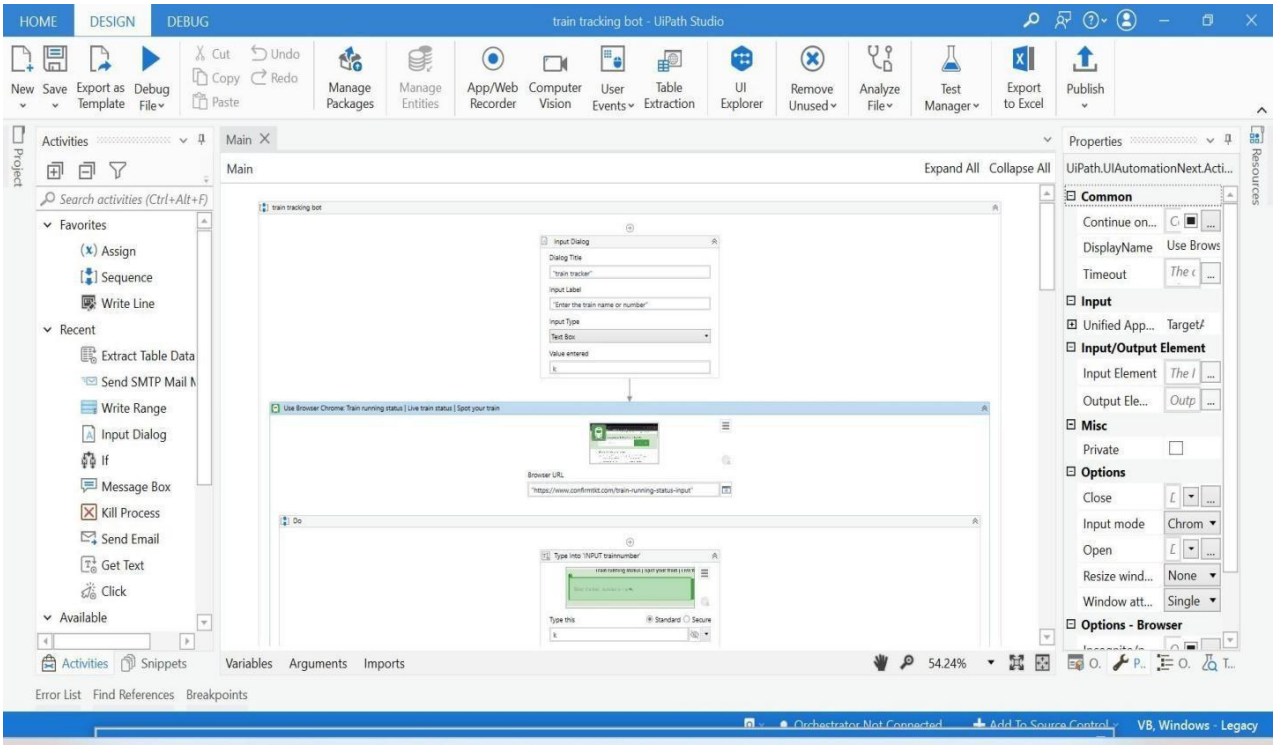


Fig 6.4 Write the data in excel file

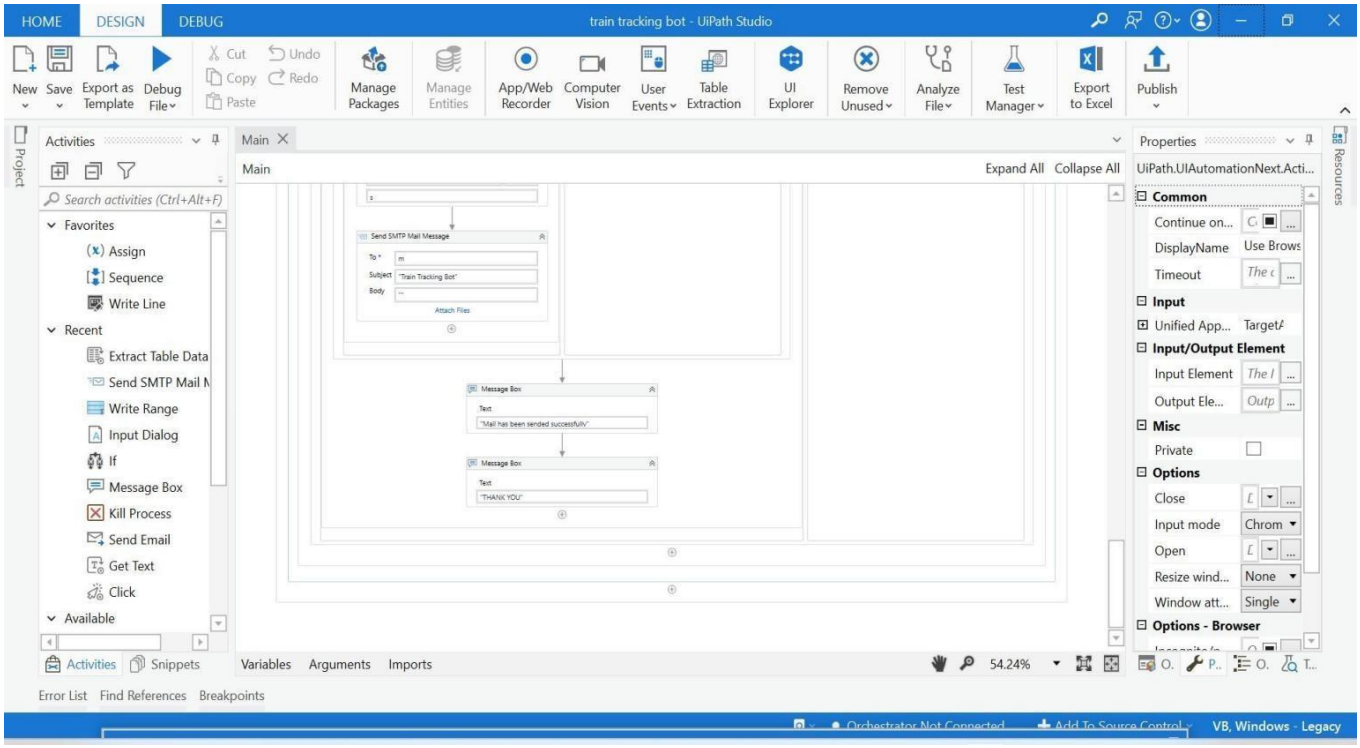


Fig 6.5 Sending smpt mail.

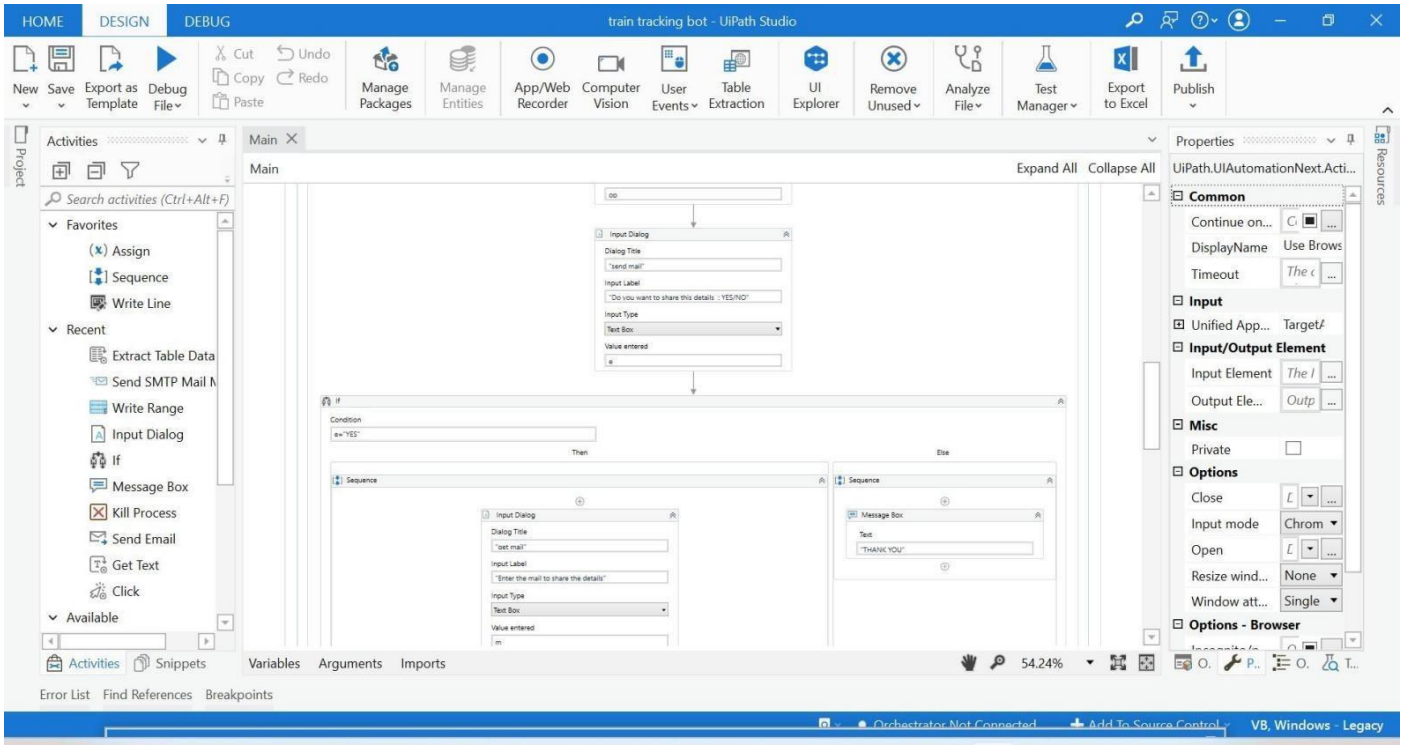
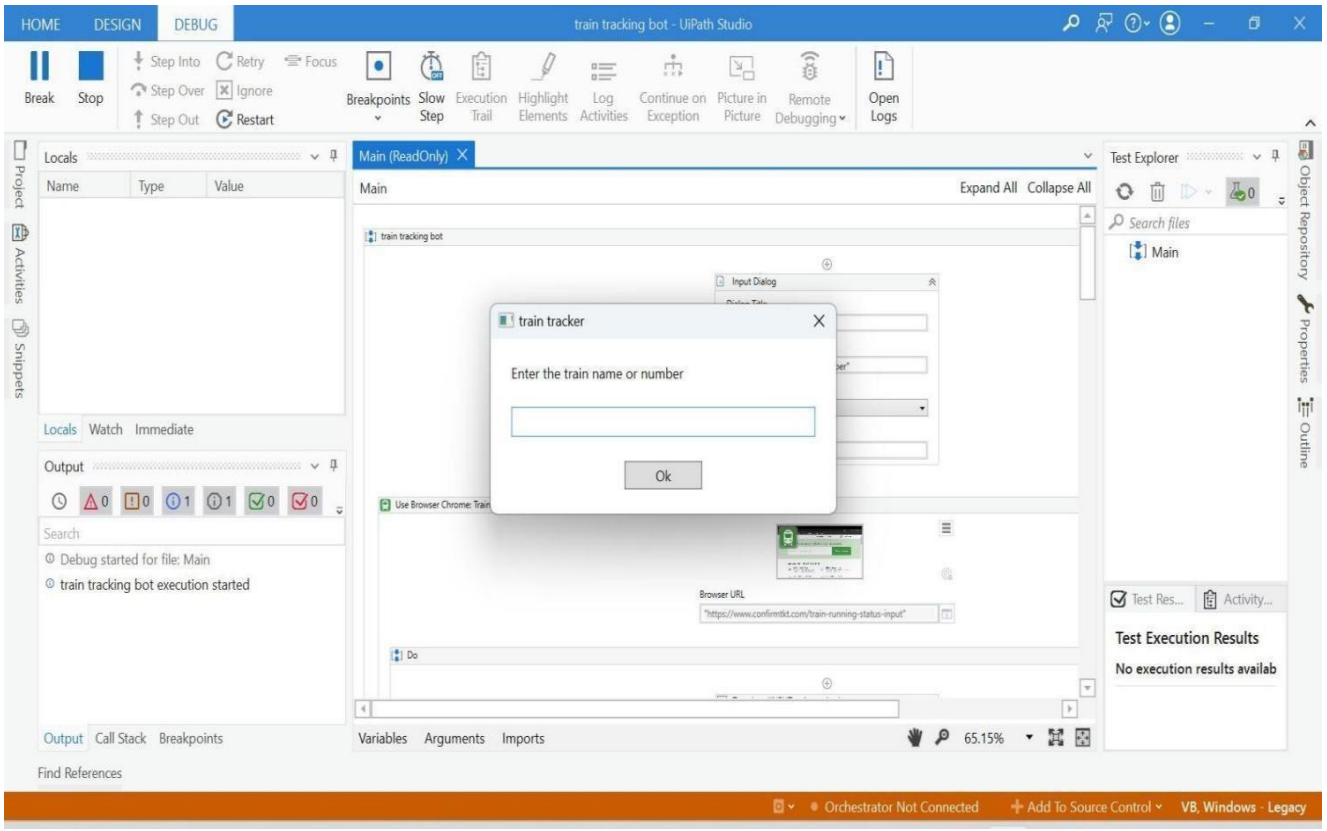
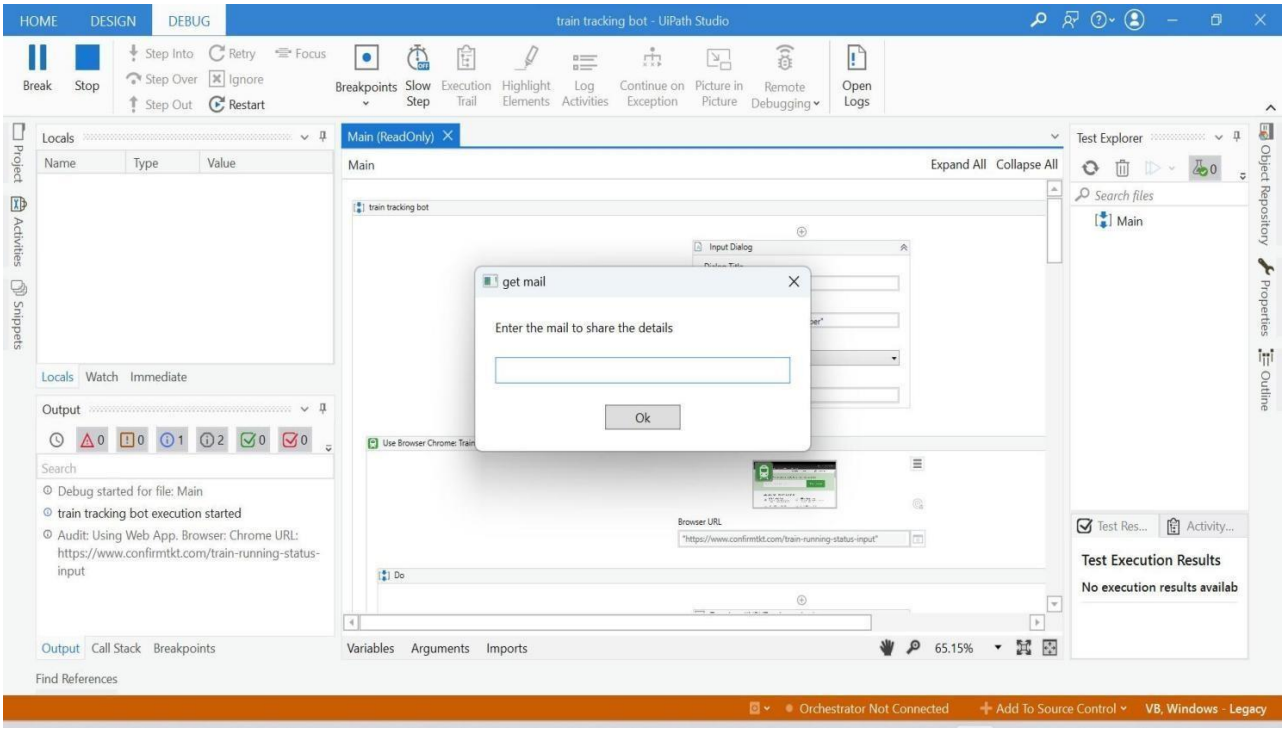


Fig 6.6 Message box after sending mail.

RESULT:

OUTPUT:




HOME
DESIGN
DEBUG
train tracking bot - UiPath Studio
Break
Stop
Step Into
Step Over
Step Out
Retry
Ignore
Restart
Focus
Breakpoints
Slow Step
Execution Trail
Highlight Elements
Log Activities
Continue on Exception
Picture in Picture
Remote Debugging
Open Logs
Locals
Name
Type
Value
Locals
Watch
Immediate
Output
Search
Debug started for file: Main
train tracking bot execution started
Audit: Using Web App. Browser: Chrome URL: https://www.confirmtkt.com/train-running-status-input
Output
Call Stack
Breakpoints
Find References
Main (ReadOnly)
Main
Expand All
Collapse All
train tracking bot
Input Dialog
get mail
Enter the mail to share the details
Ok
Use Browser Chrome: Train
Browser URL
"https://www.confirmtkt.com/train-running-status-input"
Do
Variables
Arguments
Imports
65.15%
Test Explorer
Search files
Main
Test Res...
Activity...
Test Execution Results
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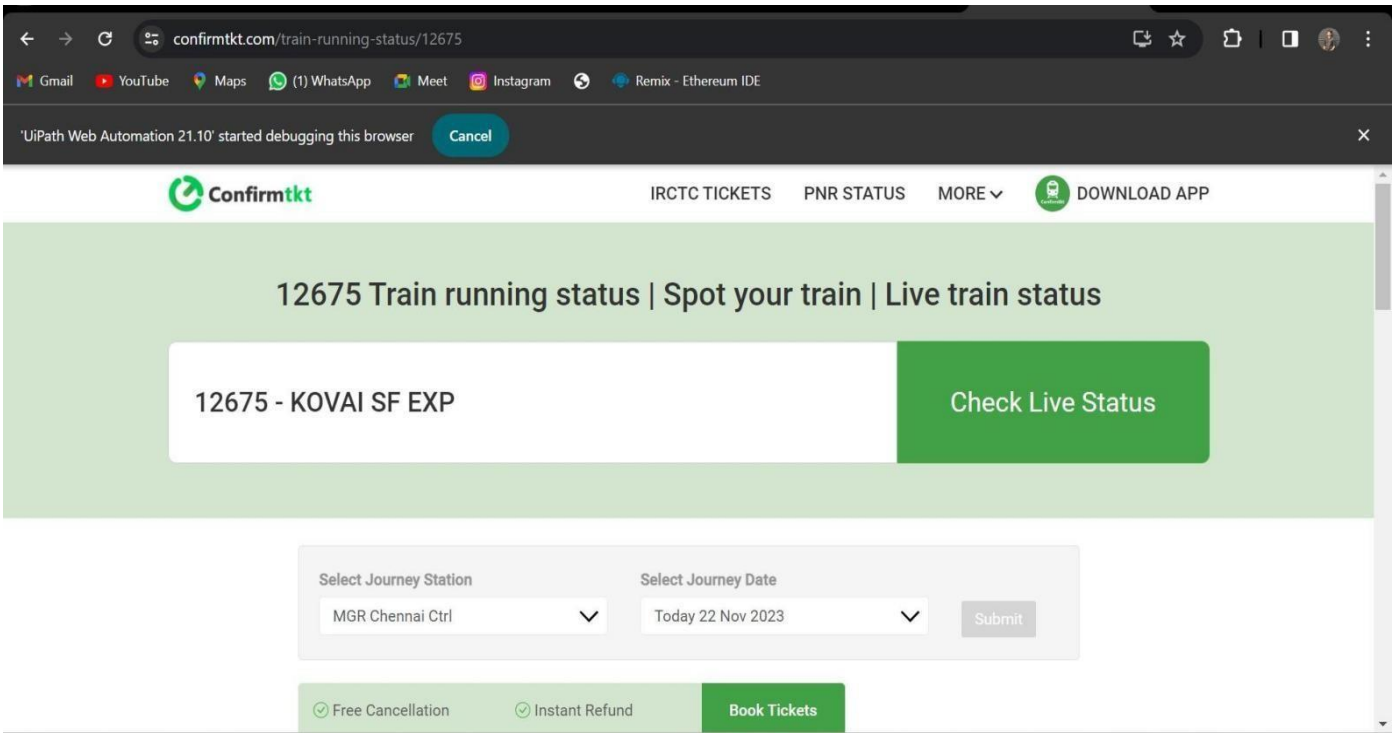
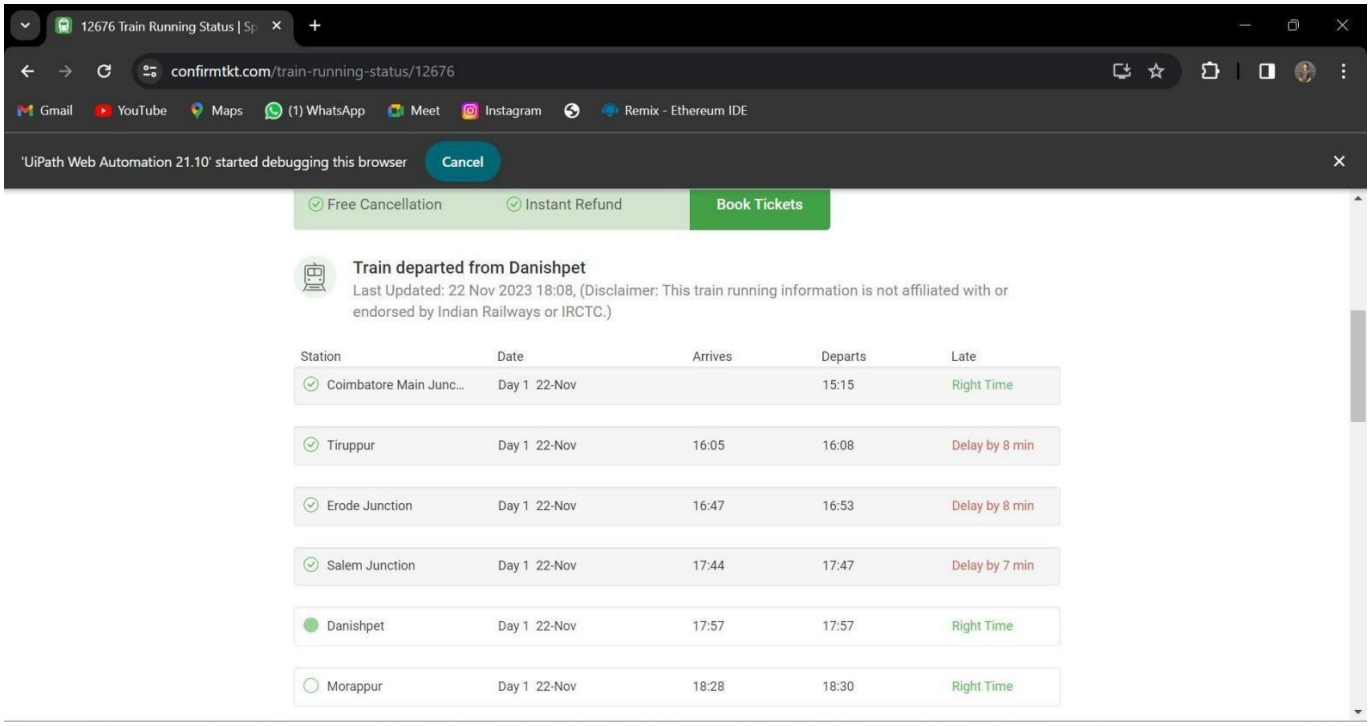
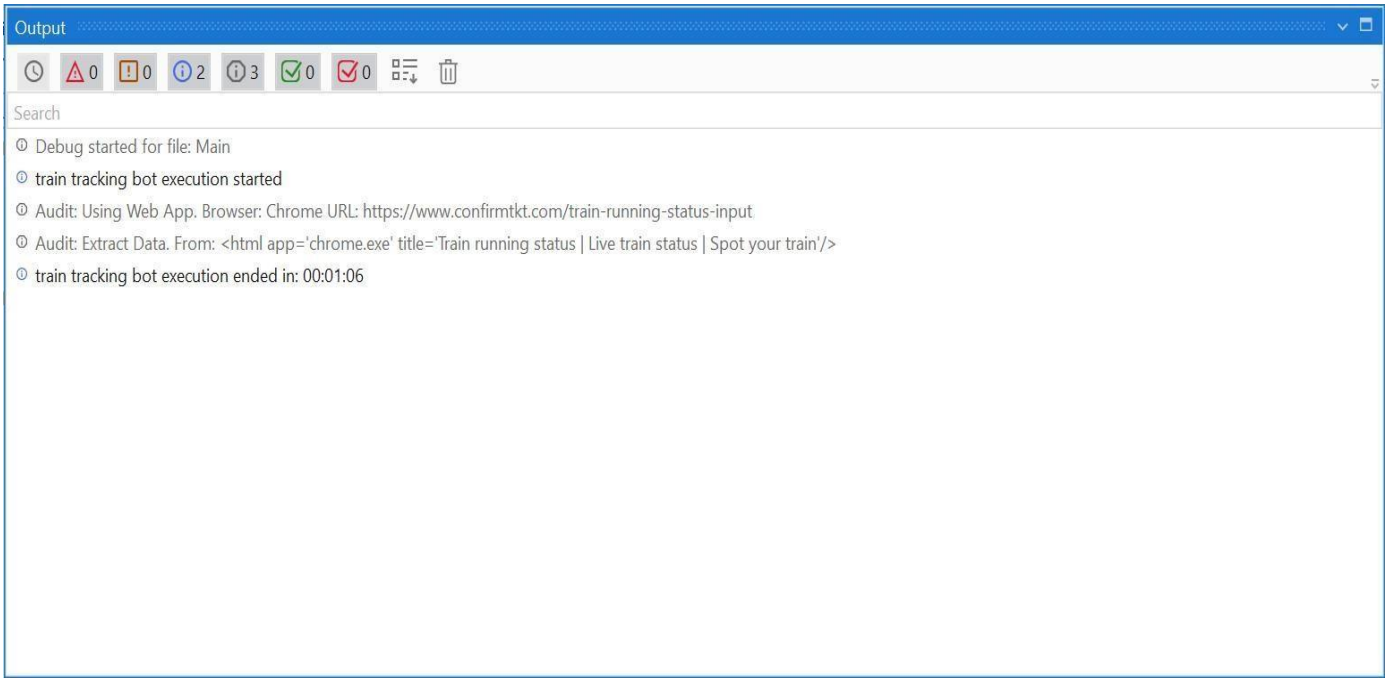
Activities
Snippets
Object Repository
Properties
Outline
Orchestrator Not Connected
Add To Source Control
VB, Windows - Legacy

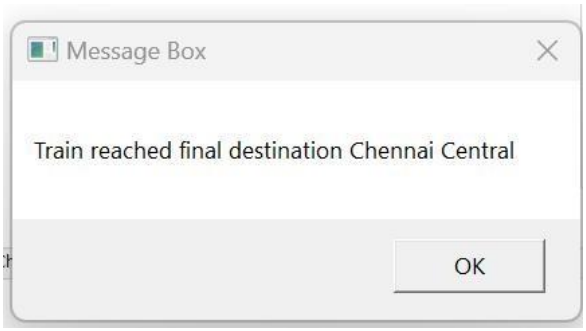

confirmtkt.com/train-running-status/12675
Gmail
YouTube
Maps
(1) WhatsApp
Meet
Instagram
Remix - Ethereum IDE
'UiPath Web Automation 21.10' started debugging this browser
Cancel
Confirmtkt
IRCTC TICKETS
PNR STATUS
MORE
DOWNLOAD APP
12675 Train running status | Spot your train | Live train status
12675 - KOVAI SF EXP
Check Live Status
Select Journey Station
MGR Chennai Ctrl
Select Journey Date
Today 22 Nov 2023
Submit
Free Cancellation
Instant Refund
Book Tickets

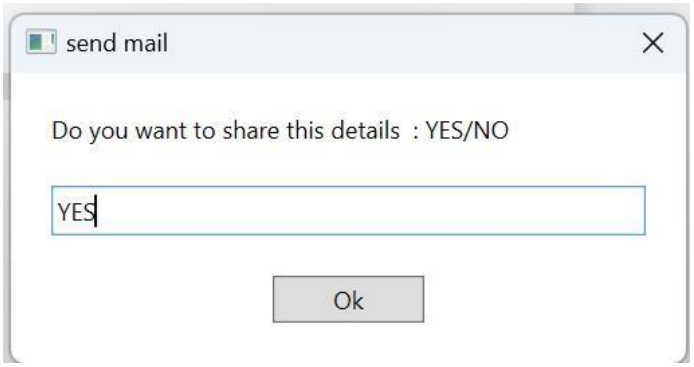

12676 Train Running Status | Sp
confirmtkt.com/train-running-status/12676
Gmail
YouTube
Maps
(1) WhatsApp
Meet
Instagram
Remix - Ethereum IDE
'UiPath Web Automation 21.10' started debugging this browser
Cancel
Free Cancellation
Instant Refund
Book Tickets
Train departed from Danishpet
Last Updated: 22 Nov 2023 18:08, (Disclaimer: This train running information is not affiliated with or endorsed by Indian Railways or IRCTC.)
Station
Date
Arrives
Departs
Late
Coimbatore Main Junc...
Day 1 22-Nov
15:15
Right Time
Tiruppur
Day 1 22-Nov
16:05
16:08
Delay by 8 min
Erode Junction
Day 1 22-Nov
16:47
16:53
Delay by 8 min
Salem Junction
Day 1 22-Nov
17:44
17:47
Delay by 7 min
Danishpet
Day 1 22-Nov
17:57
17:57
Right Time
Morappur
Day 1 22-Nov
18:28
18:30
Right Time


to me
The Status of 12675 train is Train reached final destination Coimbatore Main Junction
One attachment • Scanned by Gmail
Book 6.xlsx
Reply
Forward


Output
0
0
2
3
0
0
Search
Debug started for file: Main
train tracking bot execution started
Audit: Using Web App. Browser: Chrome URL: https://www.confirmtkt.com/train-running-status-input
Audit: Extract Data. From: <html app='chrome.exe' title='Train running status | Live train status | Spot your train'/>
train tracking bot execution ended in: 00:01:06

5


Message Box
Train reached final destination Chennai Central
OK


send mail
Do you want to share this details : YES/NO
YES
Ok


Message Box
Mail has been sended successfully
OK


Message...
THANK YOU
OK

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