AgriTech AI

PROJECT REPORT

Submitted By

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60 AD L01 & Robotic Process Automation

in partial fulfillment of the requirement
for the award of the degree

of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND BUSINESS SYSTEMS

K.S. RANGASAMY COLLEGE OF TECHNOLOGY
(Autonomous)

TIRUCHENGODE – 637 215
MAY 2025

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BONAFIDE CERTIFICATE

Certified that this project report titled **"AgriTech AI"** is the Bonafide work of **Nakul V (2303737724421021)** who carried out the project under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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Submitted for the viva-voce examination held on …………………….…………

Internal Examiner - 1 **Internal Examiner - 2**

DECLARATION

I declare that the project report on **"AgriTech AI"** is the result of original work done by me and best of my knowledge, similar work has not been submitted to **"ANNA UNIVERSITY CHENNAI"** for the requirement of Degree of Bachelor of Technology. This project report is submitted on the partial fulfillment of the requirement of the award of Degree of Bachelor of Technology.

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Place : Tiruchengode

Date :

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ABSTRACT

Agriculture remains the backbone of the Indian economy, yet it faces significant challenges including labor shortages, unpredictable weather patterns, soil degradation, and inefficient farm management practices. To address these issues, this project proposes , a comprehensive Robotic Process Automation (RPA) system powered by UiPath and integrated with artificial intelligence and robotics. AgriBot-AI is developed to automate repetitive agricultural tasks such as crop monitoring, irrigation control, pest detection, and equipment management. This solution utilizes smart sensors, drone surveillance, machine learning models, and robotic actuators to provide precision and accuracy in agricultural operations. The use of UiPath allows seamless integration of automation workflows, cloud synchronization, and real-time decision-making. By enhancing productivity and reducing dependency on manual labor, AgriBot-AI offers a scalable and sustainable approach to modern agriculture, empowering farmers to make data-driven decisions and adapt to environmental uncertainties with greater confidence.

TABLE OF CONTENTS

CHAPTER 1
INTRODUCTION

Traditional farming practices are being challenged by a global surge in food demand, limited arable land, erratic climate patterns, and a shrinking agricultural workforce. Despite technological advancements, many farming communities still rely on manual processes, leading to inconsistencies in yield, wastage of water and fertilizers, and vulnerability to crop failure. Hence, the need for digital transformation in agriculture is more pressing than ever. proposes a paradigm shift by introducing a smart automation system powered by RPA, robotics, and AI. Unlike conventional automation, RPA enables software robots (bots) to mimic human actions—reading sensor values, analysing patterns, making decisions, and triggering physical devices. Through this solution, activities such as checking soil moisture levels, activating irrigation, scanning crop leaves for diseases, and generating alerts become automated. The role of the human farmer transforms from operator to overseer—free to focus on planning, optimization, and market strategy. In essence, this project represents a convergence of agriculture, automation, and analytics—transforming labor-intensive farms into smart fields equipped for the future. It also enables inclusive innovation, allowing even small-scale farmers to adopt AI-driven techniques with minimal cost and training.

CHAPTER 2
TECHNOLOGIES

2.1 INTRODUCTION

The success of AgriBot-AI depends on the smart integration of several cutting-edge technologies. **UiPath**, a leading Robotic Process Automation (RPA) platform, enables the orchestration of tasks, sensor management, decision logic, and reporting. **Machine Learning** models built using Python and libraries like TensorFlow and OpenCV are used for image-based crop health analysis. **IoT (Internet of Things)** devices, including sensors for soil moisture, temperature, humidity, and environmental factors, provide real-time data from the field. These devices are controlled using **microcontrollers** such as Raspberry Pi and Arduino, which communicate with UiPath via APIs or cloud endpoints. The **robotic components**—such as automatic pesticide sprayers and irrigation actuators—are triggered by decisions made in UiPath workflows. Data is stored and synced using **cloud databases** like Firebase or Google Cloud Firestore. **Drones** equipped with high-resolution cameras are used for aerial mapping and crop inspection. By leveraging all these technologies under a single ecosystem, AgriBot-AI creates a powerful, flexible, and scalable solution for smart farming.

2.2 UI PATH

UiPath serves as the automation engine that binds the various components of AgriBot-AI into a cohesive and intelligent system. The **UiPath Studio** is used to design and deploy automation workflows that respond to sensor data, make decisions based on AI models, and trigger actions such as watering, alerting, or spraying. Through **UiPath Orchestrator**, these bots are deployed and scheduled across the field operations, ensuring real-time responsiveness and central control. **UiPath AI Center** is integrated to handle the execution of custom ML models, such as those used to detect plant diseases or predict crop yield based on weather data. UiPath bots also interface with cloud APIs and local databases to fetch weather data, log sensor readings, and update dashboards. For example, if the system detects that the soil moisture level has dropped below a critical threshold, a UiPath bot activates the water pump relay connected to a microcontroller, records the event, and notifies the farmer. This seamless integration ensures complete automation with very little manual oversight.

CHAPTER 3
DESIGN AND IMPLEMENTATION

3.1 SYSTEM DESIGN

The system architecture is designed with modularity and real-world scalability in mind. Each module is responsible for a specific function yet communicates with others via standardized interfaces.

INPUT LAYER:

This includes sensors (soil, air, light, humidity), drone image feeds, weather APIs (OpenWeatherMap), and manual override inputs. These sensors use analog/digital signals and are connected to microcontrollers that preprocess and send data to UiPath bots.

PROCESSING LAYER:

Here lies the intelligence. UiPath bots receive data, compare it with thresholds or run it through ML models, and determine appropriate actions. This layer handles Image classification (healthy vs diseased plants),Moisture and temperature monitoring, Time-based automation (e.g., daylight-sensitive spraying).

OUTPUT LAYER:

All system data is logged continuously in Firebase for traceability, analysis, and performance tracking. The design also supports fault tolerance—if a component fails, fallback alerts are issued, and tasks are either delayed or rerouted.

3.1 SYSTEM IMPLEMENTATION

The implementation of Agri-AI in UiPath begins with defining a structured and modular approach to automation using UiPath Studio. The first step is outlining the core workflows based on the tasks that need automation—such as irrigation control, disease detection, sensor data logging, and farmer notification. In UiPath Studio, each task is developed as a separate sequence or flowchart for clarity and reusability. For instance, one sequence handles data collection from Firebase or an API connected to sensors, another evaluates the received data, and a third takes the appropriate decision (e.g., turning on a motor or sending an alert). These individual workflows are organized using State Machine architecture inside a main dispatcher workflow, which makes the system scalable and responsive to external events or schedules. Reusability is ensured by using Invoke Workflow File activities, allowing logic to be shared across different modules. Every task is well-documented, parameterized, and logged to ensure that each action is traceable. Before full-scale deployment, the workflows are tested using mock data and UiPath's built-in debugging tools.

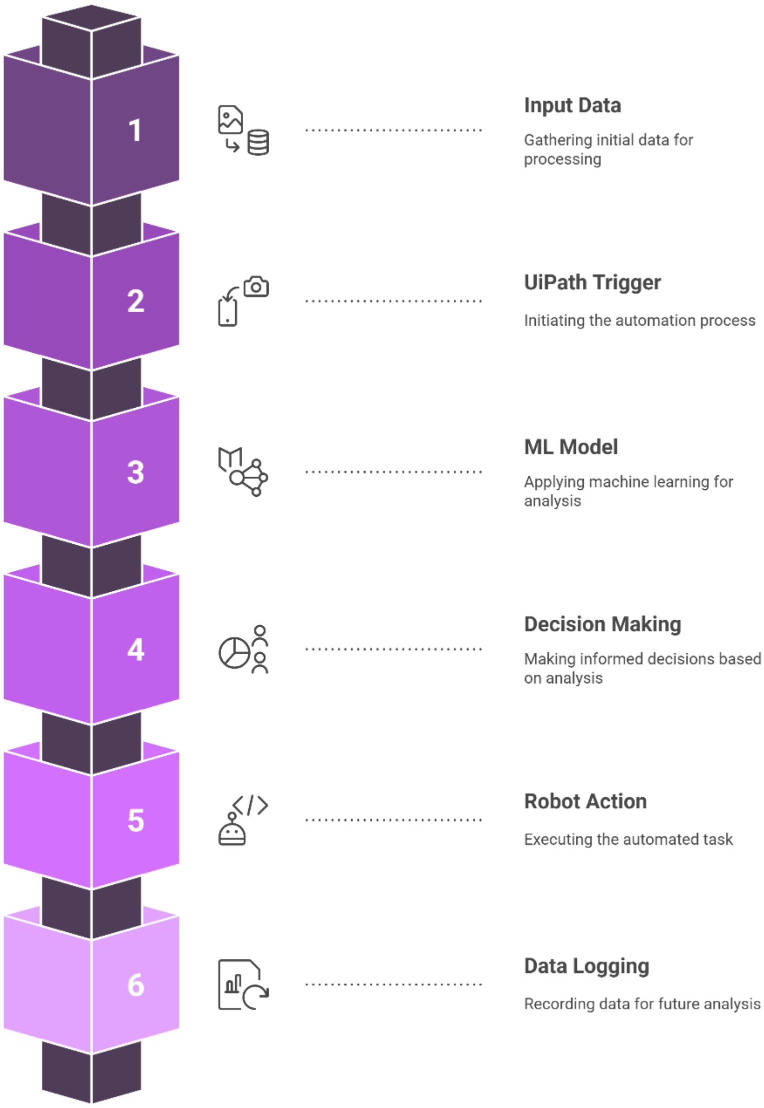
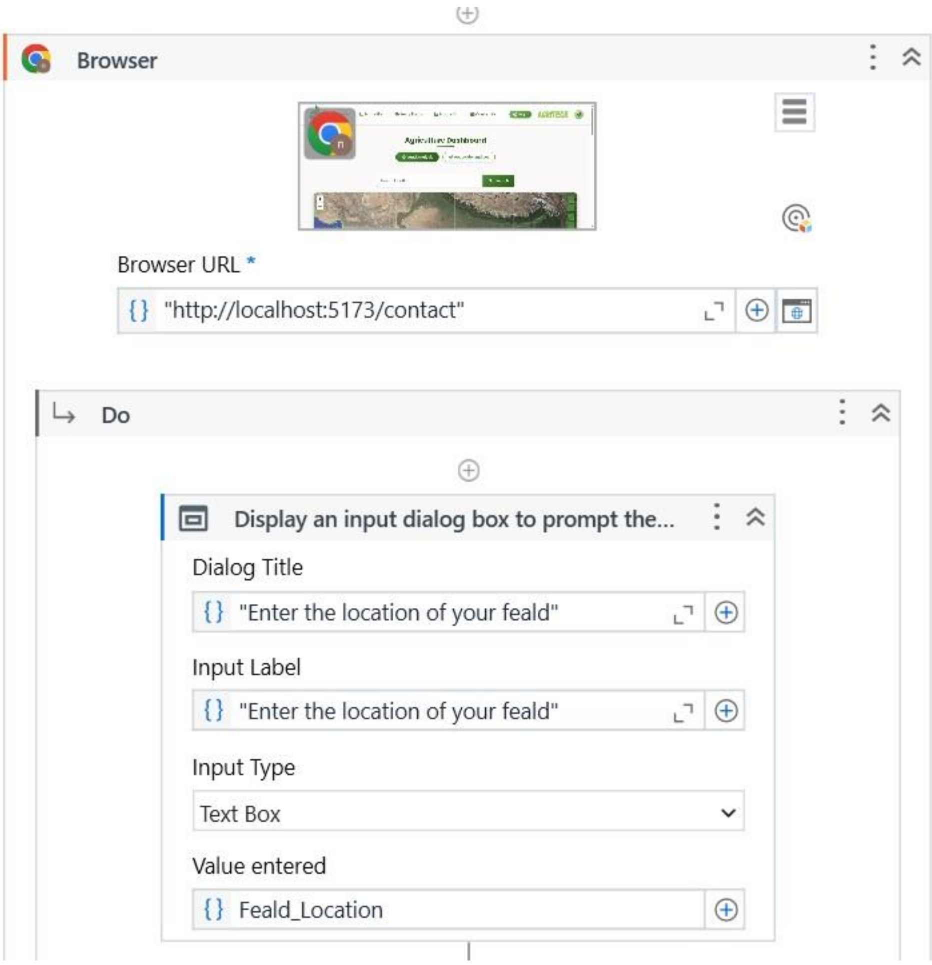
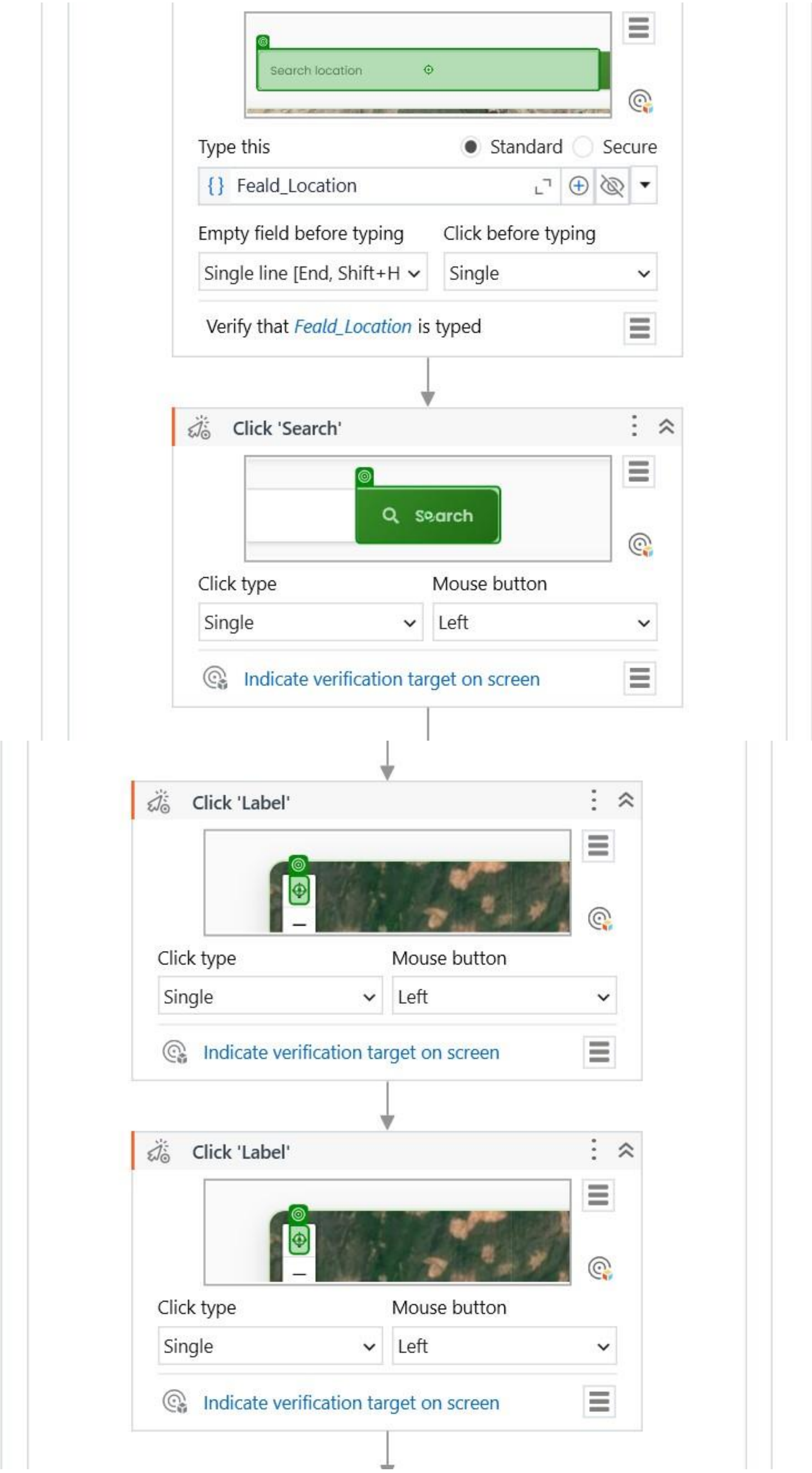


Fig. 3.1 SYSTEM FLOW DIAGRAM

CHAPTER 4

RESULTS





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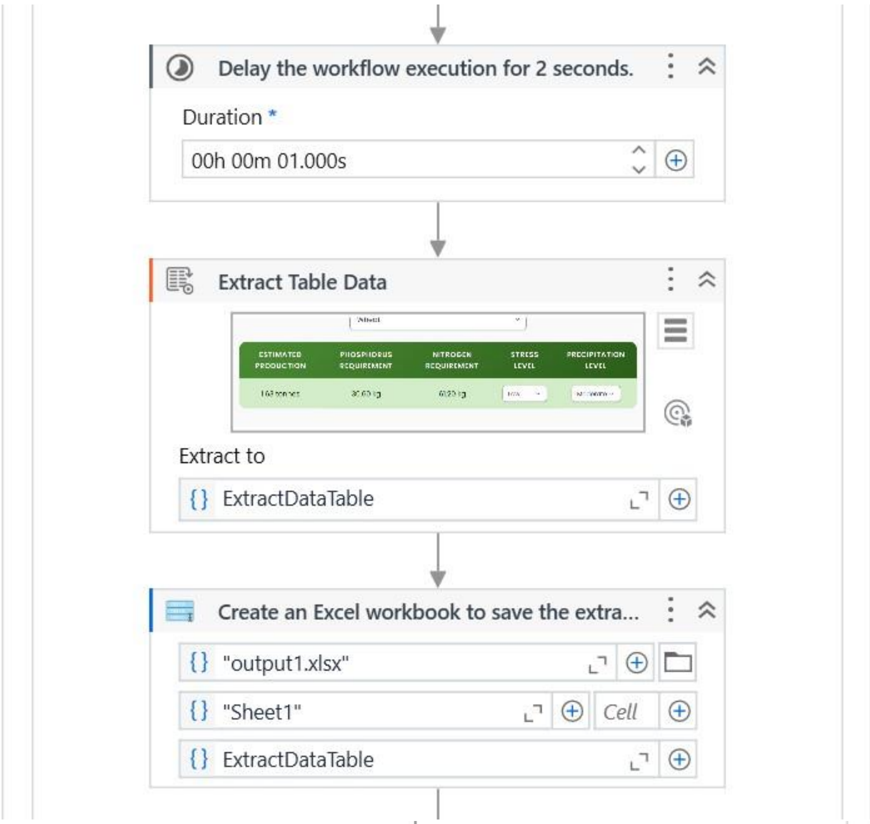
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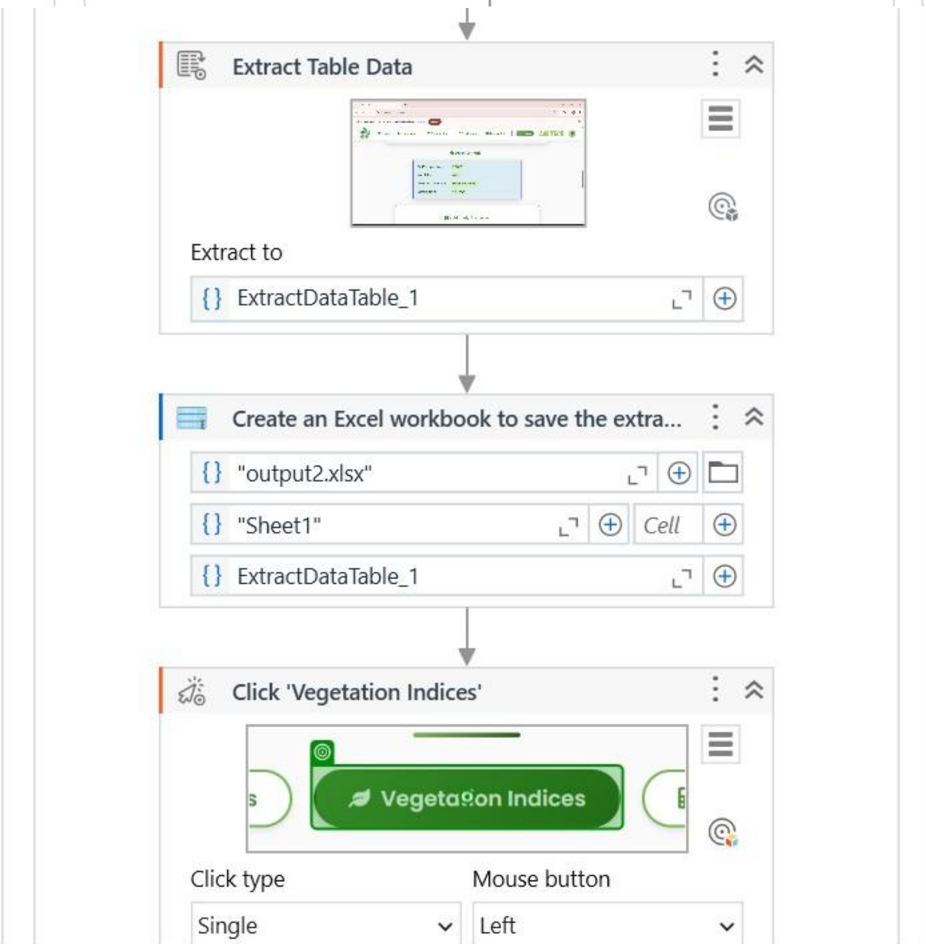
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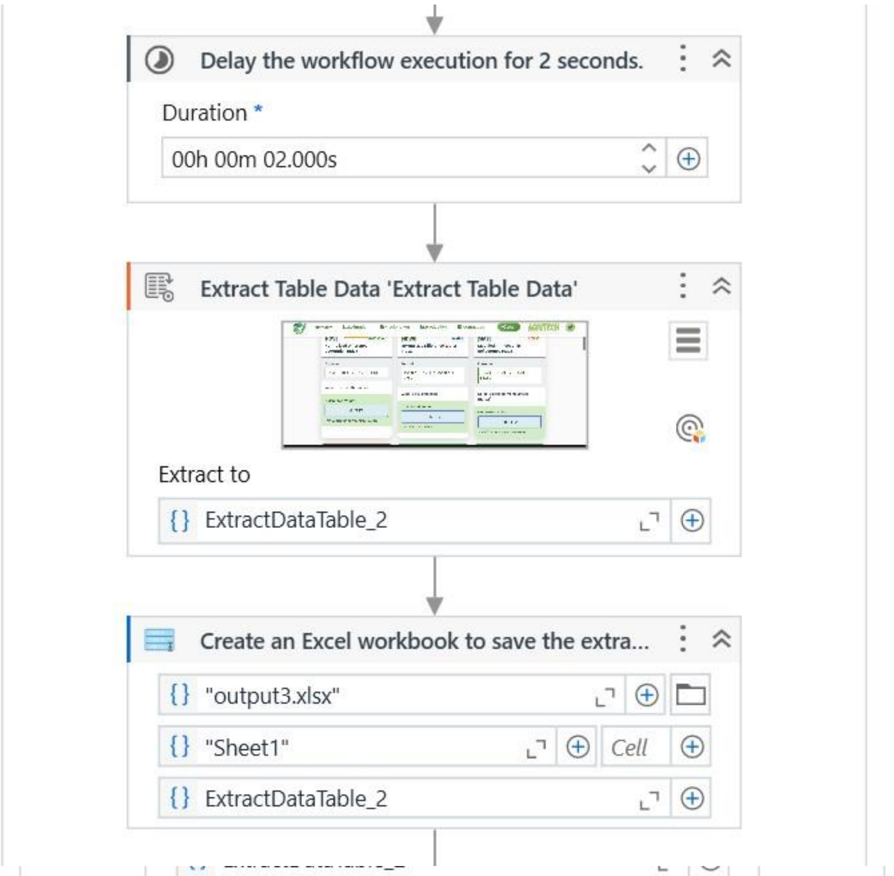
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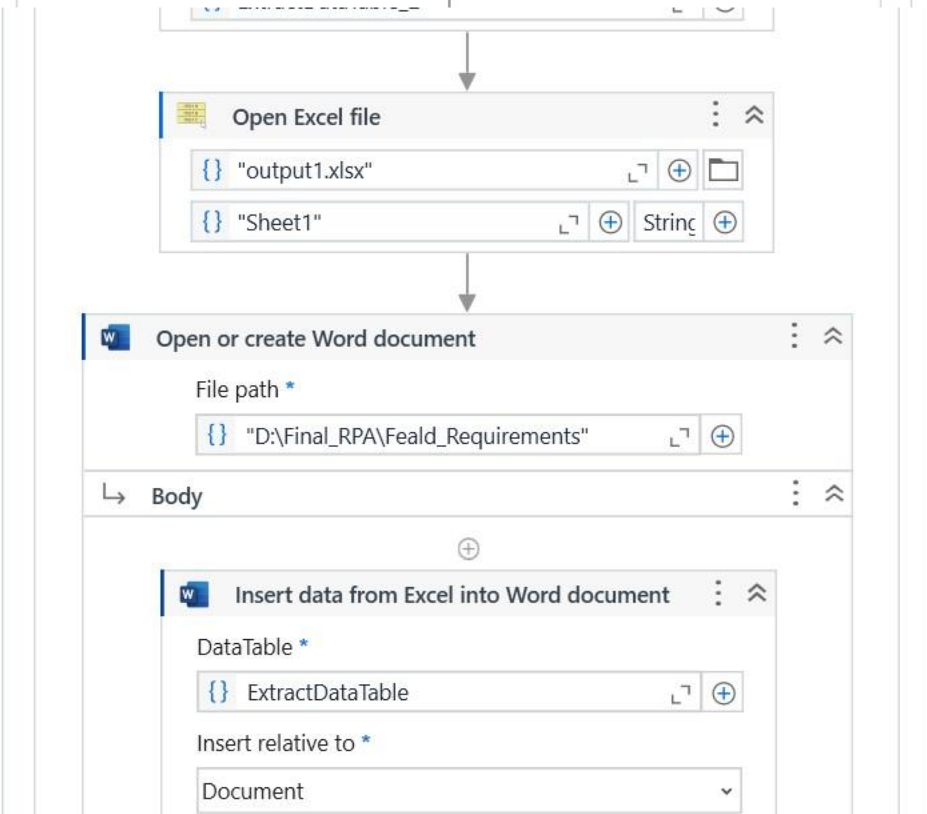
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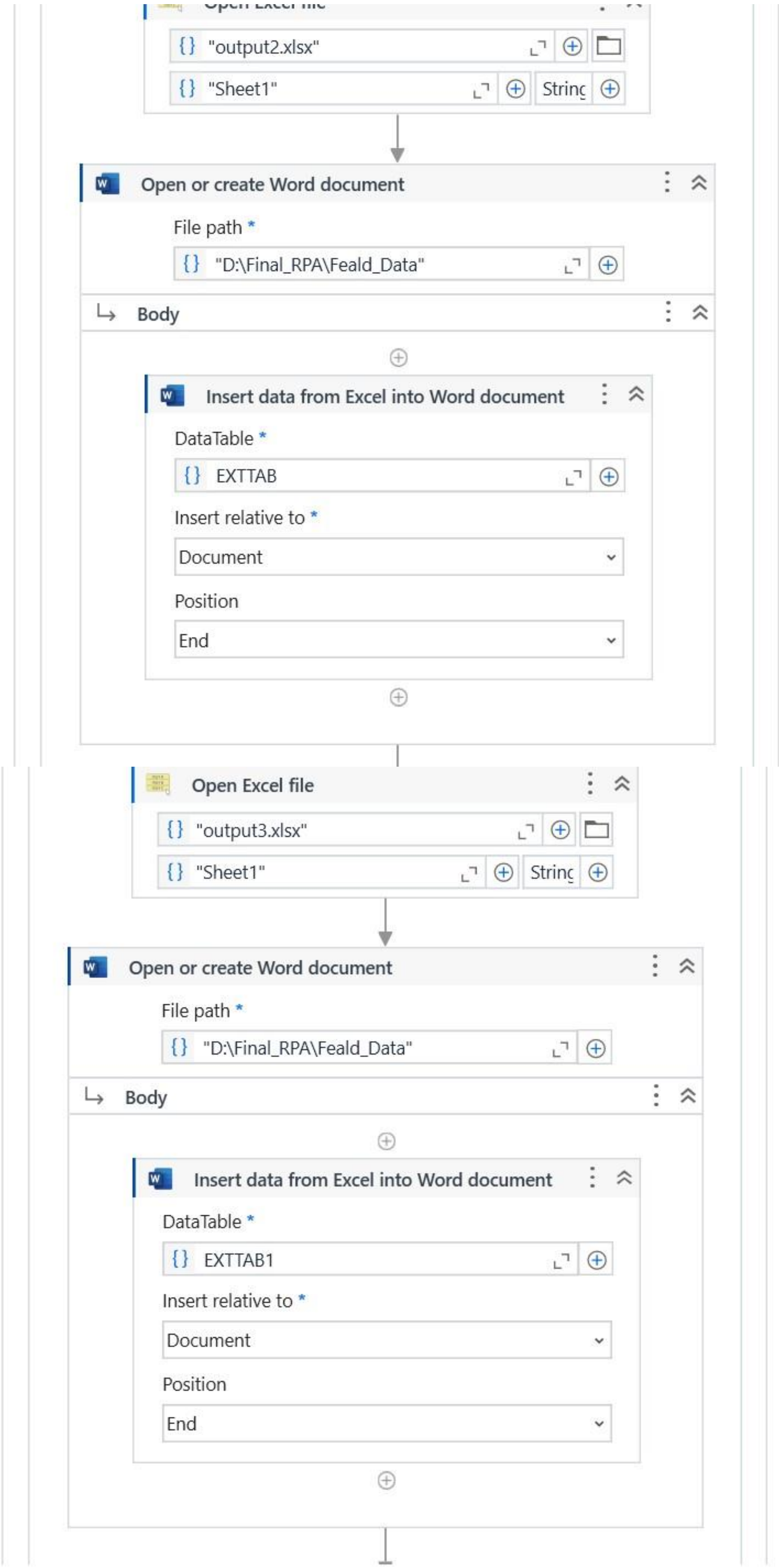
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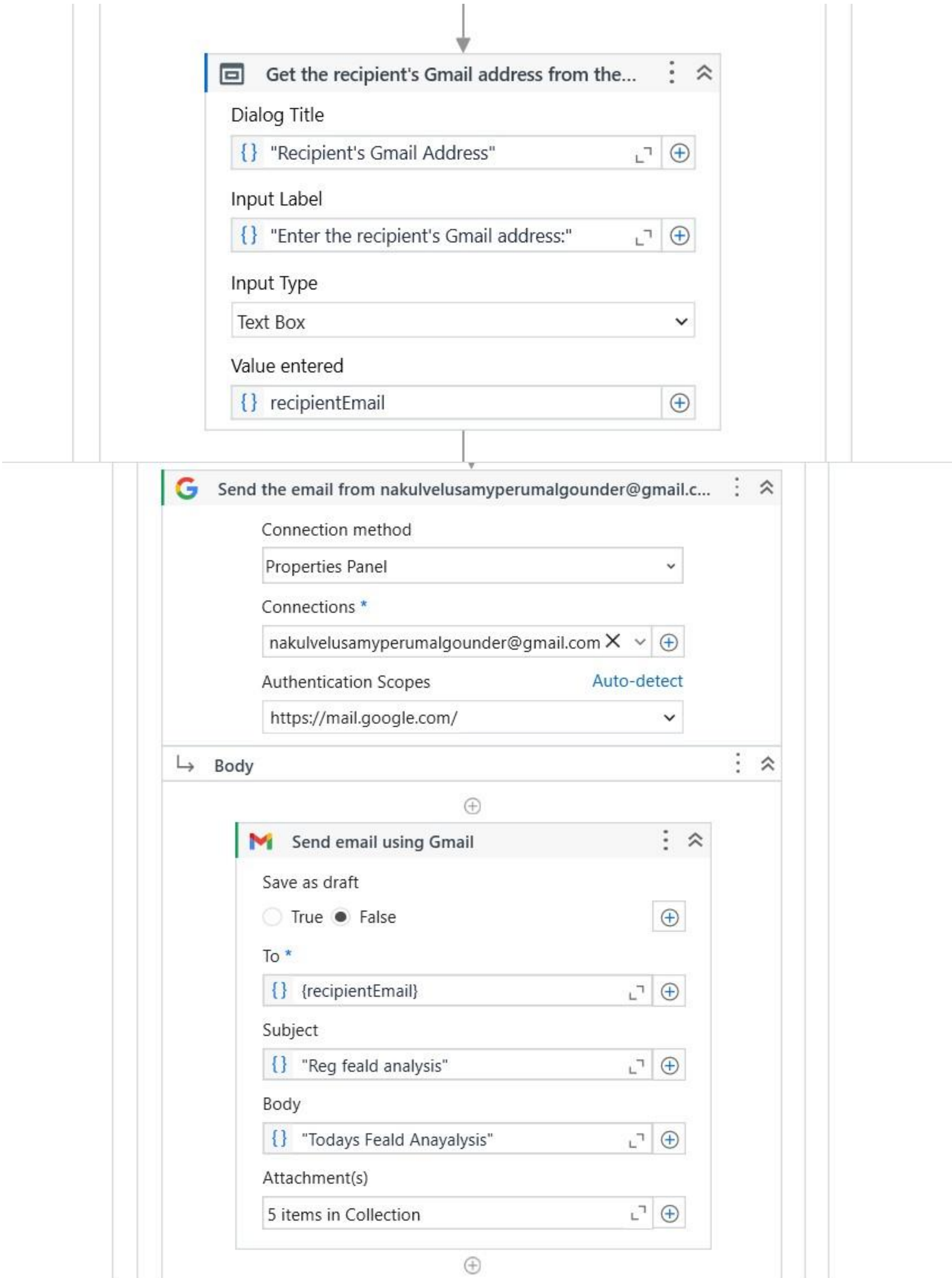
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CHAPTER 5

CONCLUSION

The AgriTech-AI system, implemented using UiPath, showcases the immense potential of combining Robotic Process Automation with IoT, artificial intelligence, and cloud technologies to revolutionize modern agriculture. By automating critical farming operations such as irrigation, disease detection, and environmental monitoring, the solution reduces manual labor, enhances productivity, and ensures timely decision-making. UiPath acts as the central automation engine, intelligently orchestrating workflows and integrating seamlessly with sensors, machine learning models, and external services. The system is modular, scalable, and adaptable to various crops and terrains, making it suitable for both small and large-scale farms. By continuously learning from real-time data and farmer feedback, AgriBot-AI evolves into a smart, sustainable, and reliable agricultural assistant. Overall, this project not only improves farm efficiency and crop yield but also serves as a scalable model for digital agriculture, contributing meaningfully to food security and the future of smart farming.

CHAPTER 6

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APPENDIX 2
PROJECT LINKS

GOOGLE DRIVE LINK:

https://drive.google.com/drive/folders/1zeIEVtqjOJiRRkabzx0FBzxhhBrMwAbL?usp=drive_link

GITHUB LINK:

https://github.com/Nakulvelusamy/RPA_FINAL.git