A

Mini Project

On

# AGRICULTURE HELPER CHATBOT

(Submitted in partial fulfillment of the requirements for the award of Degree)

BACHELOR OF TECHNOLOGY

In

COMPUTER SCIENCE AND ENGINEERING

By

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**CMR TECHNICAL CAMPUS**

**UGC AUTONOMOUS**

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**2020-2024**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**


# CERTIFICATE

This is to certify that the project entitled **"AGRICULTURE HELPER CHATBOT"** being submitted by **K.HARSHITHA(207R1A0587), P.KARTHIK(207R1A05B0) & MOHAMMED MOKHIM (207R1A0598)** in partial fulfillment of the requirements for the award of the degree of B.Tech in Computer Science and Engineering to the Jawaharlal Nehru Technological University Hyderabad, is a record of bonafide work carried out by them under our guidance and supervision during the year 2023-24.

The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

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**Submitted for viva voice Examination held on _____**

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# ABSTRACT

India is regarded as the world's agricultural powerhouse and has historically had a heavily agricultural-based economy, despite the fact that many farmers and their respective families face difficulties in the field due to a lack of knowledge about agricultural production, including poor farming practises, insufficient crop materials, improper crop planning, and failure to maintain a proper balance of fertilizer. This project is a chatbot structure prototype that aids people or farmers in crop management and foretells the crop's requirements.

Predictions about crop nutrition, fertiliser application rates, and other factors help people have enough information to take care of their fundamental requirements. In order to provide answers to questions based on specified data, this structure employs natural language processing. The chatbot evaluates prior feeds and data sources from "The Indian Council of Agricultural Research" It operates through its network of 114 institutes, 71 agricultural universities and 683 krishi vignan kendras across the country. Its main function include conducting basic and applied research in agriculture in order to ensure that the Structure is correct.

# LIST OF FIGURES/TABLES

# LIST OF SCREENSHOTS

# 1. INTRODUCTION

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## 1.1 PROJECT SCOPE

This project is titled “Agriculture Helper Chatbot”. In the previous days the farmers they are getting trouble to know exact about farming to cultivate the Seeds and farming the field in particular process of field work, like the one who doing the farming they don’t know how to approach the people and need to travel more distance to know about farming and about pesticides to spray for plants and all.By this Agriculture chatbot so many farmers will be in helpful and they can save money and time of travelling to know the exact pesticide to spray for the particular virus infected.

## 1.2 PROJECT PURPOSE

As the world population continues to grow, the demand for food is also increasing rapidly. Agriculture, being the primary source of food, has become more critical than ever before. However, farmers face several challenges such as unpredictable weather patterns, pests and diseases, lack of access to information and resources, etc. These challenges make it difficult for farmers to increase their productivity, yield and profitability.To address these challenges, there is a need for an Agriculture Helper Chatbot that can provide farmers with timely and accurate information on farming techniques.

## 1.3 PROJECT FEATURES

In this project we are designing Chatbot for farmers where Chatbot ask farmer to upload crop image and then application will apply Deep Learning CNN algorithm to predict disease from that crop leaf and display possible remedies. After getting remedies user can ask question related to crop such as crop name and then Chatbot will display soil, rainfall and other details.User can ask question Chatbot in their voice and application will use speech recognition algorithm to understand farmer question and then display answer.

# 2. SYSTEM ANALYSIS

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System Analysis is the important phase in the system development process. The System is studied to the minute details and analyzed. The system analyst plays an important role of an interrogator and dwells deep into the working of the present system. In analysis, a detailed study of these operations performed by the system and their relationships within and outside the system is done. A key question considered here is, “what must be done to solve the problem?” The system is viewed as a whole and the inputs to the system are identified. Once analysis is completed the analyst has a firm understanding of what is to be done.

## 2.1 PROBLEM DEFINITION

The Agriculture Helper Chatbot is designed to address the challenges faced by Indian farmers by providing them with essential agricultural information and recommendations. Its primary objective is to empower farmers with the knowledge and tools needed to optimize crop management and enhance agricultural productivity.

## 2.2 EXISTING SYSTEM

The existing system for agriculture assistance often involves manual monitoring and analysis of crops, which can be time-consuming, labour-intensive, and prone to errors. Additionally, traditional methods of crop management often rely on guesswork and past experiences, rather than data-driven insights.

### 2.2.1 LIMITATIONS OF THE EXISTING SYSTEM

Following are the disadvantages of existing system:

- Less Accuracy and less efficiency.
- There is no proper resources to suggest the farmers for how to overcome any problem.
- There is no specific pesticides for one specific leaf disease.

## 2.3 PROPOSED SYSTEM

The designing chatbot for farmers where chatbot ask farmer to upload crop image and then application will apply deep learning CNN algorithm to predict disease from that crop leaf and display possible remedies. After getting remedies user can ask question related such as crop name and then chatbot will display soil, rainfall and other details. User can ask question chatbot in their voice and application will use speech recognition algorithm to understand farmer question and then display answer.

### 2.3.1 ADVANTAGES OF THE PROPOSED SYSTEM

- High Accuracy.
- Helps in decision making.
- Improve agriculture production, profitability, sustainability and food quality.

## 2.4 FEASIBILITY STUDY

The A feasibility study for the Agriculture Helper Chatbot project is essential to assess its viability, potential challenges, and economic sustainability. Here are the key components of a feasibility study for this project:

- Economic Feasibility
- Technical Feasibility
- Social Feasibility

### 2.4.1 ECONOMIC FEASIBILITY

The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on a project, which will give best, return at the earliest. One of the factors, which affect the development of a new system, is the cost it would require.

The following are some of the important financial questions asked during preliminary investigation:

- **Cost Estimation**: Estimate the project's initial development costs, including technology, personnel, and data acquisition expenses.
- **Revenue Projections**: Create revenue models, considering potential income sources such as subscriptions, partnerships, or government support.
- **Return on Investment (ROI)**: Calculate the expected ROI based on revenue projections and compare it to development costs.

Since the system is developed as part of project work, there is no manual cost to spend for the proposed system. Also all the resources are already available, it give an indication that the system is economically possible for development.

### 2.4.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

- **Technology Infrastructure**: Evaluate the availability of the necessary technology infrastructure for chatbot development including servers, databases, and software tools.
- **Development Expertise**: Assess the availability of skilled developers and data scientists to build and maintain the chatbot.
- **Data Sources**: Verify the reliability and accessibility of data from "The Indian Council of Agricultural Research" and other sources.

### 2.4.3 SOCIAL FEASIBILITY

- **Market Research**: Conduct market research to understand the needs and preferences of Indian farmers regarding agricultural support tools like chatbots.
- **Competitor Analysis**: Identify existing agricultural chatbots or similar services and analyze their strengths and weaknesses.
- **User Adoption**: Gauge the potential user base and their willingness to use the chatbot.

## 2.5 HARDWARE & SOFTWARE REQUIREMENTS

### 2.5.1 HARDWARE REQUIREMENTS:

Hardware interfaces specify the logical characteristics of each interface between the software product and the hardware components of the system. The following are some hardware requirements.

- Processor : Intel Dual Core I3 and above
- Hard disk : 40GB and above
- RAM : 4GB and above
- Input devices : Keyboard, mouse

### 2.5.2 SOFTWARE REQUIREMENTS:

Software Requirements specifies the logical characteristics of each interface and software components of the system. The following are some software requirements,

- Operating system : Windows 8 and above
- Languages : Python, Html, CSS
- Tools : Python IDEL3.7 version

# 3. ARCHITECTURE

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## 3.1 PROJECT ARCHITECTURE

A Chatbot denotes to a conversation bot. It is a communication pretending computer program. It is all about the discussion with the user. The conversation with a Chatbot is very easy. Its responses to the queries asked by the user. The conversation with the user and the chatbot is very important. The design of chatbot indicates as follows.

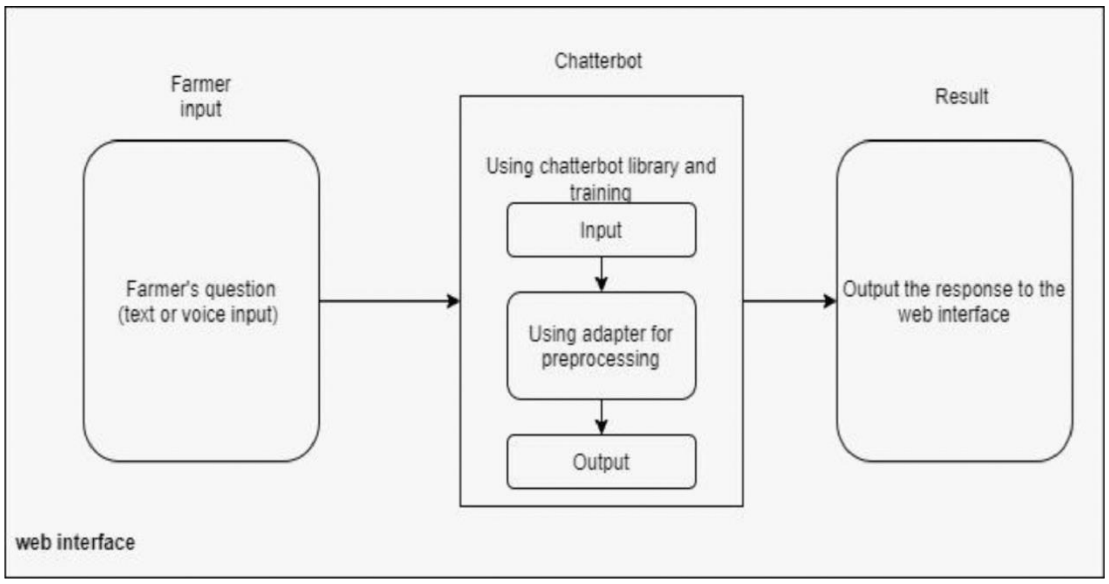



Figure 3.1: Project Architecture for Agriculture Helper Chatbot

## 3.2 DESCRIPTION

In this project we are designing Chatbot for farmers where Chatbot ask farmer to upload crop image and then application will apply Deep Learning CNN algorithm to predict disease from that crop leaf and display possible remedies. After getting remedies user can ask question related to crop such as crop name and then Chatbot will display soil, rainfall and other details.

## 3.3 USECASE DIAGRAM

In the use case diagram, we have basically one actor who is the user in the trained model.

A use case diagram is a graphical depiction of a user's possible interactions with a system. A use case diagram shows various use cases and different types of users the system has. The use cases are represented by either circles or ellipses. The actors are often shown as stick figures.

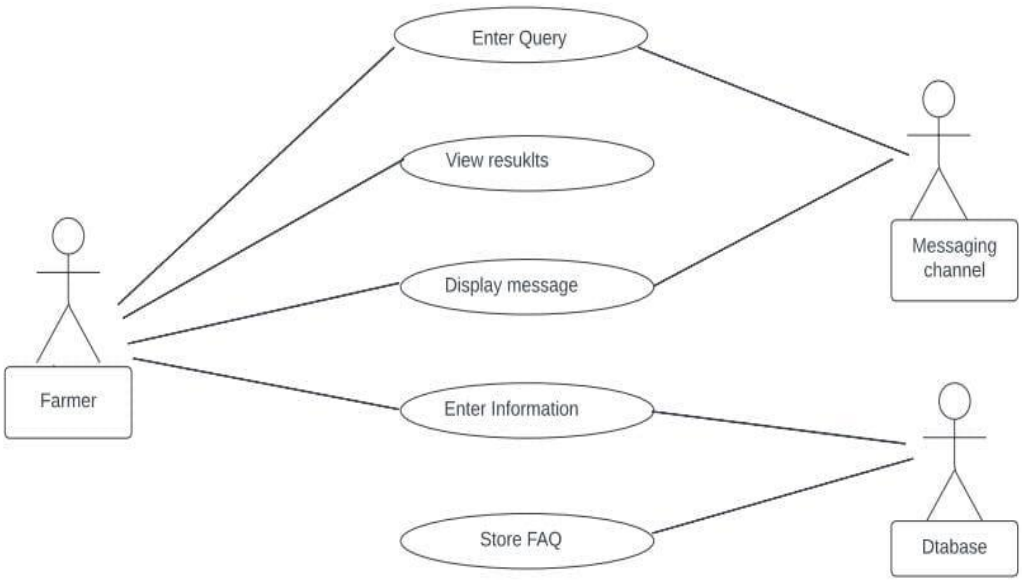



Figure 3.2: Use Case Diagram for Agriculture Helper Chatbot

## 3.4 CLASS DIAGRAM

Class diagram is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations(or methods), and the relationships among objects.

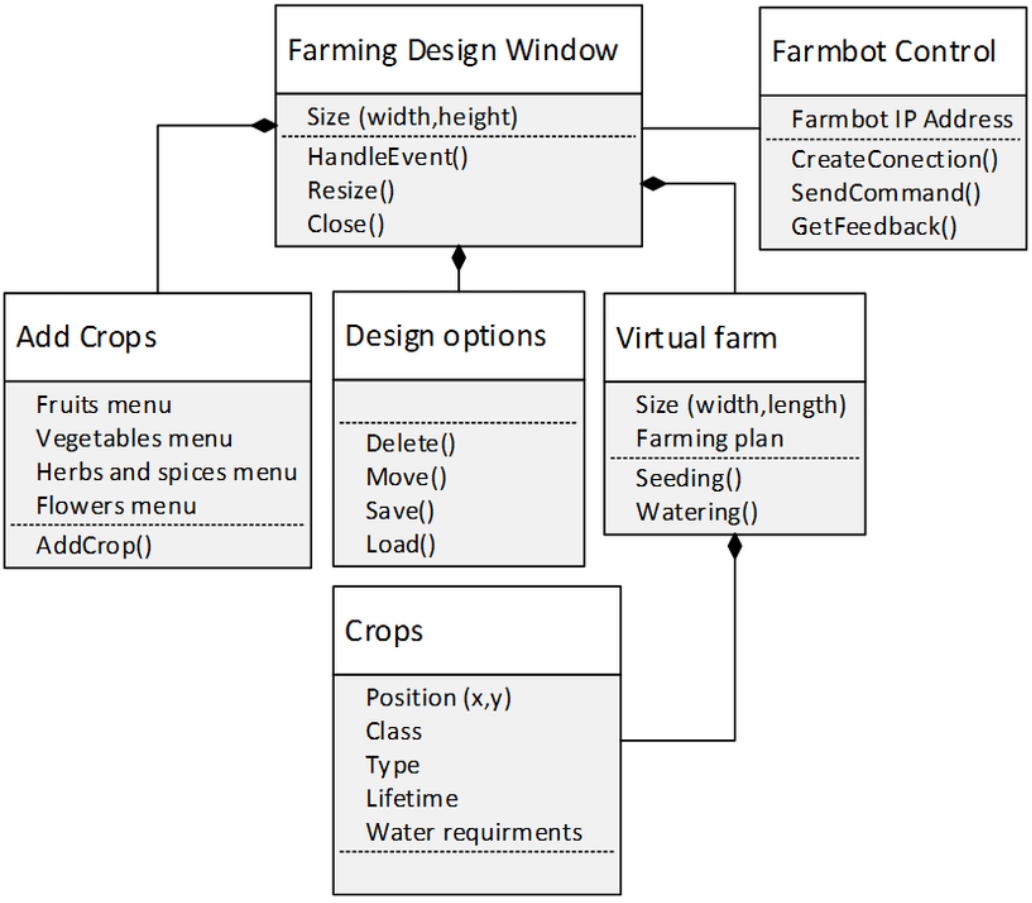



Figure 3.3: Class Diagram for Agriculture Helper Chatbot

## 3.5 SEQUENCE DIAGRAM

A sequence diagram shows object interactions arranged in time sequence. It depicts the objects involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the logical view of the system under development.

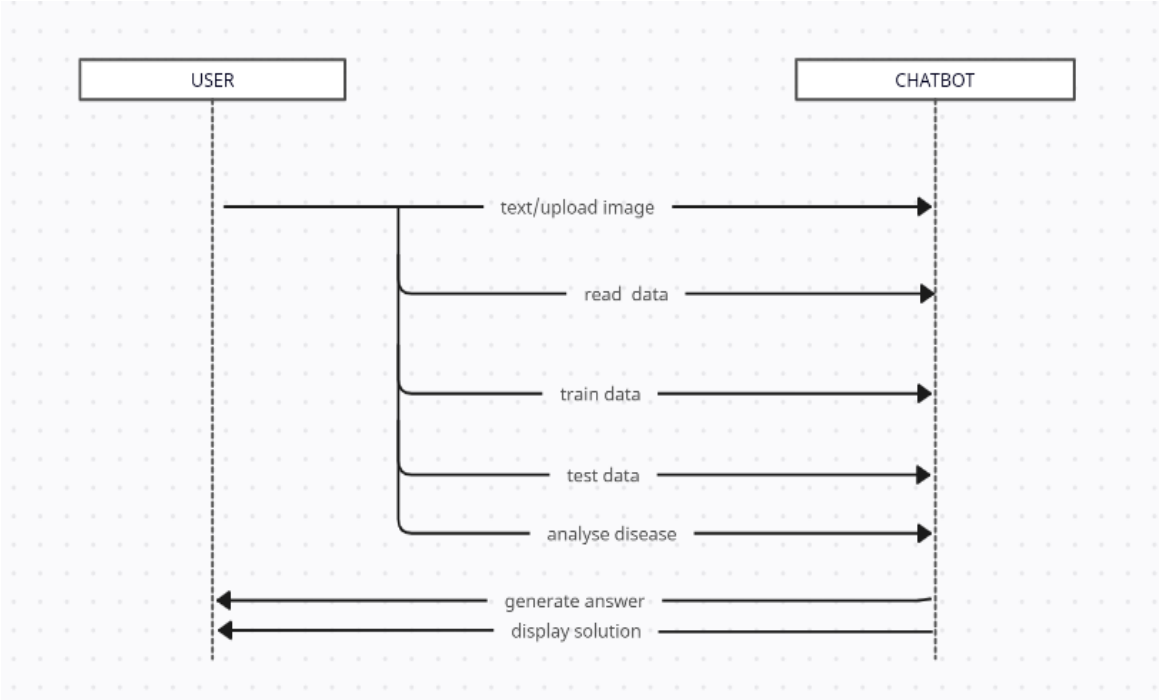



Figure 3.4: Sequence Diagram for Agriculture Helper Chatbot

## 3.6 ACTIVITY DIAGRAM

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. They can also include elements showing the flow of data between activities through one or more data stores.

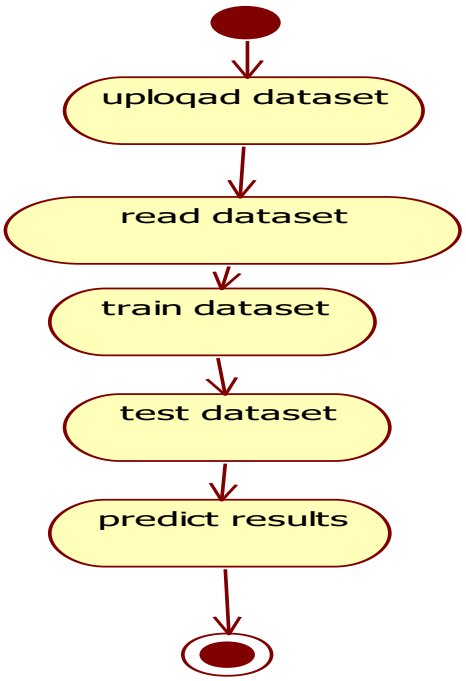



Figure 3.5: Activity Diagram for Agriculture Helper Chatbot

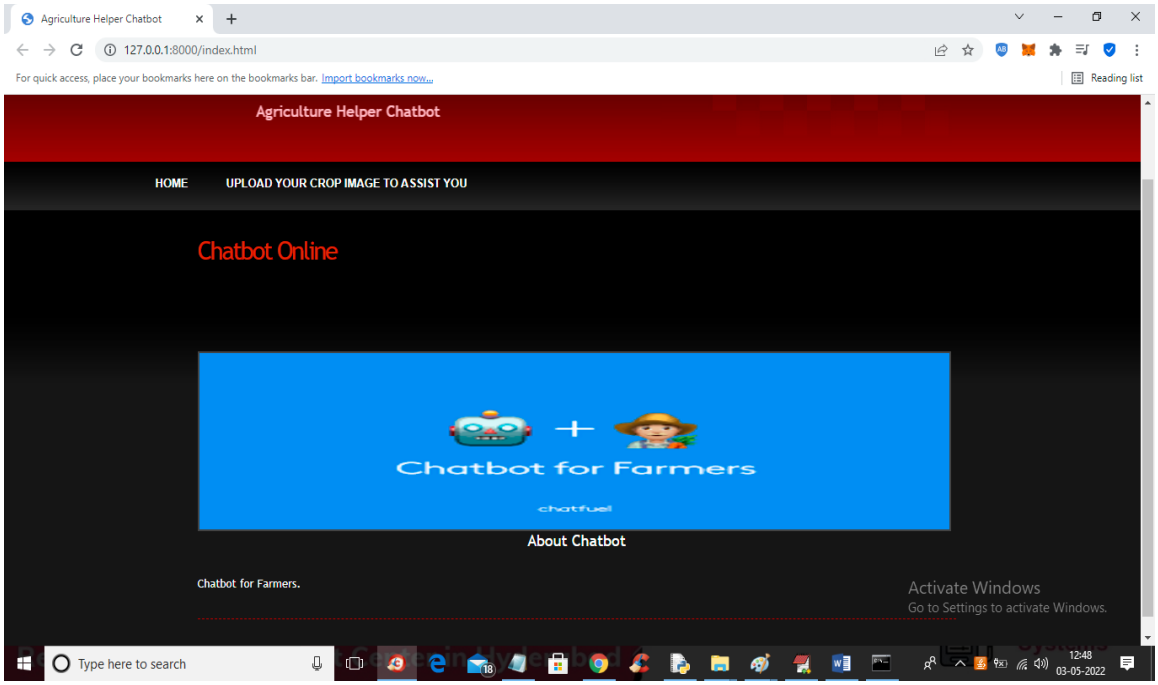
# 4.IMPLEMENTATION

## 4.1 SAMPLE CODE

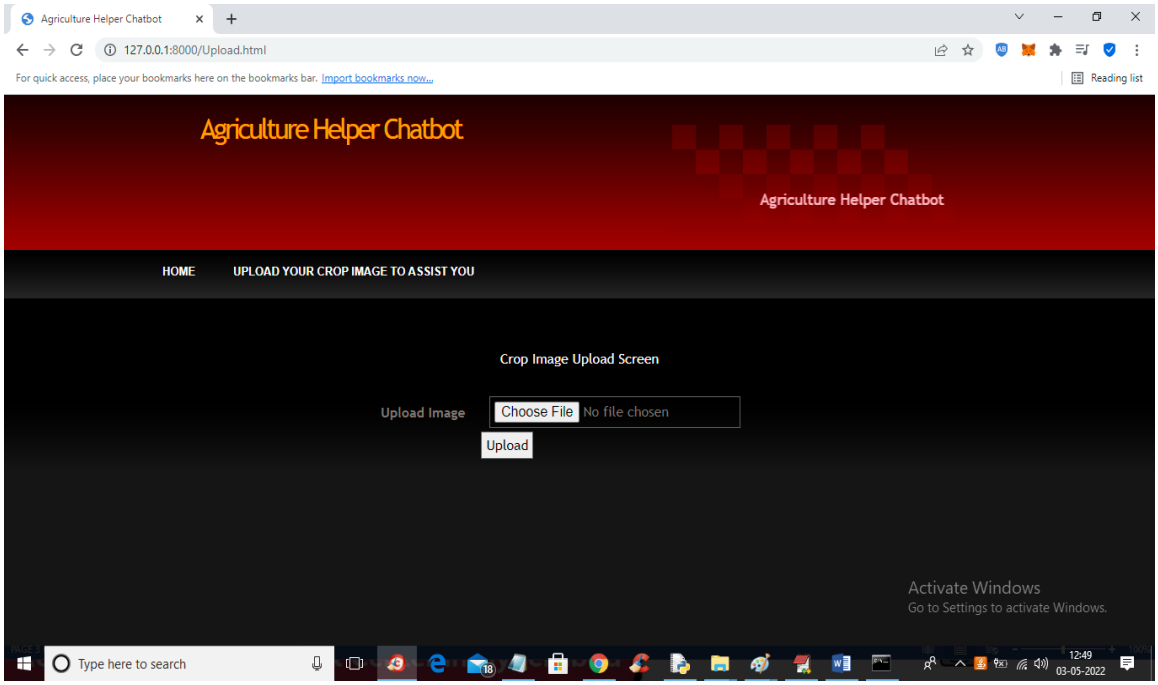
```
import pandas as pd
import numpy as np
question = []
answer = []
dataset =
pd.read_csv("Messages/dise
ases.txt", encoding='iso-
8859-1',header=None)
dataset = dataset.values
for i in range(len(dataset)):
    disease = dataset[i,0]
    remedy = dataset[i,1]

question.append(disease.stri
p().lower())
    answer.append(remedy)
dataset =
pd.read_csv("Messages/chat
bot.csv",encoding='iso-
8859-1')
dataset = dataset.values
for i in range(len(dataset)):
    crop = dataset[i,0]
    rainfall = str(dataset[i,1])
    soil = str(dataset[i,2])
    irrigation =
str(dataset[i,3])

question.append(crop.strip().
lower())
```

```
 answer.append(rainfall+"
"+soil+" "+irrigation)
tfidf_vectorizer = TfidfVectorizer(use_idf=True,
smooth_idf=False, norm=None,
decode_error='replace')
tfidf =
tfidf_vectorizer.fit_transform
(question).toarray()
print(tfidf)
```

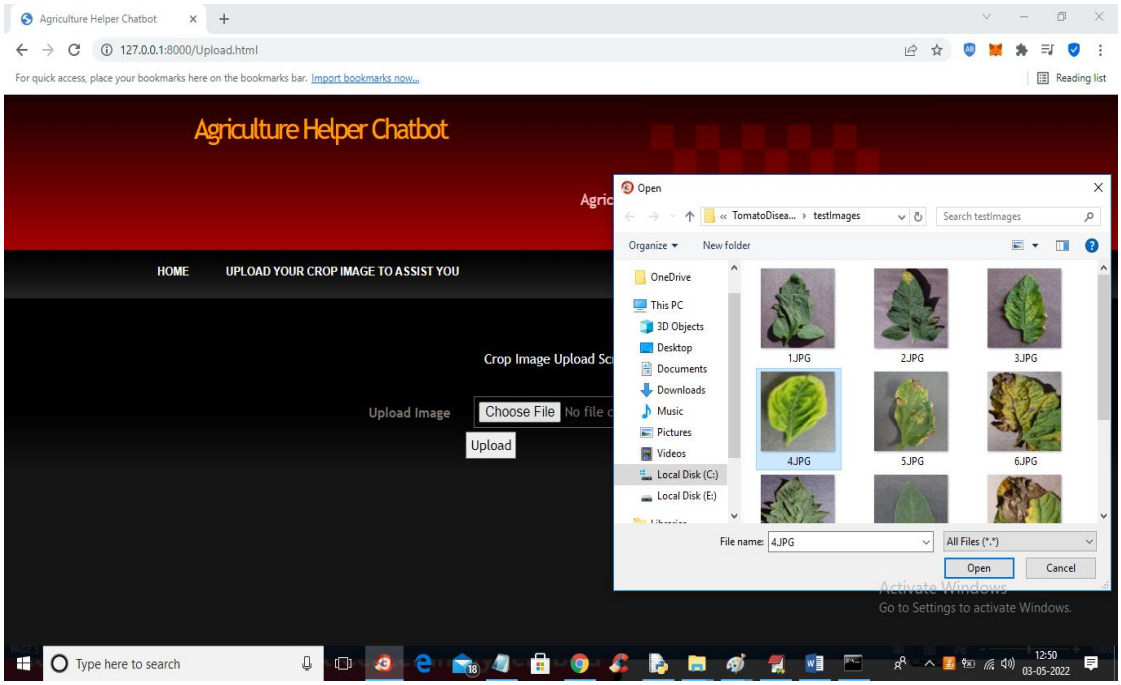
# 5.SCREENSHOTS



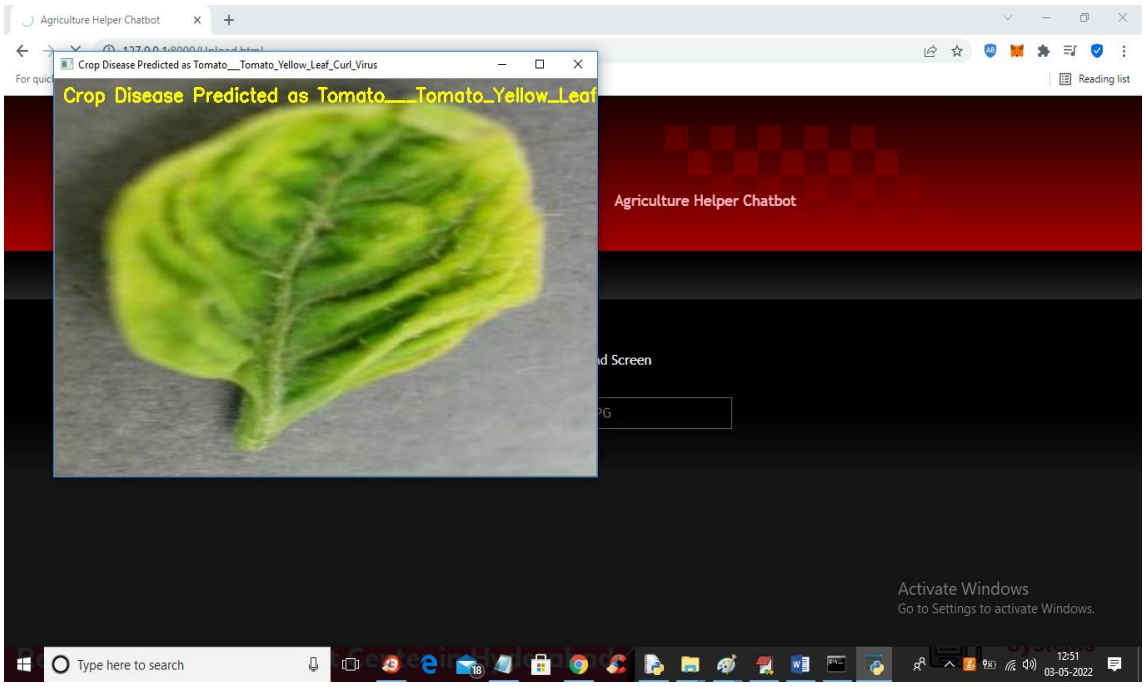

Screenshot 5.1: Chatbot Application



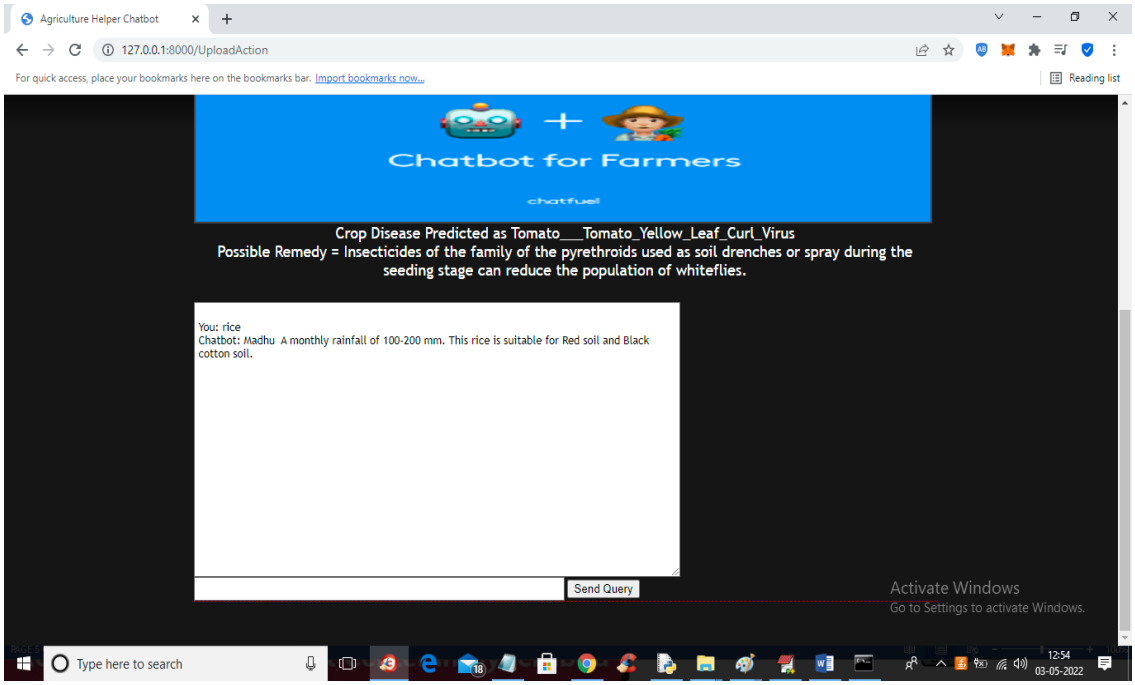

Screenshot 5.2:Upload Crop Image



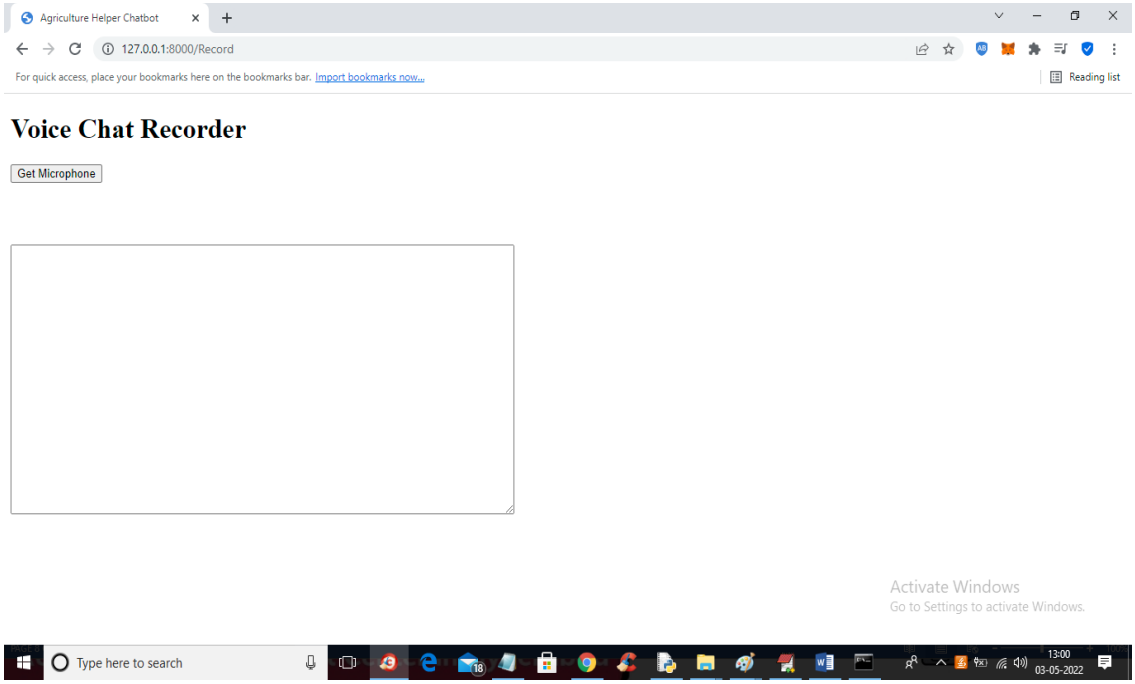

Screenshot 5.3: selecting file to upload




Screenshot 5.4: Crop disease predicted




Screenshot 5.5: Query through text area




Screenshot 5.6 : Query through Voice search

# 6.TESTING

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## 6.1 INTRODUCTION TO TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, subassemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of tests. Each test type addresses a specific testing requirement.

## 6.2 TYPES OF TESTING

### 6.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .It is done after the completion of an individual unit before integration. This is a structural testing that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

### 6.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Integration tests demonstrate that although the components were individually satisfactory, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

### 6.2.3 FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.
Functional testing is centered on the following items:

| | |
|---|---|
| Valid Input | : identified classes of valid input must be accepted. |
| Invalid Input | : identified classes of invalid input must be rejected. |
| Functions | : identified functions must be exercised. |
| Output | : identified classes of application outputs must be exercised. |

Systems/Procedures: interfacing systems or procedures must be invoked. Organization and preparation of functional tests is focused on requirements, key functions, or special test cases.

## 6.3 TEST CASES

### 6.3.1 CLASSIFICATION

| Test case ID | Test case name | Purpose | Input | Output |
|---|---|---|---|---|
| 1 | Upload crop image | To detect crop disease. | The user gives the input in the form of a image. | An output is a text remedy for crop disease |
| 2 | Query in the text area | To detect query. | The user gives input in the text area | An output is a text remedy for the query |
| 3 | Query in through voice | To detect voice | The user gives the input through mic | An output is a text remedy for the voice query |

# 7.CONCLUSION

# 7. CONCLUSION & FUTURE SCOPE

## 7.1 PROJECT CONCLUSION

An agriculture helper chatbot can be a valuable tool for farmers and other individuals in the agriculture industry. It can assist and provide valuable insights recommendations to improve efficiency and productivity. An agriculture helper chatbot has the potential to revolutionize the industry and help farmers to navigate the complex challenges of modern agriculture.

## 7.2 FUTURE SCOPE

The future scope of an agriculture helper chatbot looks very promising. It could be also integrated with other technologies like drones and sensors, to collect real-time data and offer more accurate insights. Furthermore, the chatbot could be designed to support multiple languages, making it accessible to farmers globally.

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## 8.2 GITHUB LINK

https://github.com/Harshitha-31/Agriculturehelper-Chatbot-