



Interactive Plant Care Assistant

CS 416/616: Service Oriented Systems

Group 18

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1 Introduction

The Interactive Plant Care Assistant is a web-based system designed to assist users in monitoring and caring for plants. The platform leverages image processing and intelligent suggestions to provide personalized guidance to users for plant health maintenance.

The application is built using a tech stack that includes React.js, Node.js, and Firebase for authentication and real-time data storage. It connects with external APIs to handle services like identifying plants, checking weather conditions, giving smart care tips, and setting reminders.

2 Purpose of the Project

Taking care of plants can be hard, especially with today's busy lifestyles—even though plants are great for cleaning the air and reducing stress. The Interactive Plant Care Assistant is a smart web application that makes plant care easier by giving personalized tips in real time. It helps users track their plant's environment, gives care suggestions based on the type of plant, and sends helpful reminders. Whether you're a plant lover, or a beginner, this tool makes it easier to keep your plants healthy, get weather-based advice and remind you to do your plant care routines. It's all about boosting productivity and helping people stay connected with nature.

3 Technology Stack

- **Frontend:** HTML, CSS, React.js
- **Backend:** Node.js
- **Database:** Firebase (Authentication and Storage)
- **Deployment:** Vercel

4 APIs Used and Their Importance

- **Plant.id API:** To enable plant identification and health assessment.
- **OpenWeatherMap API** To provide real-time weather updates for weather-based suggestions.
- **Google Calendar API:** To manage user reminders for plant care tasks.
- **OpenAI API:** To suggest personalized plant care tips based on weather conditions and plant characteristics.

5 Feature Summary and Priorities

5.1 Plant Species Identification (Plant.id API)

This feature allows users to identify plant species by uploading an image. The image is sent to the Plant.id API, which returns the plant name, characteristics, and care instructions.

Priority: High — Plant identification is a core feature of the application and essential for personalized care guidance.

5.2 Weather-Based Care Suggestions (OpenWeatherMap API)

The system fetches weather data based on the user's location and adjusts care recommendations accordingly. This helps users make informed decisions based on real-time temperature, humidity, and rainfall.

Priority: High — Weather conditions directly impact plant health, making this feature crucial for daily plant care.

5.3 Chatbot Interaction (OpenAI API)

Users can ask plant-related questions through a chatbot. The system uses the OpenAI API to generate helpful responses for plant care and troubleshooting.

Priority: Medium — While useful for engagement and quick advice, it's supplementary to the core functionality.

5.4 Calendar-Based Reminders (Google Calendar API)

Users can set reminders for tasks like watering or pruning using Google Calendar. Reminders are created via a consent-based integration with the user's Google account.

Priority: High — Reminders help users maintain consistent care routines, directly supporting plant health.

5.5 Cloud Database (Firestore)

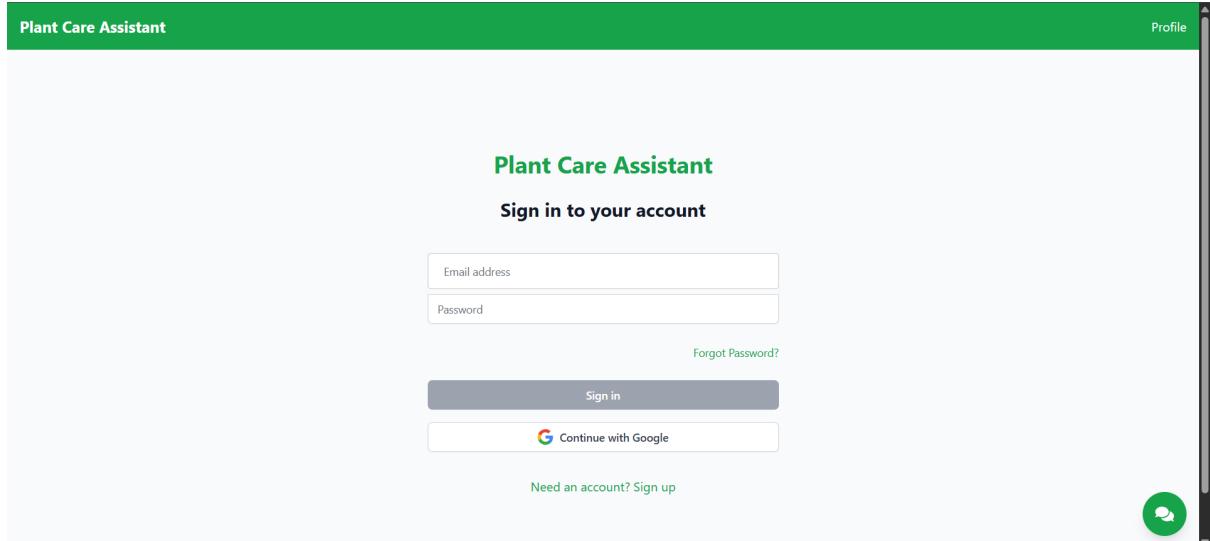
All user data including profiles, plant details, health analysis, and reminders are stored securely in Google Firestore. It supports real-time data access and syncing.

Priority: High — A robust database is essential for smooth operation, user management, and real-time data handling.

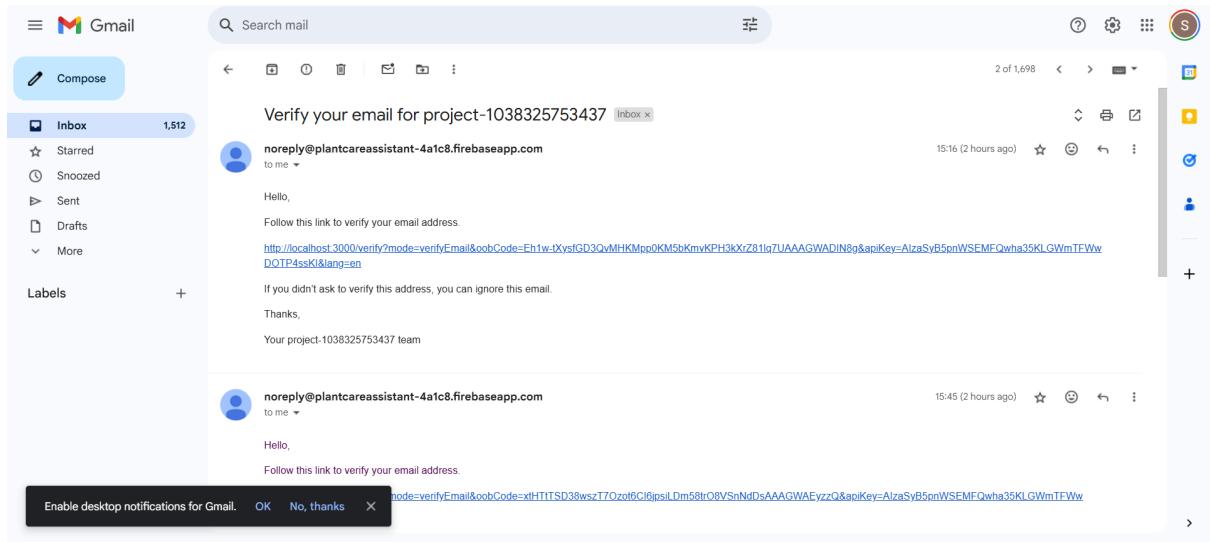
6 Application Features Demo

6.1 User Registration and Login

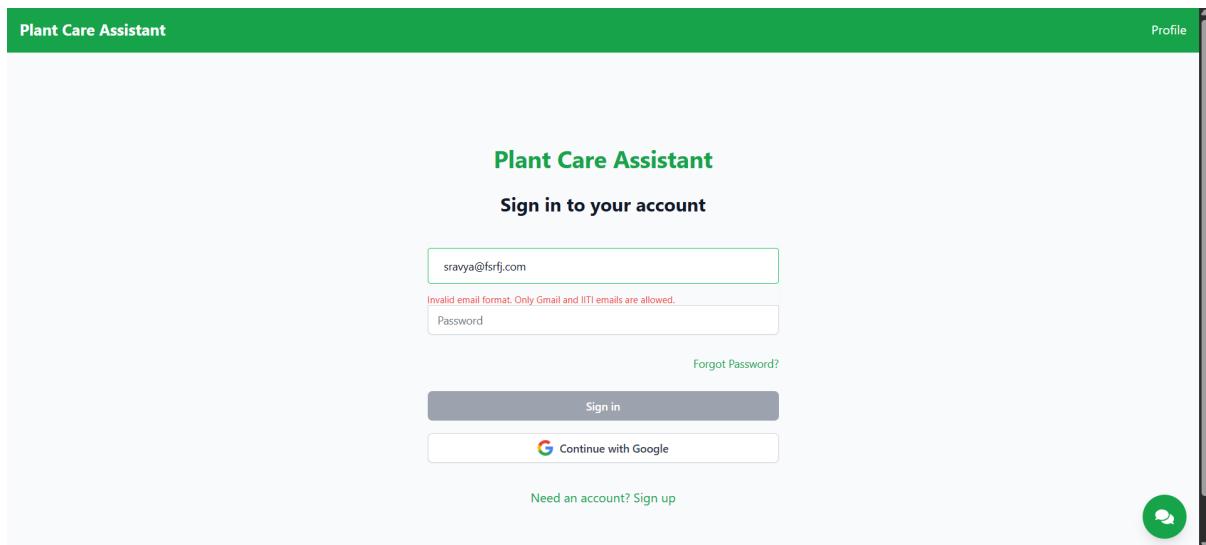
Users can register using their email and password, or choose to sign in using Google Authentication, which is securely powered by Google.



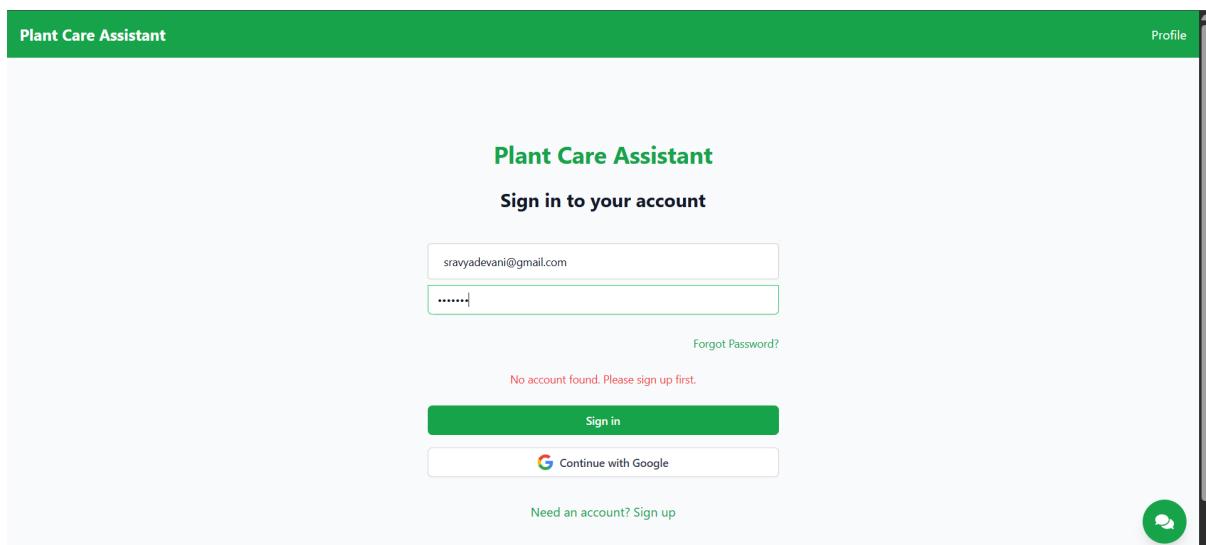
Once registered, an email verification is sent to the user's registered email address. The user must click the verification link to activate their account. Only verified users are allowed to log in, ensuring an added layer of security.



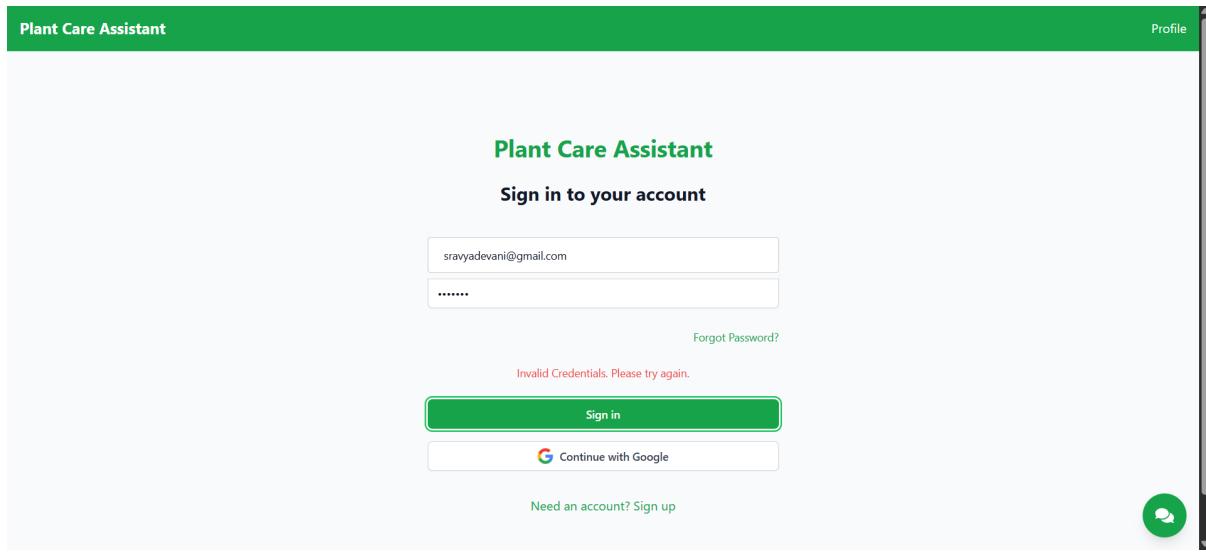
The system also validates the email format during registration to prevent invalid inputs.



A user cannot sign in without registering first. If login credentials do not match the stored details, the system displays an appropriate error message.



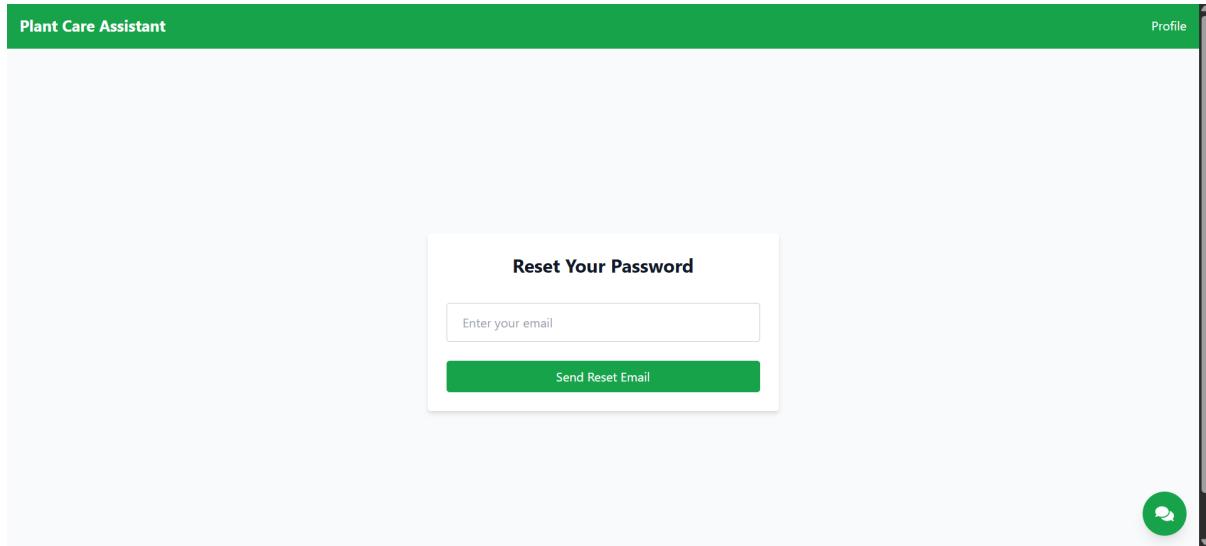
All user authentication details are securely stored and managed via Firebase. For the user to login, the credentials should match with the user credentials stored in the firebase. Appropriate error messages will be displayed accordingly.



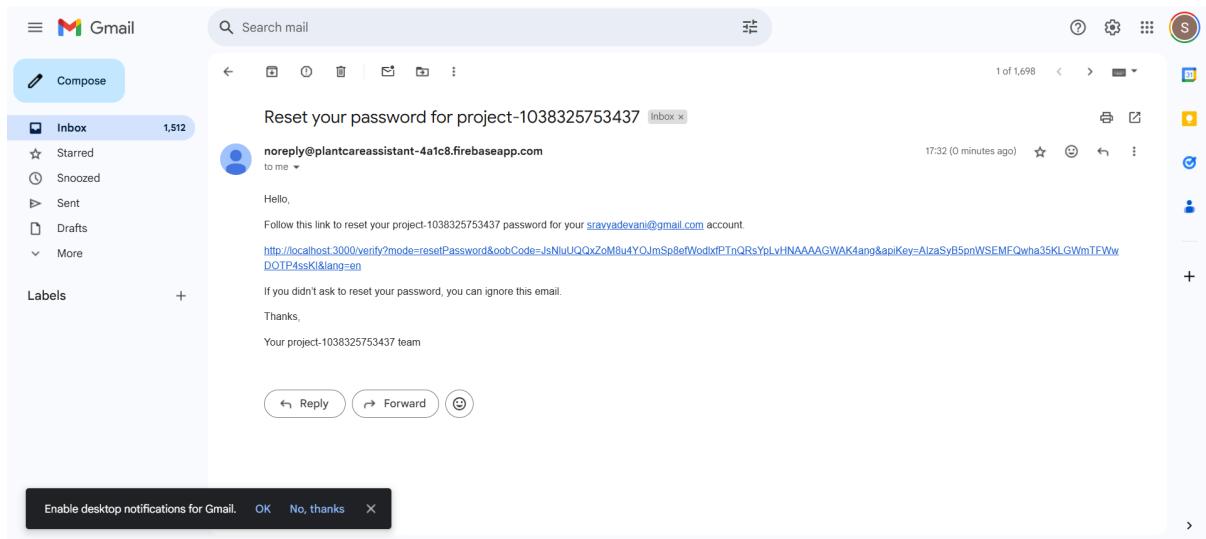
If a user attempts to log in without verifying their email or without an account, an error message is shown, guiding them through the correct steps.

6.2 Reset Password

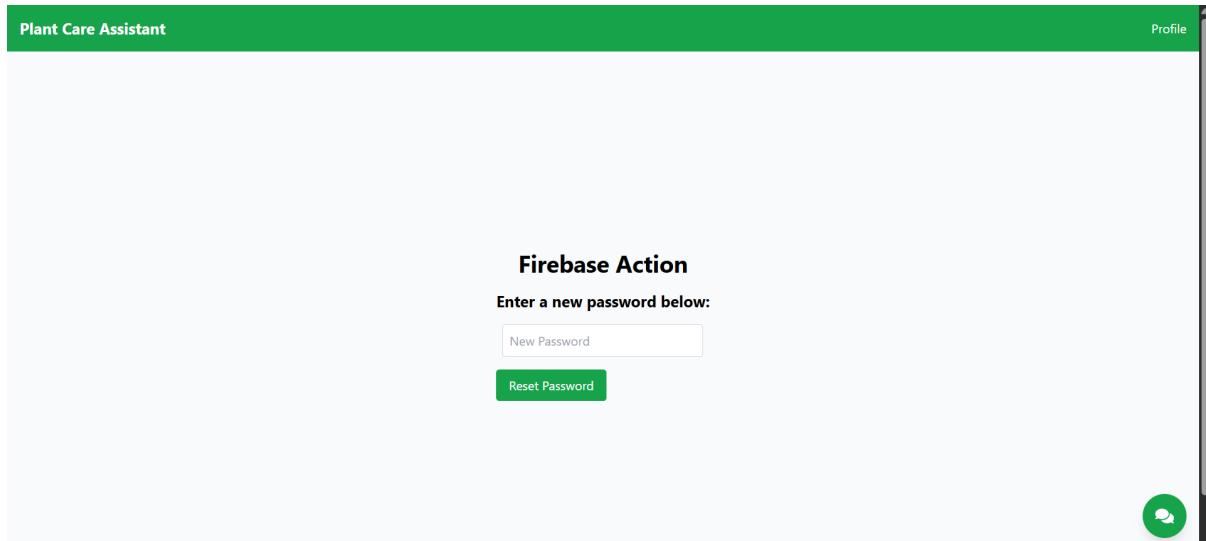
If a user forgets their password, they can click the “Forgot Password” option on the login page. The system prompts the user to enter their registered email address.



An email with a secure password reset link is sent to the provided address.



The user can use this link to set a new password and regain access to their account.



6.3 Homepage Features

The homepage serves as the central dashboard after login, allowing users to manage their plants.

Plant Care Assistant

Profile

Logout

Welcome User!

Upload New Plant

Enter New Plant

Previously Added Plants:

 Helianthus annuus
Confidence: 63.20%

 Rosa x odorata
Confidence: 86.73%



The **Upload Plant** button enables users to upload a new image of a plant for automatic identification using the Plant.id API.

Plant Care Assistant

Profile

Logout

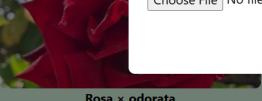
Welcome User!

Upload New Plant

Enter New Plant

Previously Added Plants:

 Helianthus annuus
Confidence: 63.20%

 Rosa x odorata
Confidence: 86.73%

Upload New Plant

Choose File No file chosen

Upload Cancel



The **Enter New Plant** button allows users to manually enter plant details if they prefer not to use image-based identification.

The screenshot shows the main interface of the Plant Care Assistant app. At the top, there's a green header bar with the title "Plant Care Assistant" on the left and "Profile" on the right. A red "Logout" button is located in the top right corner. Below the header, a "Welcome User!" message is displayed. There are two buttons: "Upload New Plant" on the left and "Enter New Plant" on the right. Under "Previously Added Plants", there are two cards: one for a sunflower labeled "Helianthus annuus" with a confidence of 63.20%, and another for a rose labeled "Rosa" with a confidence of 86.73%. A central modal window titled "Enter Plant Details" contains fields for "Plant Name" and "Image URL (optional)", along with "Cancel" and "Save Plant" buttons. A small circular icon with a bell通知 symbol is in the bottom right corner.

The **Previously Added Plants** section displays a list of all plants identified or entered by the user, pulled from Firebase Firestore. Each entry links to a detailed PlantPage view.

The **Logout** button safely logs out the user from the application using Firebase Authentication.

When an image is uploaded via the Upload button, it is sent to the backend and forwarded to the **Plant.id Identification API**. The response includes the scientific name, probability of match, and related plant images.

6.4 Plant Detail Page

Clicking on a plant entry opens a dedicated detail view (PlantPage) for that specific plant.

The screenshot shows the Plant Detail Page for "Rosa x odorata". The page has a green header bar with the title "Plant Care Assistant" on the left and "Profile" on the right. A red "Delete Plant Entry" button is in the top right. The main content area features a large image of a red rose. To the right of the image is a block of care instructions: "Rosa x odorata, also known as the fragrant rose, is a delicate and perfumed rose species. Here's how to care for it in the given weather conditions: 1) Watering: Since the temperature and humidity are low, it's essential to keep Rosas x odorata well-hydrated. Water them deeply, but not too frequently as overwatering can lead to root rot. Water the plant when the top inch of soil is dry. 2) Sunlight: Fragrant roses prefer full sun exposure, so place your Rosa x odorata in an area that receives at least 6 hours of direct sunlight every day. If possible, choose a spot that's shielded from harsh winds. 3) Temperature: Ensure your Rosa x odorata is kept in a temperature between 32.43°C to 26.67°C. These roses can tolerate a light frost, but extended frigid winter temperatures may cause damage that affects the plant's blossoming." Below this is a note: "Updated on 4/5/2025". A green button says "Get Current Weather Based Recommendations". At the bottom, it shows: "Status: Healthy", "Health Probability: 98.85%", "Plant Detection Confidence: 94.97%", "Possible Issues: • Fungi: 2.13%", and "Updated on 4/5/2025". A green button at the very bottom says "Upload Image for Health Check". A small circular icon with a bell通知 symbol is in the bottom right corner.

The view displays **basic plant information** such as the scientific name, identification confidence, and likelihood, all provided by the Plant.id API.

A **related plant image** is shown to help the user visually confirm the plant's identity.

Users can remove the plant from their collection using the **Delete Plant Entry** button.

This screenshot shows the Plant Care Assistant interface. At the top, there are tabs for "Plant Care Assistant" and "Profile". In the center, a large image of a red rose flower is displayed. Below the image, the plant's name is listed as "Rosa × odorata". To the right, there is a modal dialog box asking "Are you sure you want to delete this plant?". The "OK" button is highlighted in green, while the "Cancel" button is in grey. On the far right, a red button labeled "Delete Plant Entry" is visible. The main content area includes sections for "Scientific Name: Rosa × odorata", "Identification Confidence: 86.73%", and "Plant Likelihood: 94.97%". To the right of the flower image, there is a sidebar with various buttons and text snippets related to plant care.

localhost:3000 says

Are you sure you want to delete this plant?

OK Cancel

Profile

Rosa × odorata

Additionally, suggest the best organic fertilizer and pruning techniques for maintaining the health and beauty of Rosa × odorata.

Answer:

Rosa × odorata, also known as the fragrant rose, is a delicate and perfumed rose species. Here's how to care for it in the given weather conditions:

1) Watering: Since the temperature and humidity are low, it's essential to keep Rosas × odorata well-hydrated. Water them deeply, but not too frequently as overwatering can lead to root rot. Water the plant when the top inch of soil is dry.

2) Sunlight: Fragrant roses prefer full sun exposure, so place your Rosa × odorata in an area that receives at least 6 hours of direct sunlight every day. If possible, choose a spot that's shielded from harsh winds.

Updated on 4/5/2025

Get Current Weather Based Recommendations

Health Monitoring Log (No data yet)

Updated on dd/mm/yy

Upload Image for Health Check

Add Reminder

Scientific Name: Rosa × odorata
Identification Confidence: 86.73%
Plant Likelihood: 94.97%

6.5 Health Diagnosis

Users can monitor plant health by uploading a recent image of the plant (e.g., a leaf with visible symptoms).

For this the **Upload Image for Health Check Button** in Plant page opens a modal where users can upload a photo for health analysis.

This screenshot shows the Plant Care Assistant interface with a modal dialog box overlaid. The modal is titled "Upload Plant Image for Health Check" and contains a "Choose File" input field with the file name "Botrytis-Blig...on-Roses.jpg". Below the input field are two buttons: "Cancel" and "Analyze". The background of the interface shows a large image of a red rose flower. To the right, there is a sidebar with various buttons and text snippets related to plant care.

Plant Care Assistant

Rosa × odorata

Profile

Delete Plant Entry

Additionally, suggest the best organic fertilizer and pruning techniques for maintaining the health and beauty of Rosa × odorata.

Answer:

Rosa × odorata, also known as the fragrant rose, is a delicate and perfumed rose species. Here's how to care for it in the given weather conditions:

1) Watering: Since the temperature and humidity are low, it's essential to keep Rosas × odorata well-hydrated. Water them deeply, but not too frequently as overwatering can lead to root rot. Water the plant when the top inch of soil is dry.

2) Sunlight: Fragrant roses prefer full sun exposure, so place your Rosa × odorata in an area that receives at least 6 hours of direct sunlight every day. If possible, choose a spot that's shielded from harsh winds.

Get Current Weather Based Recommendations

Health Monitoring Log (No data yet)

Updated on dd/mm/yy

Upload Image for Health Check

Add Reminder

Choose File Botrytis-Blig...on-Roses.jpg

Cancel Analyze

Scientific Name: Rosa × odorata
Identification Confidence: 86.73%
Plant Likelihood: 94.97%

The image is sent to the backend, which forwards it to the **Plant.id Health Diagnosis API**.

The API responds with:

- Overall health status (Healthy or Unhealthy).
- Confidence scores for health and plant detection.
- Top disease suggestions, each with probability and name.

Example of a diseased rose and Health Check Result:



Additionally, suggest the best organic fertilizer and pruning techniques for maintaining the health and beauty of Rosa x odorata.
Answer:
Rosa x odorata, also known as the fragrant rose, is a delicate and perfumed rose species. Here's how to care for it in the given weather conditions:
1) Watering: Since the temperature and humidity are low, it's essential to keep Rosa x odorata well-hydrated. Water them deeply, but not too frequently as overwatering can lead to root rot. Water the plant when the top inch of soil is dry.
2) Sunlight: Fragrant roses prefer full sun exposure, so place your Rosa x odorata in an area that receives at least 6 hours of direct sunlight every day. If possible, choose a spot that's shielded from harsh winds.
Updated on 4/5/2025

[Get Current Weather Based Recommendations](#)

Status: Unhealthy
Health Probability: 20.92%
Plant Detection Confidence: 95.61%

Possible Issues:

- **Fungi:** 79.35%
- **senescence:** 22.58%
- **rose rosette disease:** 12.61%
- **Insecta:** 11.24%
- **Animalia:** 11.16%

Updated on 4/5/2025

[Upload Image for Health Check](#)

[Add Reminder](#)

This data is presented directly on the PlantPage, helping users make informed decisions about plant care.

6.6 Weather Based Plant Care Suggestions

When the user clicks on "Get Weather Data", the system fetches real-time weather details such as temperature, humidity, sky conditions (e.g., clear or cloudy), and rainfall. Based on this data, the application provides care suggestions—like adjusting watering frequency or sunlight exposure—helping users respond to current environmental conditions.

The screenshot shows a detailed view of a sunflower (Helianthus annuus). On the left, there's a large image of a sunflower head. Below it, a green box displays the plant's scientific name, identification confidence (63.20%), and plant likelihood (96.28%). On the right, a sidebar titled "1. Watering:" provides tips for watering based on soil moisture levels. A "Get Weather Data" button is at the bottom of this sidebar. Below the sidebar, status information is shown: "Status: Unhealthy", "Health Probability: 4.80%", and "Plant Detection Confidence: 99.91%". A "Possible Issues:" section lists risks like Fungi, Animalia, Insecta, feeding damage by insects, and mechanical damage. A "Delete Plant Entry" button is located at the top right of the main content area.

6.7 Chatbot Assistant

The application includes an interactive **Chatbot Assistant** to assist users with plant care and general queries.

The chatbot is accessible from the bottom-right icon and opens in a dedicated chat interface.

The screenshot shows the "Plant Care Assistant" dashboard. At the top, there are "Upload New Plant" and "Enter New Plant" buttons. Below them, a "Welcome User!" message is displayed. A "Previously Added Plants" section shows two entries: a sunflower labeled "Helianthus annuus" with a confidence of 63.20%, and a rose labeled "Rosa x odorata" with a confidence of 86.73%. To the right, a "Chatbot" interface is open, showing a text input field with "Hi" and a "Send" button. A small circular icon with a speech bubble is also visible.

Features:

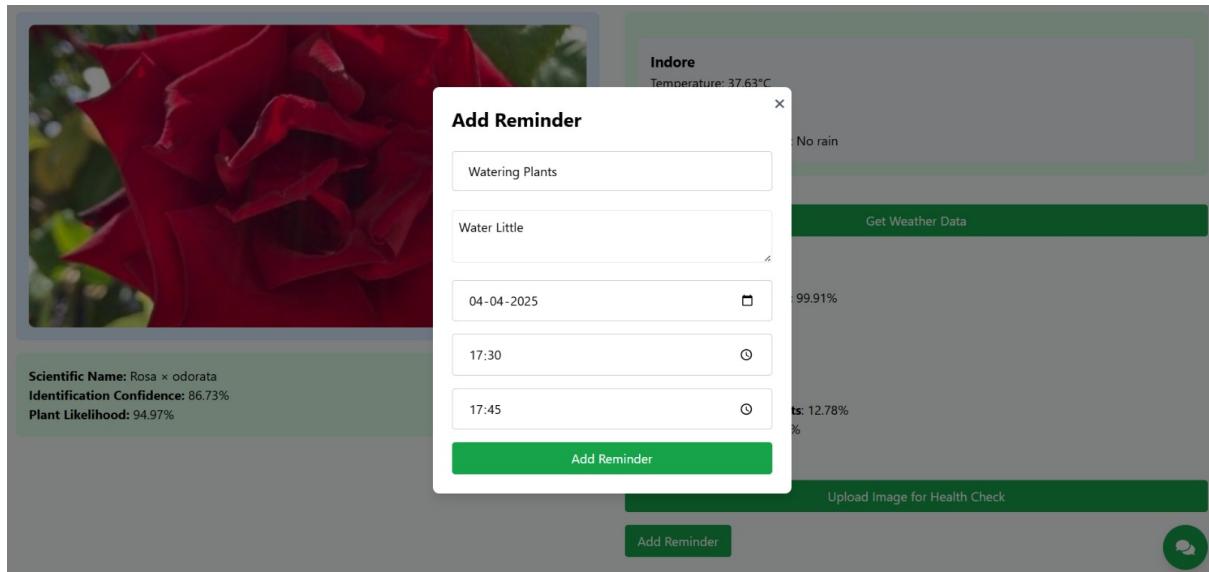
- Users can type questions related to plant care, watering schedules, light conditions, or general support.
- Each user message is sent to the backend, which communicates with a **chat API** to generate a relevant response.
- Responses are displayed in real-time, providing an interactive conversational experience.
- The chat interface supports a smooth and continuous conversation with preserved history for context.

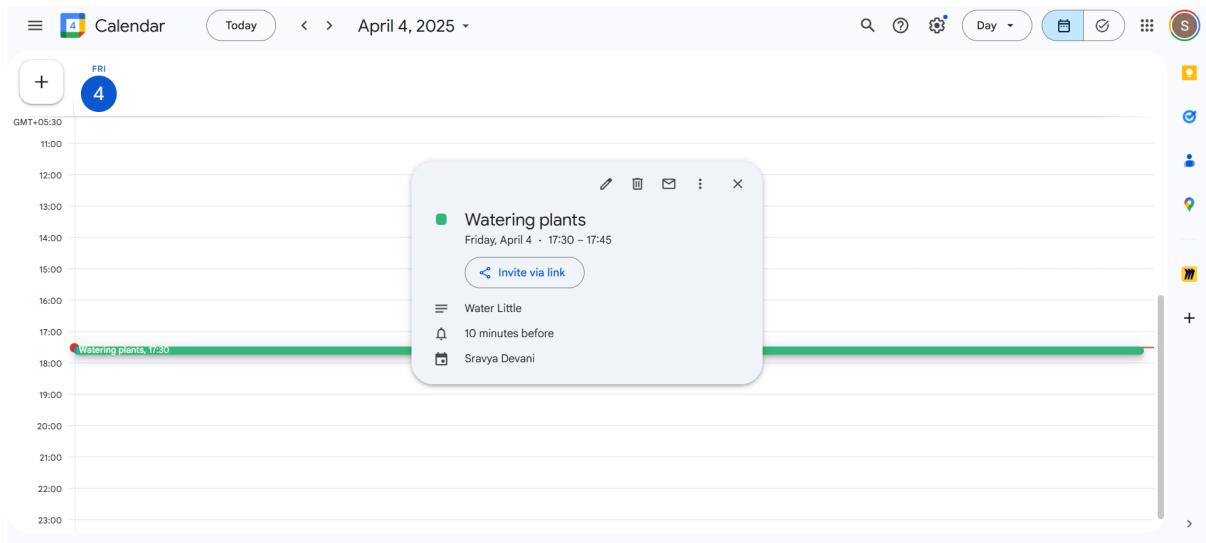
This feature enhances user engagement by providing immediate and informative responses within the app.

6.8 Google Calendar Reminders

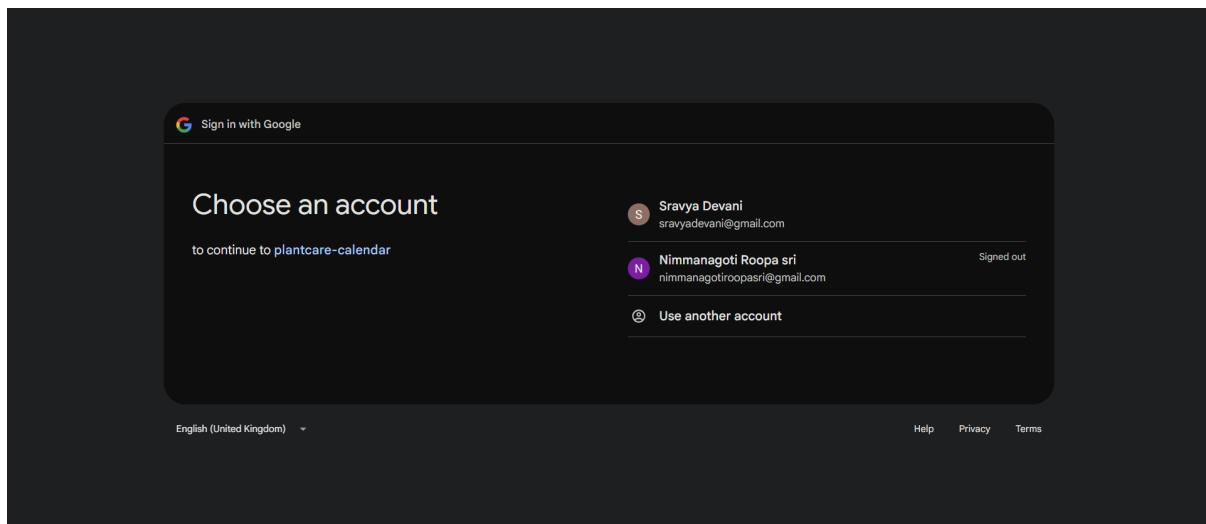
Users can set Google Calendar reminders for plant care activities such as watering or placing the plant in sunlight at a specific time.

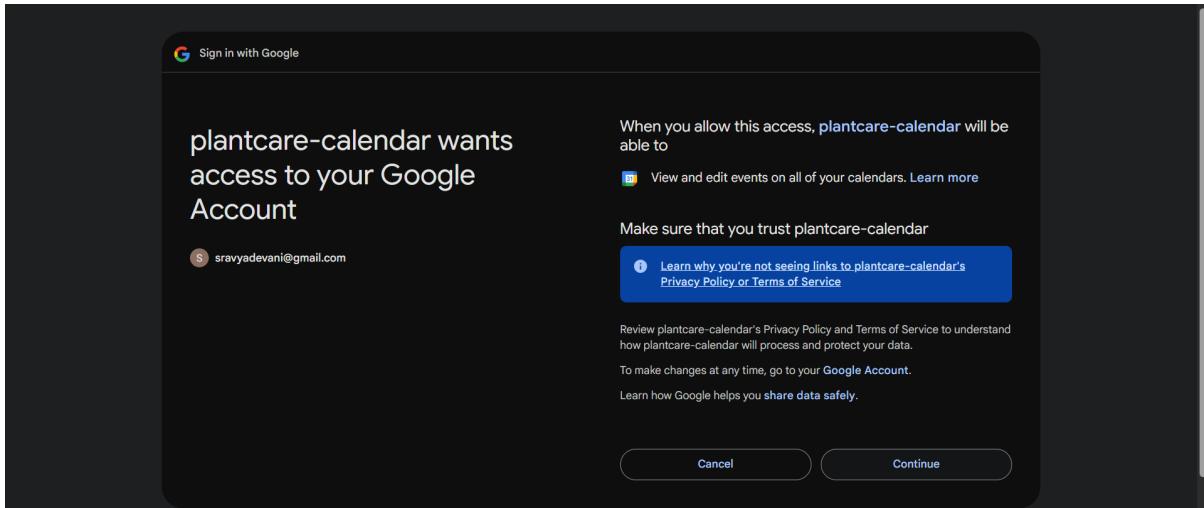
Each plant has its own dedicated page with an “Add Reminder” button. Clicking the button opens a form where users can enter the title, description, date, and time for the reminder. Once submitted, the reminder is created as a Google Calendar event, allowing users to manage their plant care schedules seamlessly within the app.





When setting a reminder for the first time, users are shown a Google consent screen. This screen requests permission to access their Google Calendar, ensuring secure and authorized event creation.





7 GitHub Repository

You can find the complete source code and project files at:

Code Link - <https://github.com/PVSekhar1234/Interactive-Plant-Care-Assistant>

8 Conclusion

This project demonstrates how technology can simplify and enhance plant care. By integrating smart features like plant identification, reminders, health checks, and user-friendly interfaces, the application supports users in maintaining healthy plants with ease. It encourages consistent care, improves productivity, and promotes a deeper connection with nature.