Flame Guard

Next-Gen Intelligent Solutions for Forest Fire Prediction

A Machine Learning-Based Forest Fire Prediction System

User Guide

Prepared by
Team FlameGuard

Aptech North Karachi,
Pakistan

September 23, 2024

FlameGuard - User Guide

User Guide

This User Guide provides step-by-step instructions on how to use the FlameGuard Forest Fire Prediction system. FlameGuard is a web-based application that allows users to input environmental data and receive predictions about forest fire risk.

1. Accessing the Application

- Open a Code folder and run app.py (Chrome, Firefox, Safari, etc.) on your device.
- In the address bar, type the URL provided by your code terminal
- Press `Enter` to load the application homepage.

2. Homepage Navigation

- The homepage provides an introduction to the application, and users can navigate to different sections using the navigation bar at the top.
- The available sections include:
  - **Home**: Navigate back to the homepage at any time.
  - **Data Analysis**: Access charts and visualizations to analyze past forest fire occurrences.

3. Inputting Data for Prediction

- On the homepage, users can input environmental data into the form fields provided.
- The required inputs include:

- **Temperature (in Celsius)**: Enter the current temperature value in degrees Celsius.
- **Humidity (in Percentage)**: Enter the current humidity level as a percentage.
- **Oxygen (in Percentage)**: Enter the oxygen level as a percentage.

- After filling in the data, click the **Predict Probability** button to submit the input for analysis.

4. Understanding Prediction Results

- Once the input data is processed, the system will display a prediction result:
  - **High Risk**: If the fire prediction probability exceeds 50%, the system will display a message that indicates the forest is at high risk for fire.
  - **Low Risk**: If the probability is below 50%, the system will display a message that the forest is currently safe.
- The prediction will also include a probability score, for example, `Probability of fire occurring: 0.85`.

5. Data Analysis Section

- Users can explore historical data by navigating to the **Data Analysis** section.
- This section provides visual charts showing relationships between temperature, humidity, wind speed, and forest fire occurrences.
- To access this section, click on **Data Analysis** in the navigation bar.

6. Error Handling

- If invalid data is entered (e.g., missing or non-numeric input), the system will display an error message and prompt the user to correct the input.
- Ensure that all input fields are filled correctly before clicking **Predict Probability**.

Frequently Asked Questions (FAQs)

Q1: What data do I need to enter to predict forest fires?

A1: You need to enter three key environmental variables: Temperature (in degrees Celsius), Humidity (in percentage), and Oxygen levels (in percentage). These values are used by the system to predict the likelihood of a forest fire.

Q2: How accurate is the prediction?

A2: The accuracy of the prediction depends on the quality of the data entered and the model's performance. The system uses a pre-trained machine learning model with an accuracy rate of over 90%.

Q3: Can I see past data on fire occurrences?

A3: Yes, you can visit the **Data Analysis** section to explore visual charts and trends based on historical data.

Q4: What happens if I enter invalid data?

A4: If you enter invalid data (e.g., missing values or non-numeric characters), the system will prompt you to correct the input and resubmit the form.

Q5: How often should I use this system?

A5: It is recommended to use the system regularly during fire-prone seasons or whenever significant environmental changes are noticed.