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Weather Monitoring and Reporting System with Disease and Outfit Prediction

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Abstract

Weather conditions strongly influence human health, comfort, and daily lifestyle decisions can trigger several weather-related health issues such as heatstroke, asthma, flu, and allergies Similarly, inappropriate clothing choices during adverse weather conditions increase the risk of illness and discomfort. To address these challenges, this paper proposes an intelligent Weather Monitoring and Reporting System with Disease and Outfit Prediction, enhanced with advanced AI-driven features. This comprehensive aims to improve user awareness, promote health safety, and assist individuals in managing their daily activities effectively. The system collects real time weather and air quality data from trusted APIs such as Open Weather Map and analyzes key parameters including temperature, humidity, wind speed, atmospheric pressure, and AQI. It integrates machine learning techniques to weather forecating potential health risks and disease probabilities while offering personalized preventive recommendations based on user profiles and environmental conditions. Additionally, an AI powered outfit recommendation module suggests weather-appropriate clothing by considering temperature fluctuations, rain probability, UV index, and user preferences. the presented work used advanced features such as hyper local forecasting, smart notifications, geo fencing alerts, wearable device integration, and a voice assisted interface further enhance system intelligence and user experience. The paper also provides seasonal disease trend analysis, pollution alerts, and minute level weather predictions to support informed decision making. Designed as a web or mobile application, the system offers a unified, user friendly platform for real-time weather monitoring, disease risk prediction and smart lifestyle guidance.

Keywords: *Air Quality Index (AQI), Artificial Intelligence, Environmental Health Monitoring, Hyperlocal Forecasting, Weather Monitoring, Machine Learning*

Introduction

Weather conditions play a vital role in influencing human health, comfort, and everyday activities. Rapid changes in environmental factors such as temperature, humidity, wind speed, atmospheric pressure, and air quality can significantly affect people's well-being. Extreme heat may lead to heatstroke, poor air quality can trigger asthma and respiratory problems, while sudden weather fluctuations often cause flu and seasonal allergies. In addition, choosing inappropriate clothing during unfavorable weather conditions can increase the risk of illness and discomfort. Despite the availability of many weather applications, most of them only provide basic forecasts and do not offer personalized health guidance or preventive recommendations based on environmental conditions.

To address these limitations, this paper proposes a Weather Monitoring and Reporting System with Disease and Outfit Prediction, enhanced with advanced AI-driven features. The system collects real-time weather and air quality data from reliable APIs and analyzes parameters such as temperature, humidity, wind speed, atmospheric pressure, and Air Quality Index (AQI). By integrating real-time monitoring, health prediction, and smart lifestyle guidance into a single platform, the system aims to improve user awareness, promote health safety, and support better daily decision-making. Using machine learning techniques, the system predicts potential health risks and provides personalized recommendations to help users prevent weather-related diseases. Additionally, it includes an intelligent outfit recommendation module that suggests suitable clothing based on weather conditions and user preferences. Remaining sessions are divided into literature review, proposed work result and discussion and conclusion.

Literature Survey

1. This study reviews various architectures for based weather systems, emphasizing microcontrollers, GSM modules, and WSNs. Energy consumption, data accuracy, and connectivity in remote areas are the challenges.
2. Focuses on hyperlocal weather prediction using and machine learning (ML).

This system improves anomaly detection and resolution compared to traditional systems, particularly in urban microclimates.

3. Proposes a 5-layered-AI framework including acquisition, processing, decision-making, and forecasting especially useful for agriculture and rural weather advisory systems.
4. A systematic review on smart monitoring systems' role in environmental impact evaluation. Emphasizes how real-time data can inform policy decisions and disaster preparedness.
5. Discusses practical use cases for enabled monitoring especially in smart cities, flood zones, and precision farming. It also covers cloud integration and real-time alerting.
6. Presents case studies from India where real-time weather stations improved urban infrastructure resilience and agricultural decision-making using NB- and cloud dashboards.
7. Offers a detailed breakdown of AWS (Automatic Weather Station) components: meteorological, data loggers, solar panels, and communication modules. It also explains typical configurations.
8. Focuses on calibration, accuracy standards, and common types such as ultrasonic wind, thermistors, and rain gauges.
9. Case study on building a basic Arduino-GSM-BME280-based weather system, demonstrating feasibility for rural or educational deployments.
10. Introduces a GSM-based weather alerting system capable of sending SMS alerts for threshold breaches in temperature, wind, or rainfall—useful in disaster-prone zones
11. Documents NY State's large-scale weather sensor network with over 100+ stations, collecting data every 5 minutes. Highlights operational issues like power, maintenance, and data latency.
12. Describes the U.S. National Weather Service's AWIPS system, integrating satellite, radar, and ground station data for nationwide forecasting and alerts.
13. Provides an overview of the Weather Research and Forecasting (WRF) model, a widely used numerical prediction system with support for parallel computing and real-time assimilation.
14. A global initiative aimed at improving 1- to 14-day weather predictability. Highlights importance of multi-national data sharing and ensemble forecasting techniques.
15. Offers a comparative literature review, covering various data collection platforms (AWS, satellite, GSM-based systems), and highlights integration of windSat and remote sensing data.

Methodology

The proposed system follows a structured methodology to collect, process, and analyze weather data in order to provide health risk predictions and outfit recommendations. Initially, real-time weather and air quality data are obtained from reliable APIs such as Open Weather Map. The collected data includes parameters such as temperature, humidity, wind speed, atmospheric pressure, rainfall probability, and Air Quality Index (AQI). This data is continuously updated and stored in the system database for further analysis. After data collection, preprocessing techniques are applied to clean and organize the data. Machine learning algorithms are then used to analyze weather patterns and identify possible health risks associated with environmental conditions. Based on the analyzed data, the system predicts potential weather-related diseases such as heatstroke, asthma, flu, and allergies. At the same time, the system generates personalized outfit recommendations by considering weather conditions, temperature variations, rain probability, and user preferences. The final results are displayed through a user-friendly web interface, along with alerts, notifications, and preventive suggestions to help users make informed daily decisions.

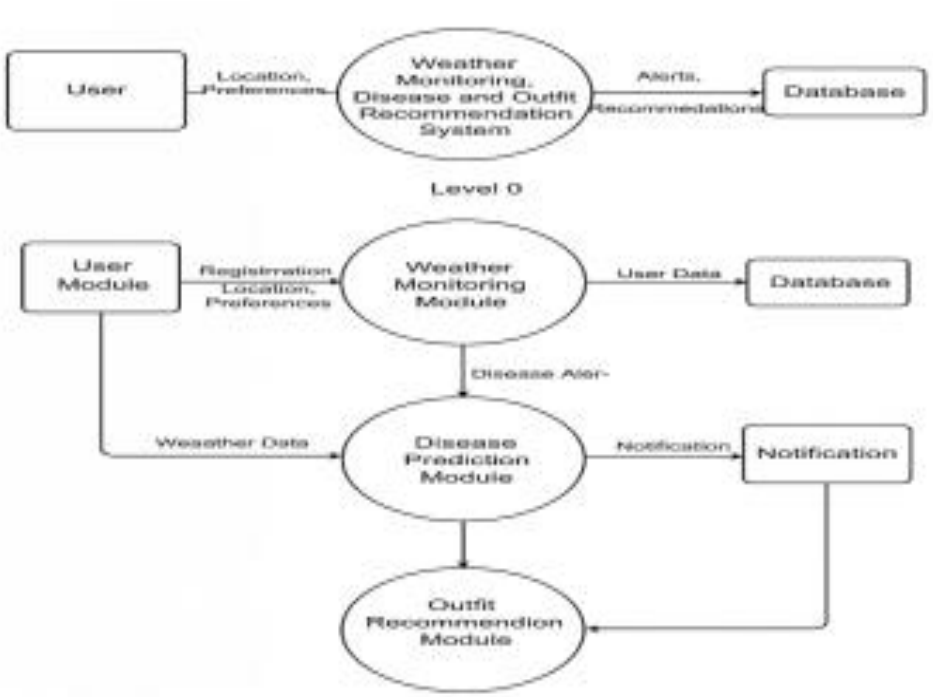

Figure.1. Weather Monitoring and Reporting System

The proposed Weather Monitoring and Reporting System with Disease and Outfit Prediction follows a modular methodology to collect weather information, analyze environmental conditions, and provide intelligent recommendations to users. The system begins with the user module where users register and provide their location and personal preferences. This information is stored in the database and used for personalized predictions and. The system is developed using Python 3.x as the primary programming language for implementing the backend logic, data processing, and integration of weather APIs. The web application is built using the Flask framework, which provides a lightweight environment for developing dynamic and efficient web applications. For the front-end interface, technologies such as HTML5, CSS3, and JavaScript are used to design responsive and user-friendly web pages. The system to store user information, weather data, disease prediction results, and outfit recommendations. Real-time weather information is obtained using the Open Weather Map API.

The Weather Monitoring Module collects real-time weather data such as temperature, humidity, wind speed, atmospheric pressure, and air quality information from external weather APIs. The collected data is processed and stored in the database for further analysis. Based on the environmental conditions and user data, the Disease Prediction Module applies analytical or machine learning techniques to identify possible health risks such as flu, asthma, allergies, or heatstroke.

After predicting potential health issues, the system generates alerts and notifications to inform users about possible risks. Simultaneously, the Outfit Recommendation Module analyzes the weather conditions and suggests suitable clothing based on temperature, rainfall probability, and environmental conditions. The final results are delivered to the user through a user-friendly interface, enabling them to make better daily lifestyle and health decisions. In terms of hardware requirements, the system requires a computer with at least an Intel Core i3 processor or higher, 4 GB of RAM, and a minimum of 20 GB of available storage space to ensure smooth operation. The software requirements include an operating system such as Windows, Linux, or macOS, along with a modern web browser like Google Chrome, Microsoft Edge, or Mozilla Firefox for accessing the application. Development tools such as Visual Studio Code or PyCharm can be used as the integrated development environment (IDE) for coding and testing the system.

Result and Discussion

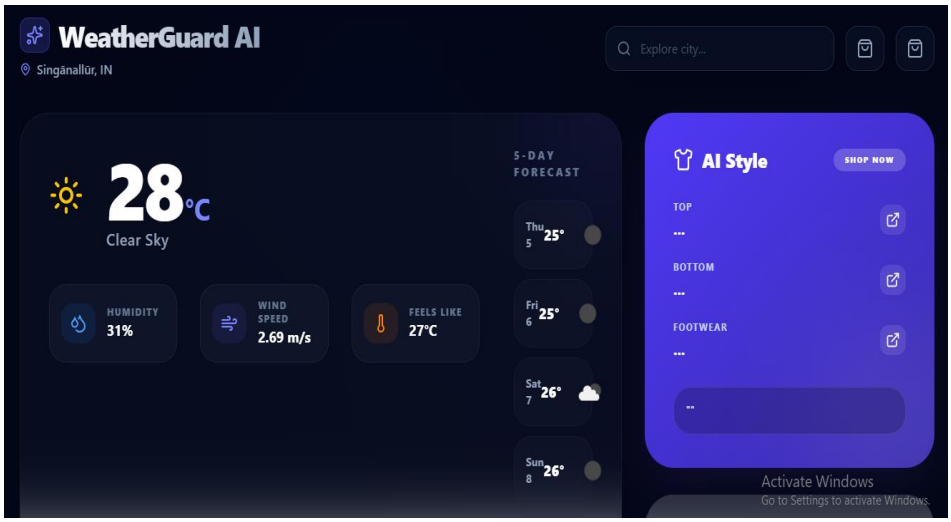

Figure.1. Weather Prediction using AI

The system interface includes an interactive satellite map that helps users visualize geographical locations and environmental conditions. The map displays a global view of the Earth with terrain and boundary analysis using satellite imagery. Users can easily identify their location through a marker placed on the map based on latitude and longitude coordinates.

Figure.2. Visual Geographical locations

The satellite view enhances the user experience by providing a clear geographical representation of continents, oceans, and regional boundaries. This feature supports real-time weather monitoring and improves location-based predictions for disease risks and outfit recommendations within the proposed weather monitoring system.

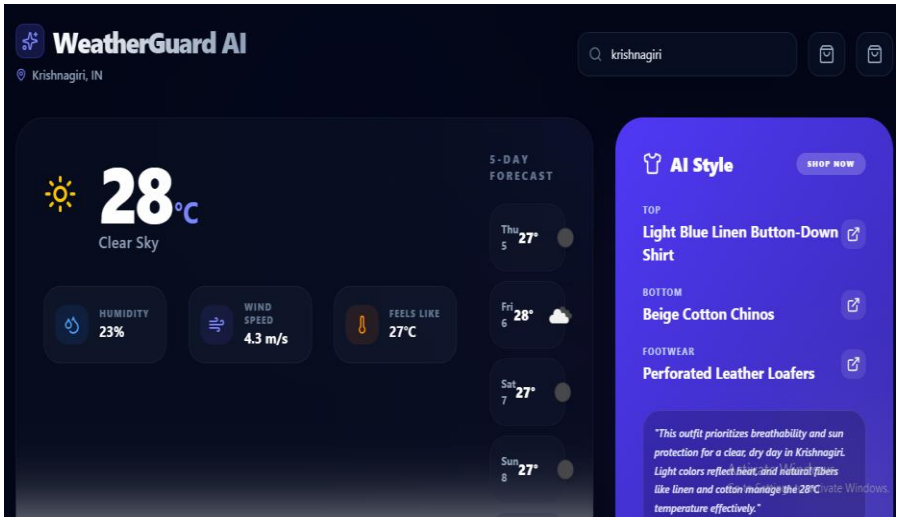

Figure.3. Report of five-day weather forecast

The dashboard shows the weather details for Krishnagiri, India, with a temperature of 28°C and clear sky conditions. The system also presents a five-day weather forecast, allowing users to understand upcoming weather patterns and plan their activities accordingly.

Conclusion

The proposed Weather Monitoring and Reporting System with Disease and Outfit Prediction provides an intelligent solution for monitoring environmental conditions and supporting healthier daily lifestyle decisions. The system collects real-time weather data such as temperature, humidity, wind speed, atmospheric pressure, and air quality using reliable weather APIs. By analyzing these environmental factors, the system is able to predict possible weather-related health risks such as flu, asthma, allergies, and heatstroke. This helps users take preventive measures and stay aware of potential health issues caused by changing weather conditions. The main limitation is the dependency on external weather data sources such as the Open Weather Map API and the accuracy of machine learning predictions.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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