DENGUE OUTBREAK EARLY WARNING FROM WEATHER SIGNALS

A Mini Project Report

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CERTIFICATE

This is to certify that the mini project report entitled **“Dengue Outbreak Early Warning from Weather Signals”** has been carried out by **Aditya Kumar** under the supervision of **Prof. (H.O.D) Manmohan Mishra** in partial fulfillment of the requirements for the award of the degree of **Master of Computer Applications (MCA)** from **United Institute of Management**.

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ABSTRACT

The project **“Dengue Outbreak Early Warning from Weather Signals”** aims to predict the likelihood of dengue outbreaks based on daily weather parameters such as temperature, humidity, and rainfall. The system is a simple front-end web application developed using HTML, CSS, and JavaScript. It helps users assess dengue risk levels based on weather conditions and provides early warnings for prevention and awareness.

INTRODUCTION

Dengue is a mosquito-borne viral infection that thrives in warm, humid, and rainy climates. Predicting dengue outbreaks is crucial for taking early preventive measures. This project focuses on developing a weather-based risk assessment system that estimates dengue risk using daily temperature, humidity, and rainfall data. The system calculates a risk score and classifies it into low, medium, or high levels.

OBJECTIVE AND SCOPE

The main objectives of the project are: • To design a web-based dengue risk prediction tool. • To understand the correlation between weather parameters and dengue outbreaks. • To provide early warnings for better public health awareness. Scope: The project is designed as a prototype model demonstrating how environmental conditions affect dengue spread. It can be expanded into a large-scale system integrated with live weather data APIs and machine learning models.

SYSTEM DESIGN AND ARCHITECTURE

The system accepts three main inputs — temperature (°C), humidity (%), and rainfall (mm). Each parameter influences mosquito breeding and virus transmission differently. The model assigns weighted scores to each parameter and computes an overall dengue risk score.

Data Flow: 1. User enters daily weather data. 2. System processes and validates inputs. 3. A heuristic formula calculates temperature, humidity, and rainfall scores. 4. Weighted sum generates the final risk score. 5. Risk level is displayed as Low, Medium, or High.

FRONTEND DESIGN

The user interface is created using HTML and styled with CSS for a clean and interactive look. Users can add multiple entries for different dates using a dynamic table. JavaScript is used to handle user inputs, perform calculations, and update the results instantly on the page. The color-coded risk levels make interpretation quick and easy.

ALGORITHM AND LOGIC

The risk calculation uses a simple heuristic algorithm based on temperature, humidity, and rainfall. Each parameter is given a specific weight: • Temperature – 40% • Humidity – 35% • Rainfall – 25% Scores are assigned based on ideal conditions for mosquito breeding: • Temperature between 25–35°C → High risk • Humidity above 75% → High risk • Rainfall between 10–50mm → High risk Final Score = (0.4 × TempScore) + (0.35 × HumidityScore) + (0.25 × RainfallScore) Risk Classification: <50 = Low Risk | 50–74 = Medium Risk | ≥75 = High Risk

RESULTS AND OUTPUT

The output table displays the calculated risk scores and corresponding risk levels for each day’s weather data. Users can observe how small variations in temperature or humidity affect the overall risk. Color-coded indicators (green, orange, red) enhance visualization of dengue-prone conditions.

ADVANTAGES AND LIMITATIONS

Advantages: • Simple and quick dengue risk assessment. • No internet connection or backend server required. • Easy to use and understand. • Useful for public awareness and education. Limitations: • Uses static, heuristic formulas instead of real-time data. • Not a scientifically validated model. • Can be improved using machine learning and real weather APIs.

CONCLUSION AND FUTURE SCOPE

The project demonstrates a simple yet effective approach to predicting dengue outbreak risks based on weather signals. By analyzing environmental parameters, it can help communities take early preventive measures. In the future, this model can be integrated with live weather APIs, geographic mapping, and AI-based predictive models to improve accuracy and usability for large-scale public health monitoring.