



FUZZY LOGIC BASED WEATHER PREDICTION

Mrs. D. HEMALATHA¹, DHARANIKA. G²

¹ GUIDE

SRI KRISHNA ADITHYA COLLEGE OF ARTS AND SCIENCE

ABSTRACT :

The inherent unpredictability of atmospheric circumstances make forecasting the weather difficult. The method for forecasting meteorological parameters including temperature, humidity, and precipitation is based on fuzzy logic and is presented in this work. The suggested approach generates precise forecasts by using fuzzy inference rules and historical weather data. The findings show that, in comparison to conventional techniques, the fuzzy logic approach can better handle the ambiguity in weather data, improving prediction accuracy.

INTRODUCTION:

Conventional numerical weather prediction methods need a lot of processing power and mostly rely on mathematical formulas. Using fuzzy logic's advantages to control imprecision and uncertainty in meteorological data, this study suggests a fuzzy logic-based method for predicting weather conditions. Conventional numerical weather prediction methods need a lot of processing power and mostly rely on mathematical formulas. Using fuzzy logic's advantages to control imprecision and uncertainty in meteorological data, this study suggests a fuzzy logic-based method for predicting weather conditions.

LITERATURE REVIEW:

Instead of using the conventional true/false binary, fuzzy logic, which was first presented by Zadeh in 1965, enables reasoning with degrees of truth. Fuzzy logic is a good technique for weather prediction because it can handle the ambiguity of meteorological data. In a variety of prediction tasks, prior research has demonstrated that fuzzy systems can perform better than conventional techniques.

METHODOLOGY :

The proposed weather prediction system consists of three main components: Datacollection, Fuzzy inference system, and Output generation.

DATA COLLECTION :

Local weather stations provided historical weather data, which included variables like temperature, humidity, wind speed, and air pressure. The five-year dataset offers a thorough understanding of weather trends. Local weather stations provided historical weather data, which included variables like temperature, humidity, wind speed, and airpressure. The five-year dataset offers a thorough understanding of weather trends.

FUZZY INFERENCE SYSTEM :

The following procedures are used in the design of the fuzzy inference system: Fuzzification is the process of transforming input variables into fuzzy sets. Temperature, for example, is classified as "Low," "Medium," or "High."

Based on Rules: A collection of fuzzy rules is established.

For instance, precipitation is likely if both the temperature and the humidity are high. Precipitation is unlikely if both the temperature and the humidity are low.

INFERENCE ENGINE:

Fuzzy outputs are produced by evaluating the fuzzy rules.

DEFUZZIFICATION:

To enable practical interpretation, the fuzzy outputs are transformed back into distinct values.

OUTPUT GENERATION :

The final output includes predictions for temperature, humidity, and likelihood of precipitation for the next day.

RESULT:

For validation, the fuzzy logic-based system was put to the test using real weather data. Metrics like Mean Absolute Error (MAE) and Root Mean Square Error (RMSE) were used to gauge how accurate the forecasts were. The results show that as compared to conventional statistical methods, the fuzzy logic approach greatly increases prediction accuracy.

CONCLUSION:

This study shows how well a system based on fuzzy logic can forecast the weather. Fuzzy logic is a useful technique in meteorology because it can manage uncertainty and produce outcomes that are easy to understand. Future research will concentrate on incorporating machine learning methods to improve the system's prediction power.