7COM1079-0901-2024 - Team Research and Development Project

Final report title: Analyzing Weather Data in R

Group ID: A82

Dataset number: DS031

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Hatfield, 2024

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1. Background research
   **1.1.** **Research papers (at least 3 relevant to your topic / DS) (200 words)**
   Climate fluctuation and the consequent changes in weather have remained areas of focus in most climate research. According to Bamal *et al*., 2024, analyzed changes in regional temperature records for several decades and focused on the impact of climate change on global warming. Based on their results, the authors underscore the importance of regional approaches as a solution to these differences, especially where data records are scarce. Likewise, Tyystjärvi *et al*., 2024, examined the correlation between the amount of precipitation and other climatic factors and identified connections indicative of changes in the patterns of precipitation and other atmospheric parameters. As for precipitation behavior, this research highlighted the need for considering variations in atmospheric pressure as one of the predictor variables.

   1.2. Why RQ is of interest (research gap and future directions according to the literature)
   In particular, Mousavi *et al*., 2024, showed how the models could be used in the prediction of such calamities as hurricanes and heat waves. From this date, they employed analyzed climatic records to develop models that would detect patterns that cause extreme conditions. Yet they also mentioned conditions of low data quality and interregional differences that may affect the model. The present work aims to extend these kinds of research to assess regional patterns, interdependencies of climatic criteria, and the effectiveness of various predictions based on analysis of global meteorological data (Jihan *et al*., 2024). The structure of the dataset enriches the current hypothesis-focused and psychiatrically defined methodologies of the word 'boredom' to allow for statistical testing and data visualization to address the limitations outlined in previous studies. For instance, Bamal *et al*., 2024, precisely urged the quantification of temperature changes Some authors proposed the broadening of studies on the impact of atmospheric pressure on changes in precipitation. In addition, similar to Ji *et al*., 2024, this study employs the statistical modeling approach to improve the accuracy of prediction, for practical usage in climate resilience plans.