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INTEGRATION OF ARTIFICIAL INTELLIGENCE IN SATELLITE OBSERVATIONS FOR ADVANCED RAINFALL FORECASTING IN PERU: AN APPROACH FOR THE MITIGATION OF CLIMATE AND ENVIRONMENTAL CHALLENGES

Abstract

This research project focuses on the development of an advanced system for predicting rainfall events in Peru and adjacent regions, using satellite data for analysis and subsequently applying artificial intelligence techniques. The main goal is to establish an effective nowcasting method, allowing for the generation of accurate and timely rainfall forecasts, essential for a variety of applications, including natural resource management, agriculture, climatology, and emergency preparedness.

The research is based on the analysis of data from the geostationary satellite GOES-16. Using artificial intelligence methods, the project applies advanced strategies in the processing and analysis of temporal data. This approach enables the extraction of relevant features and their correlation with meteorological data for the forecast of climatic events.

The scope of the study includes a wide range of geographical scenarios in Peru and neighboring countries, covering everything from densely populated urban areas to remote and rural areas. The proposed system has the potential to revolutionize decision-making in various fields, facilitating effective agricultural management and rapid response to natural disasters.

Preliminary results indicate that the model is capable of providing rainfall forecasts with acceptable accuracy, demonstrating its feasibility for implementation in an early atmospheric alert system. This breakthrough represents a significant step in mitigating the adverse effects of extreme weather phenomena, offering a valuable resource for planning and rapid and effective response in various situations. In summary, this project highlights the capability and adaptability of artificial intelligence applied to the field of meteorology and emergency management.