Improved estimation of past rainfall using neural networks

Overview

Risk management for crop insurance policies can be based on many variables, including past weather data. Currently, the accuracy of precipitation estimates can vary depending on how close an area is to the radar or rain gauge station. And for computer modeling programs, much needed older data may be unavailable for some areas. To address these issues, a statistical approach has been developed to estimate past rainfall levels using archived radar data. This technology could help weather insurance companies better assess customer claims and also build policies that better reflect the risk of severe weather.

Advantages

- Reconstructs past precipitation for the periods when NEXRAD data is lacking
- Outperforms Multi-Linear Regression model predictions
- Uses publicly available NEXRAD and rain gauge datasets

Description

Hydrologic models, crop models, and other applications often need rainfall datasets covering many years for proper calibration and validation. However, complete long term radar datasets are not always available. To accurately estimate precipitation levels when data is missing, a program using artificial neural networks was developed. Once the program is trained using trusted radar and rain gauge datasets, it can estimate rainfall data for periods when such data is lacking. This method performed better than a multi-linear regression model and provided more accurate stream flow levels compared to rain gauge estimates (see reference and figure below). This technology could be useful to crop insurance companies and others needing accurate past rainfall estimates at the local level.

Status

- Software has been demonstrated
- Proof of concept published in the Journal of Hydrologic Engineering

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research or a joint venture

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