

The Time Scales Rainfall Forecast in Water Monitoring Application

1. Why is the National Hydro Informatics and Climate Data Center or NHC?
2. Big Data, Data Analytics, and Data Science
3. BI-DSS system - Difference of Rainfall Forecasting Time Scales

Summary

In the recent years, the precipitation information is increasing needed to make the decision for water resource management. Especially in Thailand, since there was the severe flood in 2011, the weather structured and unstructured data and information from 38 government agencies were collected into the National Hydro Informatics and Climate Data Center or NHC data warehouse. These weather information include the rainfall forecast datasets which are used for flood and drought monitoring and planning.

In the past few years and over the years, Big Data, Data Analytics, and Data Science are widely applied to analyze and derive the algorithm process insights which can lead to better decisions. Big Data is the large collection of data from multiple sources and is not usually available in standard database formats. All types of data in Big Data are structured, semi-structured and unstructured data. Data Analytics applies the algorithm process to derive the correlations between the number of datasets. Data science is a scientific approach that applies mathematical and statistical and computer for processing Big Data.

From the severe flood event as previously mentioned, the BI-DSS which is the second phase system has been developed by collecting some weather data and information from NHC and some unstructured weather data such as the satellite sea surface temperature images, the satellite rainfall images, and etc. from other international sources. These unstructured weather data have been collected in Big Data database management which is MongoDB in this system. Data Analytics and Data Science have been applied to analyze the datasets and predict the water and weather situations to assist making the decision and managing the water in Thailand. One function of this system is the rainfall forecasting using over 5-years the weather datasets and applying the Data Science methods such as image similarity comparison, machine learning, deep learning, and etc. This rainfall forecasting is classified into 4 groups by using time series that are daily, weekly, monthly, and yearly rainfall measurement. The current rainfall situations or nowcasting and short-term rainfall forecasting are used for flood monitoring and preventing. The middle-term and long-term rainfall forecasting are used for flood and drought planning and managing of Thailand. These results of time scales rainfall forecasting can also be expand to apply in reservoir operation management.

Therefore, this work focuses on the combination of time scales rainfall forecast displaying in one system to improve the capability of flood and drought plan and management in Thailand.

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