

ABSTRACT

The Weather analysis and database construction for research and highland developments in Thailand aimed to explain the variation of weather and develop the accurate models for highland climatic forecasting system by using the lowland climate data in the north recorded by the Meteorological Department association with highland climate data recorded by the Highland Research and Development Institution (Public Organization) for 58 stations. The database of weather forecasting system were connected and published via the website of the Highland Research and Development Institution (Public Organization). Types of daily climate data derived from both 2 sites of the Meteorological Department and the Highland Research and Development Institution (Public Organization) were similar for 5 categories including rainfall, maximum temperature, mean temperature, minimum temperature and relative humidity.

The studies of climate fluctuations indicated the increasing trend of the annual rainfall which the occurred cycle analyzed by using the Spectral Analysis at the 95% accuracy was 2.3-2.4 yrs and 5.2-5.6 yrs, respectively while the maximum temperature was fluctuated for ± 1 °C with the occurred cycle of 2.1-3.6 yrs. The trend of the minimum temperature was increase with the occurred cycle of 3.6 yr. By using the regression analysis, the maximum temperature was significantly related (positive correlation) in the same direction with the mean temperature ($r=0.757$) and the minimum temperature ($r=0.358$). It also illustrated the significant relationship (negative correlation) in the opposite direction with the rainfall ($r=-0.497$) and the relative humidity ($r=-0.577$).

These climate data were then analyzed and were constructed the weekly, monthly, and annual climate forecasting models of the rainfall, the maximum temperature and the minimum temperature by using the technique of Artificial Neural Network which will forecast the precise highland climate data longer than 1 period with the higher accuracy at 95% significance.

The weather database was done by using the PHP (PHP Hypertext Preprocessor) for website construction on Microsoft SQL Server and was illustrated in HTML pattern. The login page were necessary for all users to express themselves before using the weather forecasting database and the system log was also recorded. For using, the weather station, type of climate data and duration were respectively selected and the forecasting data was illustrated in both of table and graphic representation. Finally, these results could be saved and continuously used by all login users.

Keywords: Artificial Neural network, Prototype, Spectral analysis, Weather database