

C
001.642
KAL

AN INTELLIGENT WEATHER FORECASTING SYSTEM
FOR SRI LANKA

A THESIS PRESENTED BY

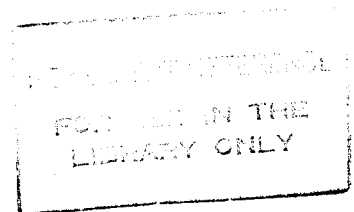
SUMUDU SANJEEWA KALUPAHANA
~

to the Board of Study in Statistics & Computer Science of the
POSTGRDUATE INSTITUTE OF SCIENCE

in partial fulfillment of the requirements
for the award of the degree of

MASTER OF PHILOSOPHY

of the



UNIVERSITY OF PERADENIYA

SRI LANKA

2007

614248

ABSTRACT

Over the past two decades, there has been a substantial increase of understanding how satellite meteorological data can be used to estimate rainfall. Nevertheless, despite the use of interactive computer systems, the time required to produce rainfall estimates typically exceeds half an hour. Moreover, the average error for rainfall events is about 30%. Considering these facts, learning capabilities of neural network models and the state-of-the-art technology, force to investigate applications of neural network models in weather forecasting. There have been numerous research done on the related theme, but the approach taken here is new.

Proposed intelligent weather forecasting system is based on artificial neural networks (ANN), the inputs and outputs are the past experience (daily real rainfall figures in pervious years and corresponding daily radiosonde data collected from the weather balloons). More explicitly, daily input data for the proposed ANN are an array of height, temperature and dew points at certain pressure levels while the output being the rainfall estimates and the error within the certain period of analysis. During the learning, it is necessary to store as much previous experience as possible in order to predict the actual weather forecast with the available data or partially available data.

- There are free analytical software tools to train and manage such neural networks but they are built by research institutes for research purposes therefore not specific for weather but with ability to cater for any general environment. Therefore we could still chose to use these tools with our proposed model or use the final product (LIWPAT) which is designed to handle the entire forecasting process including data management.

The ANN approach is applied for weather forecasting in order to achieve results faster than the conventional methods at the same time minimizing the error. The accuracy of the model will grow in time as its self evolving, considering the present data as past experience, every day..