Temperature and Humidity Prediction at Various Heights at Telkom University Landmark Tower (TULT) Using Neural Networks and the Internet of Things (IoT)

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***Abstract* — TULT is used daily by at least 1000 students for teaching and learning activities. The air condition on each floor affects the comfort of learning. Therefore, a method is needed to monitor temperature and humidity, one of which is the Telkom University Landmark Tower (TULT) building, and each different floor or height affects the temperature and humidity inside the building. Therefore, it is difficult to predict because there are differences in temperature and humidity at each altitude. To solve the problem, it is hoped that neural networks and IoT methods can predict temperature and humidity at different heights in TULT buildings. Artificial Neural Network (JST) is one of the information processing systems that mimics the workings of the human brain. JST has the ability to make decisions on previously studied data.**

Internet of things (IoT) is a term intended to encompass the increased use of the internet, the adoption and integration of mobile computing, and connectivity into everyday life. The Internet of Things is related to DoT (Disruption of Things) and serves as an introduction to changes or shifts in Internet usage from the previous Internet of People to the Internet of M2M (Machine-to-Machine).

Keywords— tult, jst, iot

I. INTRODUCTION

In general, there must be certain differences in temperature and humidity and altitude in each area. This can occur due to the altitude itself, the influence of solar radiation and the surrounding wind. Air humidity also tends to be higher during the day. The height is the same as the building, one of which is the Telkom University Landmark Tower (TULT) building, and each different floor or height affects the temperature and humidity in the building. Therefore, it is difficult to predict because there are differences in temperature and humidity at each altitude. To solve the problem, it is hoped that neural networks and IoT methods can predict temperature and humidity at different heights in TULT buildings.

Artificial neural networks are one of the information processing systems that mimic the work of the human brain. JST is able to make decisions based on previously studied data. In this study, JST reverse propagation used 3 neurons as input variables for monthly rainfall data, weighed for 3 years using hidden layer neurons, and 1 output layer/output.

Poonia and Tiwari [1] describing accurate modeling of rainfall runoff processes is still a challenging task despite the availability of various modeling methods, such as data-driven or knowledge-driven, developed by various researchers in previous studies. Among these models, the artificial neural network-based precipitation-runoff (JST) model plays an important role in hydrology due to its ability to reproduce high nonlinear properties between various factors involved in hydrology. In this paper, efforts have been made to develop an ANN-based rainfall runoff model for the Hoshangabad Watershed on the Narmada River in Madhya Pradesh. Two different models, the feed-forward back propagation (FFBP) and radial basis function (RBF) network models, were developed using multiple arrays of input datasets and then correlated their flow estimation capabilities for the period 2004-2013. The best performance model is selected based on various performance evaluation criteria, namely R2, MSE, and AARE. Based on this study, it was observed that the JST model gave better results for datasets scaled between zero and one. For Hoshangabad, setting the current rainfall input with up to 4 days of antecedent rainfall and 1-day antecedent runoff values gave the best results for both models (FFBP and RBF). Of these, the RBF network has a better performance compared to the TBS network with an R2 value of 0.9964. The results of this study suggest that the ANN network model is an important tool for predicting hydrological responses in agricultural watersheds and thus helps provide sustainable measures for watersheds.

Sulaiman and Wahab [2] explains that interest in carefully monitoring severe weather events has increased due to the many disasters that have occurred in recent years in many countries around the world. Although predicting rainfall trends is a difficult task, there are many approaches that use time series analysis and machine learning techniques to provide alternative ways to mitigate the impact of flooding caused by high rainfall events. This study used an Artificial Neural Network (ANN) for the prediction of heavy rainfall every month. To this end, rainfall data from 1965 to 2015 from local meteorological stations were collected and used in the study. Different combinations of past rainfall values are