

## ABSTRACT

*Prediction is the process of systematically predicting something that will happen in the future. Information is obtained by comparing information from the past and present information. By combining a prediction system with the application of an IoT-based smart home, it can determine the pattern of using home electronic devices in increasing the efficiency of the use of electrical energy. The use of a prediction system on a smart home can be done by recording the user's habitual activities when using electronic equipment. By using the Backpropagation Neural Network method, it can support the predicted value as an estimate of information that can be concluded in the future. The Backpropagation method is a multi-layered neural network method that can optimize the weights on neurons and solve complex problems. With the design of a prediction system on a smart home, it is hoped that homeowners can find out the analysis of individuals who have bad habits in the use of electronic devices that have an impact on the efficiency of using electrical energy.*

*The design of this system is to build two control systems, namely remote control and automatic control using user habits with a prediction basis using the Backpropagation neural network algorithm. The system that runs automatically uses user datasets in running or operating electronic equipment recorded with a duration of one week. The data will be processed on a server that will send the output value to the application using an android smartphone and a nodemcu microcontroller. Data will be sent and stored on an internet-based storage. The control system can be operated with an android-based application, and the output of the prediction results will be read by the device to determine the usage status of the electronic equipment.*

*The results of this study found that 100% of the android application was in accordance with the desired expectations. Then in designing a model for predicting user habits, it is done with many choices of parameters that affect the accuracy value. The accuracy value is obtained through the confusion matrix calculation with an average accuracy value of 96.3%, a precision value of 95%, and a recall value of 96%. In the direct test of time, the models used in the test provide varying accuracy values, from 80% to 97%. The system can make predictions on the use of electronic equipment based on user habits and the control system can carry out tasks according to the predicted results properly*

**Keywords:** *Smart Home, Prediction, User Habits, Backpropagation Neural Network*