



Thesis Title

**Development of a Short Term Forecasting Model
for Electrical Energy Consumption Profile of a
Base Station Using Artificial Neural Network**

By

M. Abdullah Al-Amin

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Certificate of Approval

The thesis titled “Development of a Short Term Forecasting Model for Electrical Energy Consumption Profile of a Base Station Using Artificial Neural Network” submitted by M. Abdullah Al-Amin, Student No. 122611 of Academic Year 2018-2019 has been found satisfactory and accepted as partial fulfillment of the requirements for the Degree of Master of Science in Electrical and Electronic Engineering.

BOARD OF EXAMINERS:

1.

(Signature)

Name: Prof. Dr. Md. Ashraful Hoque (Supervisor)

Designation: Professor

Address: EEE Dept., IUT, Board Bazar, Gazipur-1704.

Chairman

2.

(Signature)

Head, EEE Dept.

Address: IUT, Board Bazar, Gazipur-1704.

Member
(Ex-Officio)

3.

(Signature)

Name: Dr. Ashik Ahmed

Designation: Associate Professor

Address: EEE Dept., IUT, Board Bazar, Gazipur-1704.

Member

4.

(Signature)

Name: Prof. Dr. Md. Shahid Ullah

Designation: Head

Address: EEE Dept., DIU, Dhaka.

Member
(External)

Declaration

It is hereby, declared that the work presented in this paper is the outcomes of the investigation performed by me under the supervision of Prof. Dr. Md. Ashraful Hoque, Professor, Department of EEE, Islamic University of Technology (IUT), Dhaka, Bangladesh. I also declare that no part of this paper has been submitted elsewhere for the award of any degree.

(Signature of the Supervisor)

Prof. Dr. Md. Ashraful Hoque

Professor, Department of EEE

Islamic University of Technology,

Board Bazar, Gazipur-1704, Bangladesh.

(Signature of the Candidate)

M. Abdullah Al-Amin

Student No.:122611

Academic Year: 2018-2019

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Abstract

Renewable storage device has built a significant place in energy sector. Recently this has achieved a vast development all around the world. With that motivation, this research is focused on forecasting the energy consumption of a BTS of the following day based on previous energy consumption model, and comparing the forecasting results with several popular Short Term Load Forecasting models.

Load forecasting is an important component for power system energy management. Precise load forecasting helps the electric utility to make unit commitment decisions, reduces spinning reserve capacity and schedule device maintenance plan properly. It also reduces the generation cost and increases reliability of power systems. In this work, an artificial neural network (ANN) for short term load forecasting is attempted along with support vector machine (SVM) and auto regressive integrated moving average (ARIMA). Time and load of same week day load are used as the independent variables for short term load forecasting. Based on the time and similar previous day load, ANN, ARIMA and SVM models are built, which are eventually used for the short term load forecasting. This comparison leads to the conclusion that, the forecasting performance of ANN gives more appropriate results than the other two techniques. ANN model forecasted the energy more accurately with increasing number of neurons. Using the curve fitting technique a mathematical model has been established from the data to independently measure the errors of the model. MATLAB SIMULINK package is used here in this work for system designing and simulation. Load data from different BTS is considered for the short term load forecasting.

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List of Abbreviation

Acronyms	Description
ANN	Artificial Neural Network
ARIMA	Auto Regressive Integrated Moving Average
FNN	Feed-forward Neural Network
RES	Renewable Energy Source
MAPE	Mean Average Percentage Error
GUI	Graphical User Interface
MSE	Mean Squared Error
OECD	Organization for Economic Co-operation and Development
PV	Photo Voltaic
BTS	Base Transceiver Station
DSM	Demand Side Management
STLF	Short Term Load Forecasting
ES	Expert System
SVM	Support Vector Machine