PREDICTION OUTPUT CURRENT AND OUTPUT POWER OF PHOTOVOLTAIC SYSTEM USING ARTIFICIAL NEURAL NETWORK

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MUHAMAD AZIM BIN MOHD WADZIR
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITY TECHNOLOGY MARA (UiTM)
SHAH ALAM, SELANGOR DARUL EHSAN

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ABSTRACT

Global climate change has already had observable effects on the environment. Glaciers have shrunk, ice on rivers and lakes is breaking up earlier, plant and animal ranges have shifted and trees are flowering sooner. Human activities such as burning fossil fuel and changes in land use, release large amounts of carbon to the atmosphere, causing CO2 concentrations in the atmosphere to rise. The burning of fossil fuels has contributed to a 40% increase in the concentration of carbon dioxide in the atmosphere. In our country, the government already do an action to reduce the amounts of carbon to the atmosphere by using the renewable energy as a electric source to reduce the dependency on fossil fuel. Under the 8th Malaysia Plan (2001 - 2005) the government of Malaysia had changed the Four Fuel Policy to the Five Fuel Policy energy mix with the addition of renewable energy as the fifth sources of fuel in the year 2000. Solar is one of type of renewable energy, by using Photovoltaic (PV) it can convert solar irradiation into electricity.

This paper presents an application of Artificial Neural Network (ANN) for prediction of output current and output power from Photovoltaic (PV). The output current and output power is predicted from PV system from Green Energy Research Centre (GERC) in Uitm Shah Alam. DC input current and voltage from two strings A and B is sets as input data in ANN program in order to predict the output current and output power from PV system. The performance of the system is measured by its regression value. The best performance of the system is when regression value is equal to 1. Usually, ANN will run heuristically for its parameter and in this paper ANN program is set to generate automatically random parameter. The purpose of prediction output current and output power from PV system using ANN is to evaluate the performance of PV system by using historical data from GERC. The results show that ANN program gives an accurate prediction.

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CHAPTER 1

INTRODUCTION

1.1   BACKGROUND OF STUDY

An increase in price of fossil fuel, air pollution and many more are the reasons why renewable energy is needed at this time. Conventional energy sources based on oil, coal and natural gas keep on increasing the economic cost, produce polluted environment and giving risk to human life. Renewable energy are used nowadays, as it can reduce the dependency on fossil fuels and drive clean technology to the market. There are many types of renewable energy in the market such as biomass, biogas but PV is a popular renewable energy sources in our country.

PV is an item that converts solar irradiation to power energy. Solar energy can be obtained freely at any places most of the time. Solar energy is a clean, pollution free and the energy source is renewable. That's why PV became alternative renewable energy sources and getting more important to electric sources. PV system can be connected to national grid or can be stand alone. In solar energy the irradiation is fluctuations and this is a weakness of PV. PV system use an input like DC current and DC voltage from PV panel, to determine the output current and output power. The performance of PV system is not known so to estimate the system performance a program like ANN is used to estimate their performance and operation[1] [2].

In Artificial Intelligence (AI) there are many methods such as Evolutionary Programming (EP), Fuzzy Logic and ANN is one of them. Based on training experience, ANN has the ability to learn from example and also has the capability to

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