Dear IJICIC Editor,

Thank you for considering our paper entitled by 'Determination of Sensorless Input Parameters of Solar Panel with Adaptive Neuro-Fuzzy Inference System (ANFIS) Method', Reference No.: IJICIC-1802-035 with Author(s): Syafaruddin, Muhammad Iqbal Abubakar, Hizkia Glorius Soma, Sri Mawar Said, Satriani Latief in the publication of International Journal of Innovative Computing, Information and Control (IJICIC).

We would like to thank to reviewers for the beneficial comments and suggestions in order to improve the quality of the paper. We have revised our paper and answered the following the reviewer comments as shown in the bold font as follows:

Best regards,

Syafaruddin

Universitas Hasanuddin, Indonesia

Comments:

(1) Although many works are cited and introduced in the introduction, the motivation of the proposed approach is not well explained. Also, some related works to ANFIS networks have been proposed and presented, but the main difference between the literature and this study is not well analyzed. For example, the "?ayda?, U., Has?al?k, A., & Ekici, S. (2009). An adaptive neuro-fuzzy inference system (ANFIS) model for wire-edm. Expert Systems with Applications, 36(3), 6135-6139.".

Thank you for your beneficial comments and suggestion to improve the quality of our paper. The motivation of this research is well-addressed in the introduction section. Please have a look at this point as follows.

Ideally, both input and output parameters are important to be known in order to determine the performance the solar panel comprehensively. However, the researchers and the owners of solar panel installations are more interested in the output power and energy production. In fact, the inputs of irradiance and cell temperature are prominent to be identified as well in order to improve the overall PV system performance. However, provision sensors to measure the real-time irradiance and cell temperature make the additional complexity system increases and of course the cost of these auxiliary systems. In addition, the historical irradiance data cannot be obtained directly because of expensive solar irradiance meters. The cost of pyranometer to measure global incoming solar radiation is about more than $1000 with capability of integrated transmitter, while the cost temperature sensor for solar cell with the capability of flat surface temperature sensor measurement is about more than $300.

Regarding the ANFIS network, the proposed method can be explained as follows.

The paper aims to benefit the artificial intelligent application by means the adaptive neuro-fuzzy inference system (ANFIS) network to deal with the complexity of input-output data combination. The ANFIS network is also successfully applied for parameters prediction in multi-input parameters systems where the accuracy of prediction is determined by the modeling of fuzzy inference system with the learning ability of artificial neural network [21]. In the field of photovoltaic systems, the ANFIS network have been used to solve different problems which mainly in the area of modelling and tracking of maximum power [22, 23]. Under variational meteorological data inputs, the ANFIS network has been used for modelling and simulation for estimated output power of photovoltaic systems where the high reliability and accuracy are confirmed better than conventional artificial neural network method [24]. The high accuracy and fast response of maximum power tracking performance is also shown with ANFIS network based control systems taking the inputs of irradiance and temperature [25]. Mostly in the previous studies, the parameters of irradiance and cell temperature are taken as the input parameters to estimate the performance output of photovoltaic systems; while in our study, these parameters are utilized as the output parameters considering the voltage and current of solar cell as the input paramaters. Therefore, our proposed method offers another contribution regarding the implementation of ANFIS network to solve the non-linearity and non-predictable parameters in photovoltaic systems by designing the estimated parameters system without utilizing any sensors.

References:

[21] Ulaş Çaydaş, Ahmet Hasçalık, Sami Ekici, An adaptive neuro-fuzzy inference system (ANFIS) model for wire-EDM, *Expert Systems with Applications*, Vol. 36, No. 3, Part 2, pp. 6135-6139, 2009

[22] Faiza Belhachat, Cherif Larbes, Global maximum power point tracking based on ANFIS approach for PV array configurations under partial shading conditions, *Renewable and Sustainable Energy Reviews*, Vol. 77, pp. 875-889, 2017

[23] Ammar A. Aldair, Adel A. Obed, Ali F. Halihal, Design and implementation of ANFIS-reference model controller based MPPT using FPGA for photovoltaic system, *Renewable and Sustainable Energy Reviews*, Vol. 82, Part 3, pp. 2202-2217, 2018

[24] Adel Mellit, Soteris A. Kalogirou, ANFIS-based modelling for photovoltaic power supply system: A case study, *Renewable Energy*, Vol. 36, No. 1, pp. 250-258, 2011

[25] Ravinder Kumar Kharb, S.L. Shimi, S. Chatterji, Md. Fahim Ansari, Modeling of solar PV module and maximum power point tracking using ANFIS, *Renewable and Sustainable Energy Reviews*,Vol. 33, pp. 602-612, 2014

(2) Figure 2 is suggested to be redrawn to improve the pixel.

The resolution of Figure 2 has been increase to improve the picture quality.

(3) Section 2.2 introduces ANFIS Network, which is the main part of this paper. However, the novelty is not sound; so it should be further enriched and improved.

In section 2.2, the contribution of ANFIS network in this field of application is significantly addressed. Please find the additional information added in the section regarding this point as follows.

It seems that the ANFIS network architecture in this study is quite conventional and similar with the original Sugeno-type of fuzzy inference system (FIS). However, this ANFIS network is accurate enough to do mapping the non-linearity and non-predictable of input-output data combination between voltage-current and irradiance-cell temperature. It is another advantage of using hybrid paradigm of intelligent techniques where a simple ANFIS network without any structure modification is powerful to solve one of complex problems in photovoltaic system applications by means the provision of data irradiance and cell temperature without deploying any pyranometer and temperature sensor surrounding the solar panel. Again, the diversity and proliferation method of ANFIS network is acknowledged as one of the powerful techniques being used and getting high attention in different fields of application.

In addition, the benefit of the ANFIS network utilization in this research is expressed in the beginning of section 3. Please have a look to this part and thank you for the beneficial comments to improve the quality of this paper.

(4) In the Conclusions, some further research directions are expected to be given.
Additional section about the future study is provided after the conclusion. The future study is as follows. The next stage of this study is to implement real-time testing for measuring the irradiance and cell temperature. Voltage and current sensors will be deployed for taking data from solar cell outputs. The analog signals of voltage and current will be connected through analog-digital (A/D) converter to the personal computer where the confirmed ANFIS network will process these data inputs. As results, the variations of irradiance and cell temperature can be monitored in the personal computer screen. The mechanism of this study will be performed under dSPACE based real-time Matlab/Simulink environment.

(5) Some improper english expressions can be found in this paper; for example, the " The paper aims to benefits..." at the beginning of the abstract is suggested to be changed into the "The paper aims to benefit..."; and the " The ANFIS network is actually is..." on page 7 is ill-formed.

Thank you for language correction. Some improper English have been corrected including these points.