Πανεπιστήμιο Κύπρου
University of Cyprus

School of Engineering
Department of Electrical and Computer Engineering

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Department of Electrical and Computer Engineering

Title: "Photovoltaic (PV) Production Forecasting Model Based on Artificial Neural Networks (ANN)**"**

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Room XOD02 – 117, New Campus – University of Cyprus

Abstract:
Accurate photovoltaic (PV) production forecasting is necessary for the optimal integration of this technology into existing power systems and is important for both grid and plant operators. In this sense, PV production forecasting enhancements are essential in order to ensure grid stability, improve the advancement of energy commercialization for selling onto the next day market and control the dispatchability of the electric system.
In general, forecasting approaches utilized to forecast the power produced by grid-connected PV systems, focus on parametric and non-parametric models. In particular, parametric models require precise and detailed information about the characteristics and behaviour of each relevant component of the PV system. Given the limitations of parametric modelling approaches, data-driven models that capture the behaviour of the system from a historical time series of inputs and outputs are gaining ground in the field of PV production forecasting. Such PV production forecasting models use only historical data of meteorological variables and power measurements and therefore the forecasting accuracy depends mainly on the quality of the data and the predictive performance of the model.
The research undertaken over the past years at the University of Cyprus, PV Technology Laboratory focuses in forecasting the day- and hour-ahead DC power produced by different technology grid-connected PV systems, using developed machine learning models based on artificial neural networks (ANN). The scope is to improve the prediction accuracy by identifying the optimal network based on the input parameters and architectural configuration. First forecasting accuracy results for a mono-crystalline (mono-c Si) Silicon PV grid-connected system showed a day-ahead root mean squared error (RMSE) of less than 1 % when compared to measured DC power data-sets for a clear sky day.
Finally, the optimized machine learning algorithms will operate on numerical weather prediction forecasts (NWP) and sky maps to calculate the day-ahead PV production forecasts for a range of PV systems located at several feeders of the National grid.

Biography:
Dr George Makrides is a research associate and the quality manager of the PV Technology Laboratory of the University of Cyprus. He has received his PhD by the University of Cyprus in 2012 and the MPhil degree in Engineering at Cambridge University in 2004, where he also

received the Cambridge Commonwealth Trust scholarship. Prior to this he had received the BEng Honours degree in Electrical and Electronic Engineering at the University of London (First class Honours). During his undergraduate degree he had received various awards for academic excellence. He has published over 80 papers in international journals and conference proceedings and has participated in various local and European research funded projects. His work on the outdoor performance of PV technologies throughout the years, has been the initiation for the establishment of the PV outdoor infrastructure and testing centre in Cyprus for many manufacturers such as Honeywell, Q Cells and others. His research interests include renewable energy sources, smart grids and grid integration issues.