**Photovoltaic power and solar radiation forecasting**

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**Literature Review**

The World population and the consumption of its resources do not stop growing, which consequently increases the demand for energy to sustain this expansion. Since the beginning of the Industrial Revolution in the 18th century, fossil fuels have been consumed at an ever-increasing rate to meet this world's energy demand [1]. However, the use of this type of energy brings serious climate problems, widely debated by the scientific community, and in addition, its extreme dependence has already caused several armed conflicts around the World.

To face it, the adoption of renewable energy sources has been increased and photovoltaic (PV) energy has shown a high penetration rate in the energy market [2]. Nonetheless, the accurate forecasting of PV power generation is significantly important to a secure energy grid operation because its variability can cause negative impacts for the stability and reliability [3], or in other words, the viability of the system.

An important approach that has been used to forecasting PV power generation is the image-based models. Jiang et al. [4] filtered the cloudy days in their dataset and built an end-to-end CNN to map the sky images of these cloudy, achieving a relative RMSE of 8.7%. Nie et al. [5] developed a deep learning framework that first categorize sky images into different sky conditions and then used CNNs models to predict the generated PV Power. They used a dataset of 102885 sky images, downscaled to 64 X 64 pixels, and achieve a RMSE = 7,3% (2.20 kW error over 30 kW rated PV array, on a test set comprising 18 complete days, 9 sunny and 9 cloudy).

Another line of research seeks to forecasting PV power from the previous values of predictions through models based on recurrent neural networks. Chen & Chang [6] started from physical variables and used Pearson coefficients for correlation tests (Pearson feature selection) to remove irrelevant features and modeled a LSTM network to predict the PV power output for the next hour. The result RMSE was 15% (with 10 MW rated PV array, 12,1% under sunny conditions and 18,1% under cloudy conditions).

Starting from the work of Nie et al. [5], it is possible to explore the use of data augmentation and add the temporal approach in the proposed models to test the hypothesis of performance improvement.

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