Intelligent Condition Monitoring of Wind Turbine Blades: A Preliminary Approach

Eugeniu Munteanu

Technical University of Moldova, Chisinau, Republic of Moldova

Sergiu Zaporojan

Technical University of Moldova, Chisinau, Republic of Moldova

Valeriu Dulgheru

Technical University of Moldova, Chisinau, Republic of Moldova

Radu Razvan Slavescu

Technical University of Cluj-Napoca, Cluj-Napoca, Romania

Vladimir Larin

Microfir Tehnologii Industriale Ltd, Chisinau, Republic of Moldova

Ivan Rabei

Technical University of Moldova, Chisinau, Republic of Moldova

Abstract:
Exploring new areas for wind energy production brings new challenges for improvement of wind farms, making them more reliable and suitable for increasing of the power grids. In this regard, it is important to study and propose reliable solutions for contactless intelligent condition monitoring of the wind turbine blades. The article is intended to contribute to the study of various aspects of this actual multidisciplinary topic problem. In this context, the paper follows a systemic approach based on relevant general-purpose pragmatic quality criteria. It reports on the preliminary results obtained when analyzing the problem of building an embedded intelligent monitoring of the state of wind turbine blades using contactless strain sensors. For this reason, the numerical modeling of the blade deformations was performed in order to get the pattern of the maximum deformations of the blade. At the same time, from the pragmatic quality

point of view, the required dataset, parameters of interest and intended data protocols were defined. Finally, a detailed structure of the edge computing module, as well as a preliminary framework for an embedded intelligent monitoring and decisionmaking system for predictive maintenance are presented.

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