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Development of Low Cost Cloud Monitoring for the Diagnosis and Prognostic of the Wind Turbines

HORIZON 2020

Development of Low Cost Cloud Monitoring for the Diagnosis and Prognostic of the Wind Turbines

Reporting

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Periodic Reporting for period 2 - CLOUD DIAGNOSIS (Development of Low Cost Cloud Monitoring for the Diagnosis and Prognostic of the Wind Turbines)

Reporting period: 2017-06-01 to 2018-07-31

Summary of the context and overall objectives of the project

Cloud Diagnosis is a very successful project. During the first year the company has developed and started the field test of our SmartGear product, but during the second year SMARTIVE has installed several prototypes and tested their functionalities in a real wind turbine.

Thanks to Cloud Diagnosis SMARTIVE is leading the Digital Transformation of the Wind Power sector. The company has been recognized as the most disruptive SME in Europe in 2016, EEN New Horizons Award. SMARTIVE has been also recognized as one of the 100 companies leading the Digital Transformation according with the German Energy Agency (dena).

SMARTIVE is currently working with leading companies worldwide like EDPR, Gas Natural or ACCIONA. Thanks to Cloud

Cloud Diagnosis will save 100 M€ annually in losses to wind producers. Once the development will be fully finished and tested thanks to the project will be available in main leading markets, Spain, Germany, France and US. SMARTIVE is becoming the leading company working on the digital transformation on the Energy Market.

The current Cloud Diagnosis solution involves vibration analysis, current analysis, voltage analysis and Acoustic Emission Analysis (Ultrasounds). Each sensor is placed in different parts of the wind turbine (Main Bearing, Gearbox & Generator). By coordinating the measurements SMARTIVE is capable to predict failures up to 6 months in advance. The whole system works coordinated with the SCADA Data analysis. Thanks to our IoT and Big Data technology the system can collect data, securing all the system.

Work performed from the beginning of the project to the end of the \sim period covered by the report and main results achieved so far

The project has two main different parts that have been carried out during this second year. The first one is related to the installation of 18 prototypes.

The main results achieved here are:

- Discussion with future possible customers for the wind farm section where it could be installed
- Selection the best wind turbines, in order to try the communications and check the functionalities
- First tests made in a real wind turbine
- Professional installation of 18 sets

The second part is related to the processing data obtained by the hardware to diagnose the condition of the turbine and display the results to the user.

The main results achieved here are:

- Assessment and selection of signal processing and AI techniques that best fit the needs of our application

- Implementation of signal processing algorithms
- Implementation of backend and frontend components of the Cloud platform.

Progress beyond the state of the art and expected potential impact (including the socio-economic impact and the wider societal implications of the project so far)

Main advances to the state of the art in the Cloud Diagnosis project will be;

- First system to diagnose wind turbines that coordinates multi-parameter analysis such as Vibration Analysis, Current Analysis, Voltage Analysis and Acoustic Emission Analysis.

- First low cost IoT solution to monitor wind turbines
- Cloud based solution to monitor and diagnose wind turbines that introduces the combination of:
- o Multi-parameter Analysis
- o Signal processing techniques: Temporal, Frequency, Time-Frequency
- o Artificial Intelligence Algorithms: Classifiers, Regressive Modelling and Clustering.
- o Cloud based solution

Main socio-economic impact of the project:

- Cloud Diagnosis can increase in average 6% the production of a Standard wind farm. That means about 3.000 MWh annually for a small wind farm with a rated power of 20 MW.

- Cloud Diagnosis can increase income of 120,000 € per a small wind farm (20 MW).
- Cloud Diagnosis will contribute to the Digital Transformation and the introduction of renewals.

- In offshore developments the impact on operations of Cloud Diagnosis may lead to Billionaire savings in costs of operations or losses in miss production.

Related documents

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