

Powerful Empathy with the Wind.

2018



- Smartive develops intelligent platforms to improve the operation an efficiency of the energy market.
- Smartive is very committed with the sustainable growth, the introduction of renewal energies and the promotion of energy efficiency. As a Smart company Smartive uses artificial intelligence, cloud computing, and data mining algorithms to provide smart and efficient solutions to our clients.

We are focusing on deliver intuitive, easy and attractive interfaces to provide accurate real-time data analysis supporting any web connected device in the market.



Why Smartive?





SMARTIVE Big Data Architecture





Failures of Main Components

WindFarm 1, 18 GBX Failures in 8 Years



18/08/2016 3/10/2015 B211 y = 135,74x + 36256 27/12/2014 $R^2 = 0.942$ 2/03/2014 B21 6/05/2013 B313 /07/2012 B114 • 4/09/2011 18/11/201 2/01/2010 8/03/2009 01/06/2008 06/08/2007 10/10/2006 B313 B10 14/12/2005 7/02/2005 3/04/2004 8/06/2003 01/09/2002 05/11/2001 9/01/2001 5/03/200 0/05/199 15

WindFarm2, 43 GBX Failures in 16 Years

WindFarm 1, 6 Generator Failures in 2 years



WindFarm2, 11 Generator Failures in 3 Years



Statistical Analysis – January-May– GBOX







Gearbox Overheat

Cold oil temperature



Statistical Analysis – January-May – GBX





GearBox Temperature out of range



Deep Learning, Clustering



Clustering is a non-supervised training technique. Clustering allows the determination of different points of operation or failure regions.



Example of cluster purity



Cluster I: Purity = $1/6 * (\max(5, 1, 0)) = 5/6$ Cluster II: Purity = $1/6 * (\max(1, 4, 1)) = 4/6$ Cluster III: Purity = $1/5 * (\max(2, 0, 3)) = 3/5$ Total: Purity = 1/17 * (5+4+3) = 12/17

Deep Learning, Clustering





Clustering aggregates similar data into clusters



Main Bearing, Fuhländer

Classifiers, Collaborative Algorithms





Classifier Results



TP: 8 FP: 223 FN: 0 TN: 480 NA: 70 Kappa: 0.046 Kappa ref.: 0.019 (Since: 2014-01-01)

Classifier Results





Our current operations



Our products are currently in use in different projects and agreements in Wind Farms (WF), with the following WTGs and power output for each customer







Wind Farm owners



Manufacturers



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