

Digitalizando la detección y análisis de defectología:

Inteligencia artificial Vs Experiencia técnica humana

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Análisis Operativo
de **PARQUES EÓLICOS**

>> **30** SEPTIEMBRE de **2021**



CRÍATURAS
DEL VIENTO

 Tm
aracnóptero
aerial view

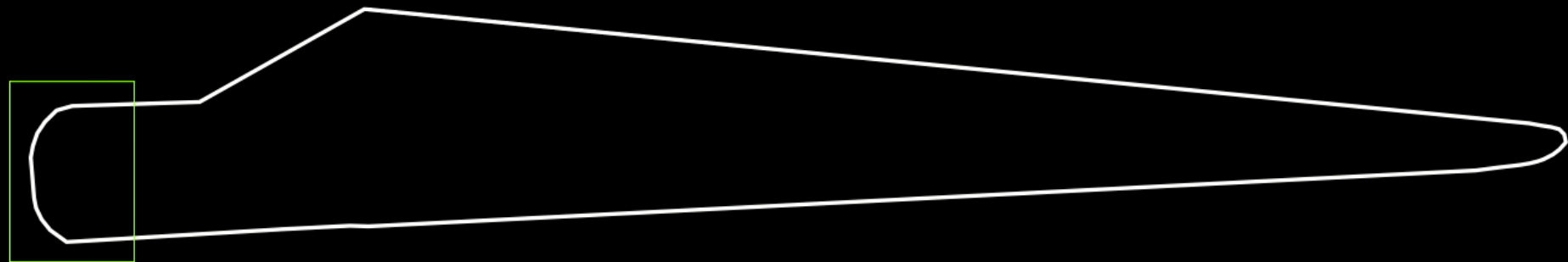
Inspección diferida



Pozuelo de Aragón 2011



2011



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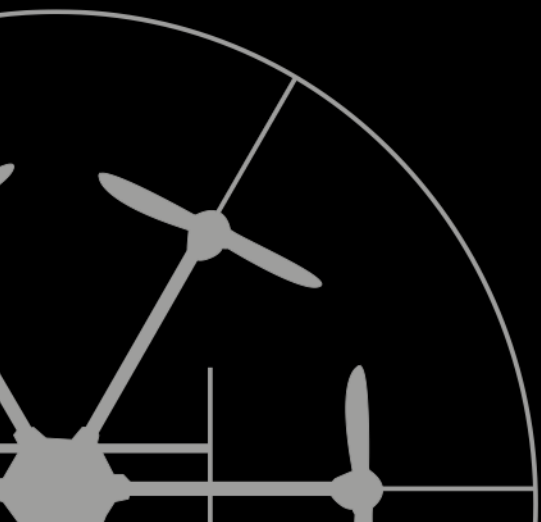
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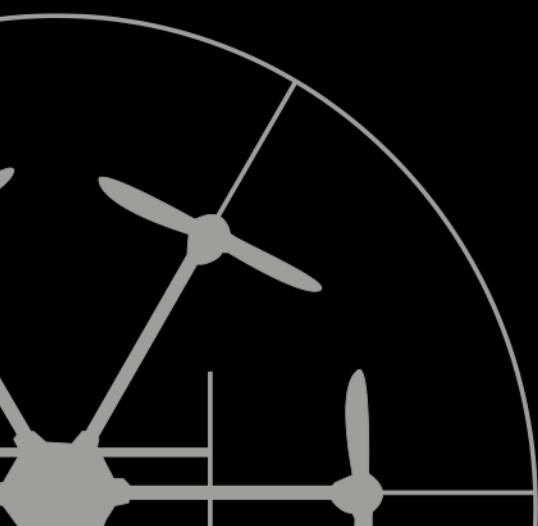


Demasiada información



2021 El dilema

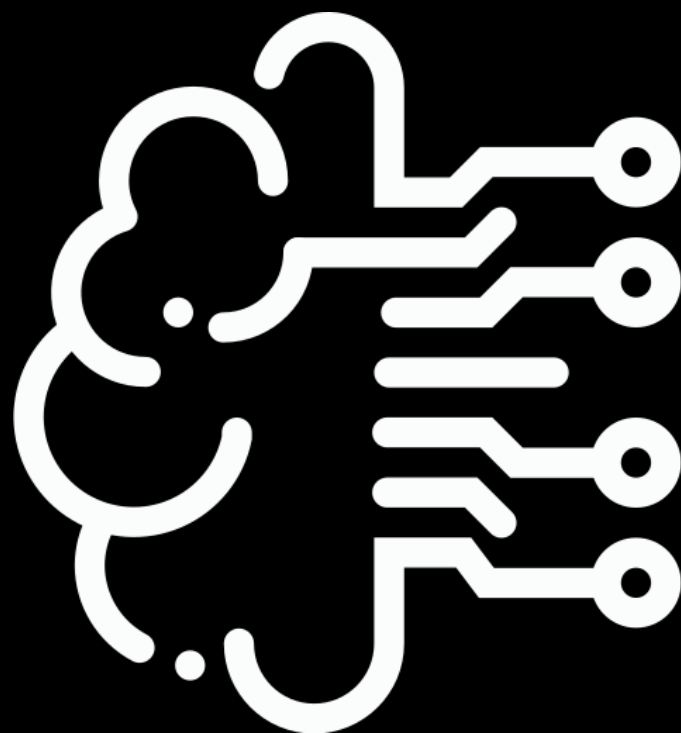
La flota envejece , requiere cada año más presupuesto
El presupuesto se reduce



Presupuesto reducido: ¿Hasta donde reparar?

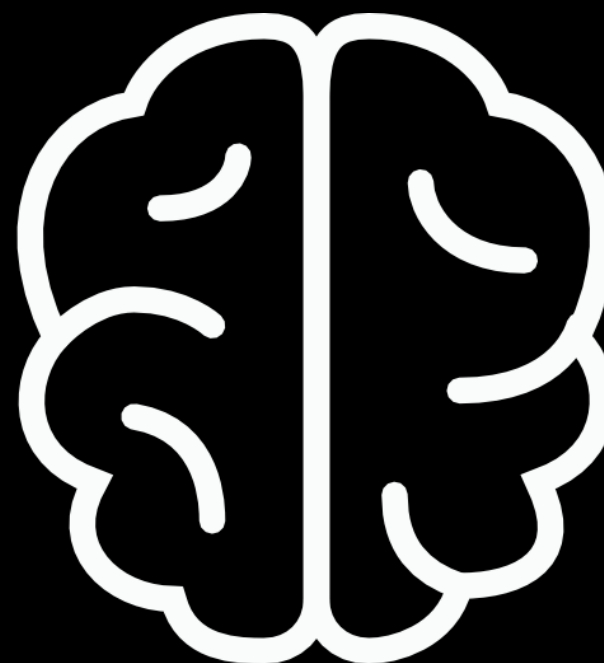
No reparar: Nada no realmente **crítico**
Antes de lo necesario
Mas de lo necesario

Reparar: Por orden de riesgo hasta fin de presupuesto

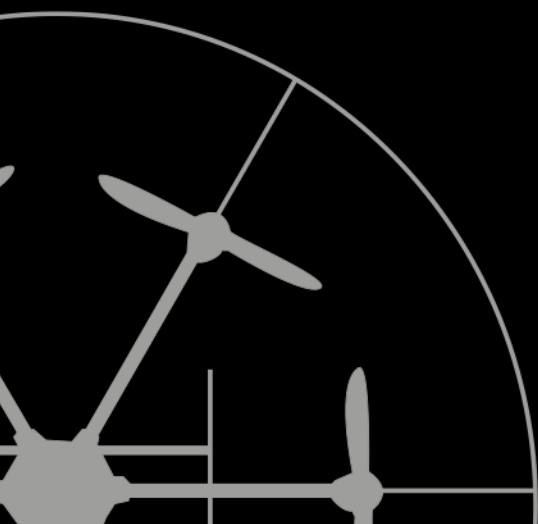


Si

Vs



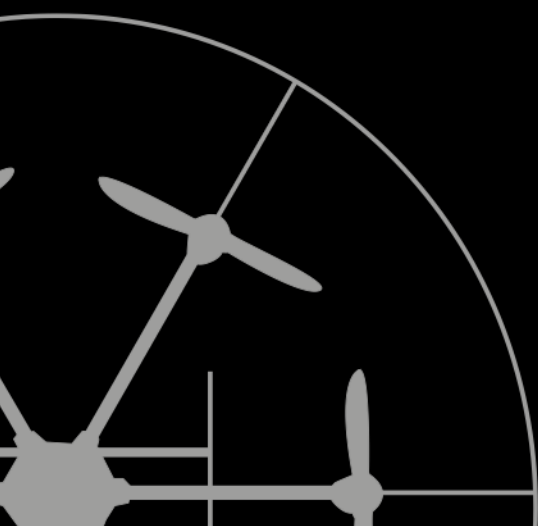
C





Visión artificial+aprendizaje profundo

Poderosas herramientas para O&M



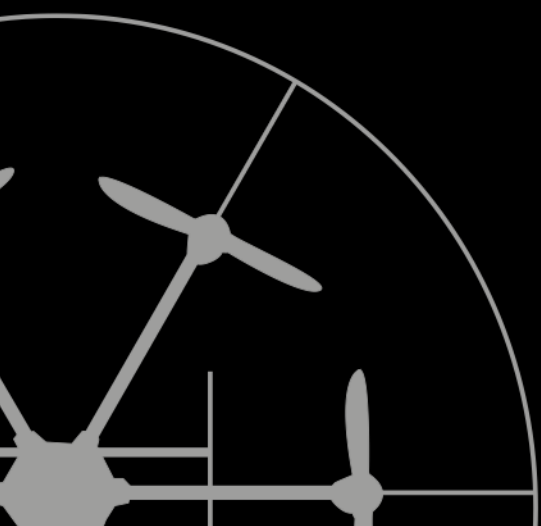


Ejemplos:

Detección digital autónoma

Detección certificable

Detección automática revisable



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Ejemplo 1 Detección autónoma



Detección EPIS para Norton Grupo Tamoin

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Ejemplo 2

Inspección digital certificable



Ejemplo 2

Inspección digital certificable

Standard ISO 5817

Certifying inspector- ISO 9712 Level 2



Ejemplo 3

Detecc. automática revisable





Drones are here!

Blades predictive maintenance based on deferred inspection model with RPAS and software analysis

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Jorge Pedrón, Iberdrola

Keywords: Deferred Inspection, RPAS, digital mapping, wind turbine, processing, automated report, predictive maintenance, operating life extension.

AWEA California 2017

Introduction

Wind turbine blades have been manufactured for a long time with very handcrafted processes. Manufacturing defects, together with the effect of fatigue, extreme loads or climatology in some cases unleash of premature aging leading to costly losses. Wind industry demands high value technical solutions for the blades inspection, looking for predictive maintenance procedures with efficiency / economy criteria. This sector shows interest in applying new technologies to improve these processes, including the use of RPAS or "drone".

Methods

A disruptive inspection method based on RPAS designed specifically for wind inspection has been used, as well as a software platform for inspection data processing. The procedure has been developed by Arbórea Intellbird, a company investee by Iberdrola, pioneer in this kind of operation since 2011.

The aerial platform integrates a large set of state-of-the-art sensors such as: visible spectrum cameras and high resolution radiometric thermal IR, gyroscopes, accelerometers, magnetometer, satellite positioning, laser lidar and barometer.

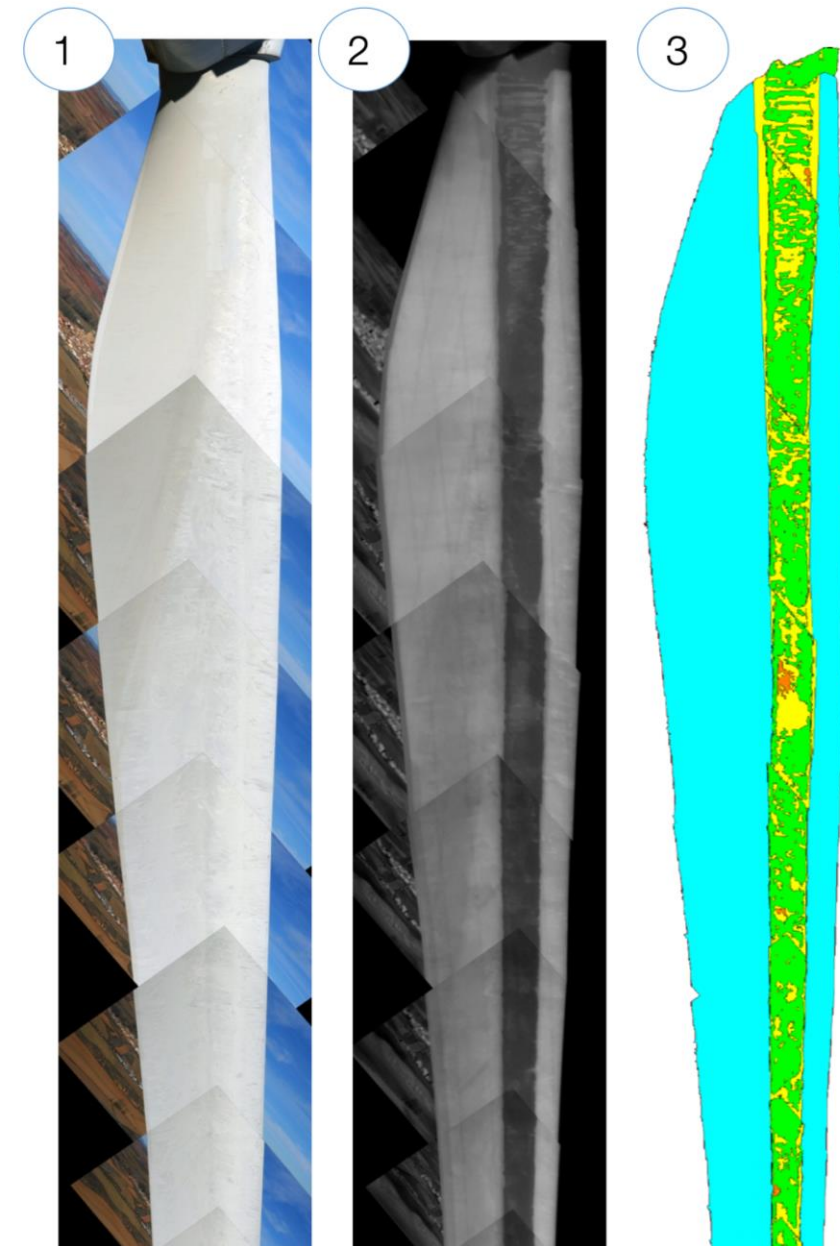
All this has allowed to integrate a series of data and metadata associated on time that make it possible to generate multi-spectral mappings of the entire surface of the blades, identify, position and measure visible and structural defects not detectable at sight, classify them and generate studies of aging and automatic reports, all through a specific software. The digital work format throughout the process, has allowed the application of artificial vision algorithms to gain precision in the measurements and reduce processing times and analysis to the inspectors. Measurement and positioning of damages and automated reports through a processing system absolutely digital and deferred is described. This analysis allows detecting even no visible structural defects such as deficiencies in glue lines, discriminating defects severe and urgency.

Iberdrola has generated a new catalog of defect categorization based on the capabilities of this new tool, which includes internal adhesive deficiencies, take-offs, peeled or delamination.

During the last quarter of 2016 Arbórea team has inspect close to 1000 blades in Spain and other countries.

Validation

The detection capabilities of the system have been validated by Iberdrola with the help of third-party blade engineering and maintenance companies. For this purpose, simultaneous thermographs have been made manually by means of a lifting platform and heat active application and also detailed analysis on defective blades removed for repair and opened in the workshop.





Conclusiones

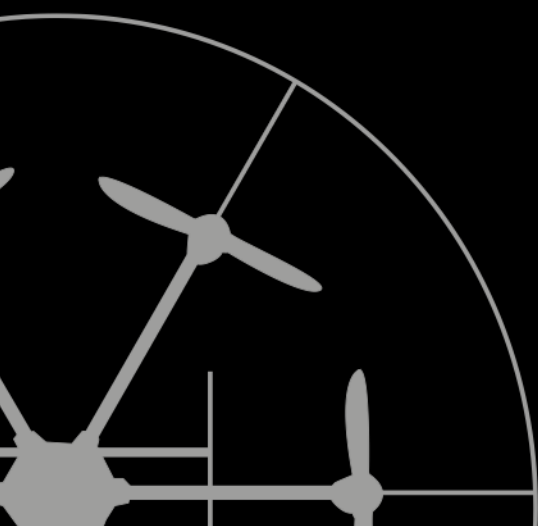


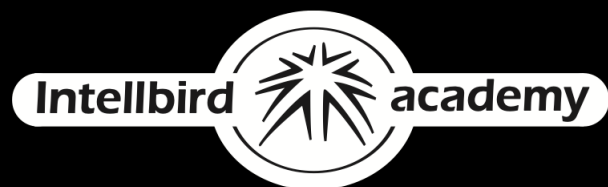
La detección automática basada en visión es una poderosa herramienta aplicada a O&M

La detección autónoma puede generar sobremantenimiento

La certificación necesaria limita algunos procesos

La supervisión humana por técnicos experimentados es un valor insustituible hoy





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Gracias

