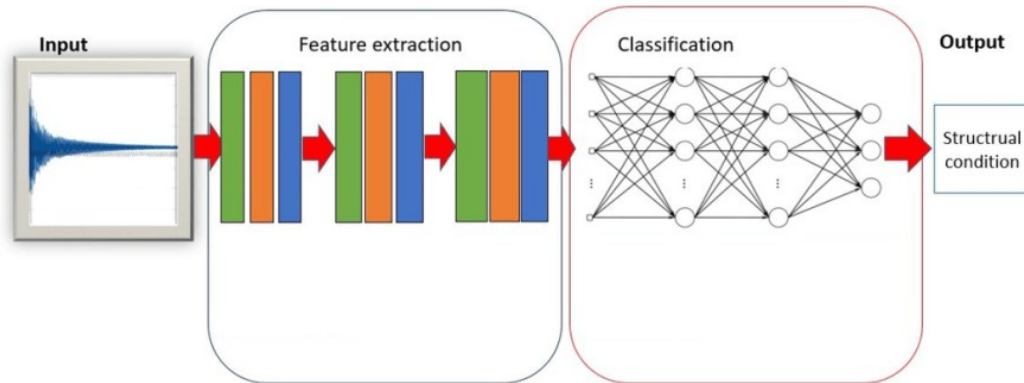**UNIVERSITAT POLITÈCNICA DE CATALUNYA**
BARCELONATECH
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PhD Seminar on

Artificial Intelligence for Wind Turbine Condition Monitoring and Structural Health Monitoring

Abstract
To remain competitive, wind turbines (WTs) must be reliable machines with efficient and effective maintenance strategies. Thus, it is of paramount importance that the wind industry moves from corrective and preventive maintenance to the so-called predictive maintenance (scheduled as needed based on the asset condition). On the one hand, this talk addresses WT condition monitoring methodologies based on SCADA data. WTs generate a wealth of SCADA data from a variety of sensors, which can be effectively used to enable fault diagnosis strategies. Data-driven techniques, based on machine or deep learning, are particularly promising in this field. Furthermore, this approach is cost-efficient and readily available as no extra equipment needs to be installed in the wind turbine. On the other hand, this talk addresses the structural health monitoring (SHM) of WTs. The main purpose is to detect, locate, and characterize damage, so that maintenance operations can be performed in due time. The standard SHM approach based on guided waves (where the input excitation is known and imposed to the structure and then the output vibration is measured) cannot be straightforward applied as the excitation is not known (wind, waves, currents) neither can be imposed. A new paradigm, a vibration-response-only methodology, is developed that assumes unknown input excitation and that only the vibration response is measurable by means of different sensors.

AULA MAGNA – AUDITORIUM (lecture hall)   **20-10-2022 16.30-18.30**