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# Deep Machine Learning for Mechanical Performance and Failure Prediction

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## ABSTRACT

Deep learning has provided opportunities for advancement in many fields. One such opportunity is being able to accurately predict real world events. Ensuring proper motor function and being able to predict energy output is a valuable asset for owners of wind turbines. In this paper, we look at how effective a deep neural network is at predicting the failure or energy output of a wind turbine. A data set was obtained that contained sensor data from 17 wind turbines over 13 months, measuring numerous variables, such as spindle speed and blade position and whether or not the wind turbine experienced a failure at that time. It was found that the deep neural network was able to predict the failure and energy output with a high degree of accuracy, with an average residual of -0.005 for key predictors, thus validating its use as a potential predictor of energy production or safety hazards caused by mechanical failure.

## KEYWORDS

Deep Learning, Machine Learning, Artificial Intelligence, Statistics, Data Science, Neural Networks, Algorithm