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Natural selection to improve wind farm design

University of Adelaide computer scientists are using maths based on natural selection's 'survival of the fittest' principles to develop a tool that will position turbines on wind farms for optimal productivity.



Credit: istockphoto

Dr Frank Neumann is using calculations called evolutionary algorithms, which take into account wind factors, wake effects, the minimum amount of land needed and the complex aerodynamics of wind turbines.

'An evolutionary algorithm is a mathematical process where potential solutions keep being improved a step at a time until the optimum is reached,' explains Dr Neumann.

'You can think of it like parents producing a number of offspring, each with differing characteristics. As with evolution, each population or set of solutions from a new generation should get better. These solutions can be evaluated in parallel to speed up the computation.

'Current approaches to solving this placement optimisation can only deal with a small number of turbines. We have demonstrated an accurate and efficient algorithm for as many as 1000 turbines,' Dr Neumann says.

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