Contribution ID: **94** Type: **Workshop**

A deep learning-based wind energy turbines suitability location analysis and transferability

Sunday, 1 December 2024 18:00 (1h 30m)

Despite significant advancements in the energy industry over the past decade, most global regions still face challenges in ensuring the security and supply of fossil fuels. The challenge in wind power usage is identifying the optimal location for turbine installation to maximize energy generation while minimizing environmental and socioeconomic impacts. This study aims to explore a data-driven deep learning-based modeling framework that predicts land suitability for large-scale wind energy development by inventorying current wind farms and using spatial decision criteria. The proposed framework will use recurrent neural and convolutional neural networks to simulate intricate interactions between meteorological, environmental, and infrastructure-related spatial variables influencing wind energy potential. The model will use various spatial datasets, including wind speed data, topography, and environmental constraints, to assess its transferability to different wind regimes, environmental conditions, and infrastructure challenges across various geographic regions, Furthermore, the offshore and inland regions will be utilized to identify wind potential locations using LiDAR and SAR data from Sentinel-1 satellites for suitable evaluation and detection. The results of this study will be used to translate renewable energy sources and reduce climate change by improving wind energy potential evaluation accuracy.

Keywords: Deep learning, Inland, Transferability, Turbines suitability, wind energy

Student or Postdoc?

Email address

Co-Authors

CHPC User

CHPC Research Programme

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Primary authors: Ms DIKO, Nolizwi; Ms SESE, Eyona; Mr MAYIDUME, Msimelelo (BSc (Pure Maths & Physics)); Mr GENUKILE, Sinalo (BSc (Computer Science and GIS)); Mr MNCWILI, Adumodwa (BSc (Computer Science and Physics)); Mr SIBANDZE, Phila; Ms MADULINI, Phiwokuhle; AFUYE, Gbenga Abayomi

Presenter: Mr SIBANDZE, Phila

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