

Topics (T)
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ANALYSIS AND USE OF QUANTUM COMPUTERS AND QUANTUM MACHINE LEARNING
FROM QISKIT TO OPTIMIZE AND PREDICT METEOROLOGICAL DATA WITH AEROSPACE
AND ENVIRONMENTAL APPLICATIONS.

Abstract

Quantum computing is an emerging technology with the potential to overcome the limitations of classical computing in terms of speed and processing power. One platform for software development in quantum computing is Qiskit, which is free and open-source software developed by IBM. In conjunction with the use of quantum machine learning algorithms, Qiskit can provide a valuable tool for addressing environmental and aerospace problems, being able to process and analyse large amounts of weather and environmental data more accurately and quickly, which would help improve our understanding of climate change and develop strategies to address it, as well as have greater accuracy and predictability of atmospheric data, which is of value for space missions, and be able to obtain and predict navigation and space tracking data more accurately. For example, a quantum machine learning model could be used to analyse large amounts of satellite data, such as Landsat images, to detect changes in land use and land cover. Using quantum algorithms, such as quantum principal component analysis, the model could, as mentioned above, detect patterns of change and even predict future changes in land use and land cover. That's why Qiskit was used in conjunction with Landsat satellite images to analyse changes in ocean temperature. The aim of the study was to use quantum computing to process large amounts of satellite image data more efficiently and accurately than traditional methods. To do this, Landsat images of a specific area were collected and then Qiskit tools were used to process and analyse the data. The results of the study indicated that the use of Qiskit allowed for greater efficiency and accuracy in detecting changes in temperature compared to traditional methods.