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Physics : Quantum Physics

Schuld, Maria, Petruccione, Francesco, University of KwaZulu-Natal, Durban, South Africa

Supervised Learning with Quantum Computers

- Explains relevant concepts and terminology from machine learning and quantum information in an accessible language
- Introduces a structure into the literature by clustering the work in terms of what aspects of quantum information are exploited to advance machine learning
- Critically reviews challenges that are a common theme in the works
- Gives a comprehensive outlook on future directions

Quantum machine learning investigates how quantum computers can be used for data-driven prediction and decision making. The book summarises and conceptualises ideas of this relatively young discipline for an audience of computer scientists and physicists from a graduate level upwards. It aims at providing a starting point for those new to the field, showcasing a toy example of a quantum machine learning algorithm and providing a detailed introduction of the two parent disciplines. For more advanced readers, the book discusses topics such as data encoding into quantum states, quantum algorithms and routines for inference and optimisation, as well as the construction and analysis of genuine "quantum learning models". A special focus lies on supervised learning, and applications for near-term quantum devices.

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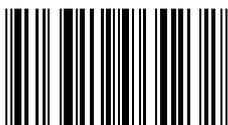
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