Cloud Computing, Artificial Intelligence, and Quantum Computing: A Synergistic Approach for Advancing Chemistry Research

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Chemistry research faces many challenges in terms of data management, analysis, simulation, and prediction. The complexity and diversity of chemical systems require advanced computational methods and resources that can handle large-scale and high-dimensional data, as well as perform accurate and efficient calculations.

In this context, cloud computing, artificial intelligence (AI), and quantum computing (QC) are emerging technologies that offer promising solutions for enhancing chemistry research. Cloud computing provides scalable and flexible infrastructure and services for storing, processing, and sharing chemical data in the cloud. AI enables intelligent and automated data analysis, modelling, and optimization using machine learning, deep learning, natural language processing, computer vision, and other techniques. QC leverages the quantum mechanical properties of qubits to perform parallel and exponential computations that are beyond the reach of classical computers.

The aim of this abstract is to present an overview of the current state-of-the-art and future directions of cloud computing, AI, and QC in chemistry research. We will discuss how these technologies can be integrated and applied to various aspects of chemistry research such as data curation, synthesis planning, reaction prediction, molecular design, property prediction, drug discovery, catalysis, materials science, and quantum chemistry. We will also highlight the challenges and opportunities of these technologies for advancing chemistry research.

We believe that cloud computing, AI, and QC can form a synergistic approach for accelerating and transforming chemistry research. By combining the power of the cloud, the intelligence of AI, and the potential of QC, we can achieve new levels of scientific discovery and innovation in chemistry. We hope that this abstract will inspire and motivate more researchers to explore and utilize these technologies in their chemistry research projects.