Acta Scientific COMPUTER SCIENCES

Volume 3 Issue 9 September 2021

Short Communication

My Learning Experience towards the Emerging Domain of Quantum Computing

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Received: April 01, 2021

Published: August 09, 2021

Abstract

Quantum computing is the process of using quantum physics to conduct computations. Quantum computers may execute computations that are impossible in the classical world by using quantum phenomena like tunnelling, entanglement and superposition. Quantum technology have a significant edge over conventional computers because of their characteristics. This work gives an overview of my learning experience towards the emerging domain of the Quantum Computing.

Keywords: Quantum Computing; Qubits; Quantum Logic Gate

Introduction

Ultra large Scale Integration circuit will require a significant abstraction of effort in a variety of areas, including the development of more reliable quantum-devices, and advance fault tolerance Nano-electronics circuits, and error detection and correcting codes. Quantum technology on the other hand, is already a reality in such companies like IBM, Google and Microsoft etc [1]. The introduction of IBM's Q System One, the world's first commercial quantum computer, has shown that the quantum computing field has progressed to a level that was unthinkable only five years ago [1]. Quantum circuits are constructed utilizing reversible quantum gates that operate on "qubits" in quantum computing. Until entering a quantum gate for retracing information, entangled (sealed) qubits are used, and entangle is maintained when the qubits exit the quantum gate [2]. Quantum gates are reversible, allowing information to be retraced and restored.

Analysis

Because of its future significance and need of energy efficient circuit and system, the synthesis of reversible gate based logic circuits has been a hot subject in the past decade. According to the fundamental and basic features of a quantum technology, an information storing unit such as qubit may compute several states at the same time, allowing for simultaneous computations with saving the computing time. In quantum information science the issues with processing time and resources it main factor during processing of information. Quantum technology has a variety of application in the fields of DNA computing, optical computing, nano-science and nano-technology, and reversible computing. Reversible Boolean logic function is implementation by the quantum logic gate. In contrast to the features of the quantum gates have the same amount of inputs and the quantity of outputs. Pauli gates, Hadamard gates, Phase gate, Controlled NOT gate, Phase gate, Controlled Z gate, Deutsch gate, Swap gate, and other quantum gates are used in the quantum logic circuit design that operate on one or more qubits.

Discussion

When compared to CMOS, quantum gates can perform complex information calculations safely without loss at high rates while using less power, but they have a greater margin for error, making quantum gate design more difficult. All the quantum logic circuit is reversible. In physical reversibility of a computing system is pre-

sented as follows: if computation can be performed in retract the input logic without causing energy/power loss, the system architecture meets the physical reversibility requirements [3,4].

Conclusion

Admittedly, this article works deal with covers the fundamental and scope of the quantum computing. Finally, it is pointed that the quantum logic gates associated circuit synthesis uses the basic qubit gates, which are presented here successfully.

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