Electrical & Computer Engineering

S E M I N A R

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Quantum Computing and Artificial Intelligence

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Abstract—Every few years we hear of a new technology that will revolutionize artificial intelligence (AI). After careful reflection it is found that the advance is within the framework of the Turing machine model and equivalent, in many cases, to existing statistical techniques. But this time, in quantum computing, we seem to be on the threshold of a real revolution—a "quantum" leap—because it is a true frontier beyond classical computing. But will these possibilities be realized any time soon? Classical computers work on classical logic and they may be viewed as an embodiment of classical physics. Quantum computers, on the other hand, are based on the superpositional logic of quantum mechanics, which is an entirely different paradigm. Conventional explanation sees consciousness arising as an emergent property of the classical computations taking place in the circuits of the brain, but this does not address the question of how thoughts and feelings arise. If brains perform quantum processing, then this may be the secret behind consciousness. Furthermore, it may explain several puzzling features of animal/human intelligence, as also provide a new direction to develop AI machines. In this brief survey I present the rationale for the convergence between quantum computing and AI, and prospects for the realization of the technology.

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