Achieving Quantum Supremacy in Image Processing: Is it Possible?

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Quantum computing is currently one of the fastest emerging branches of information processing due to its theoretical computation powers exceeding conventional computers by far. However, currently well-known quantum-powered algorithms are of theoretical nature and its effect on practical problems has yet to be discovered. Here, we coarsely review the history of quantum computing and what the term *quantum supremacy* means. Furthermore, we discuss the problem of encoding grayscale images and demonstrate how - theoretically - the encoding on a quantum hardware is exponentially more efficient than any known classical encoding. At the same time, we demonstrate why retrieving the image from the quantum encoding is the bad part and we validate this statement by experiments performed both on simulators and on actual quantum hardware.