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Application of Information Theory to Computer Vision and Image Processing

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World perception is the product of complex optical and physical processes in the human visual system, wherein light stimuli penetrate the pupils to reach the retina, which are composed of photoreceptors that transform light into electrochemical energy to be transmitted to the brain for organization, interpretation, and analysis of the received information and to recreate the perceived reality. Using similar optical and physical processes, machine vision is the eyes of cybernetics systems and allows for the virtual and real worlds to coexist in human lives, thus integrating these technologies into our daily lives for improved creativity and globalization through interconnectivity. This is possible due to the ability of advanced sensor and system technologies to acquire and compute information. Such tasks are based on the integration of optoelectronic devices for sensors and cameras. Sensors, artificial intelligence algorithms, embedded systems, robust control, inertial navigation systems, robotics, interconnectivity, big data, and cloud computing are the core of machine vision developments for cyber-physical systems to collaborate with humans and their real and virtual environments and activities.

