Energy and Information Processing in More Reliable Power Electronics

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A personal information-processing device such as a Personal Computer surprises nobody. All its varieties, such as smartphones are commonly used. Automation and robotics are at the initial stage of its heyday. Such advanced technology is also beginning to enter other basic areas of life, such as agriculture, education, medicine, including rehabilitation. Modern technologies such as the IoT, the Internet of Energy, Industry 4.0, Smart Grids including AC and DC microgrids or artificial intelligence, etc. are dynamically developing. However, a technological gap can be noticed here, especially in the third world or underdeveloped countries where electrical infrastructure is weak or does not exist at all. Namely, there is not an inexpensive personal device for transforming and storing energy, capable of driving an electric machine, which is the driving force behind the development of our civilization. Such a device should be adapted to many tasks, from basic ones, i.e. obtaining and storing energy from renewable sources, and transforming it into a useful form through compatibility with the concept of the Internet to artificial intelligence and human-machine system. The development of a series of personal Intelligent Power Electronic Converters with a drive and energy storage will make it possible to use it in many places and areas of life. Thanks to a power electronics, it will be possible to provide electricity to the neediest in third world countries, as well as to use it in exoskeletons or physical rehabilitation of people in a post-traumatic coma. An Intelligent Power Electronics Converter can be compared to the digestive system of our body. Thanks to it, we will obtain, process and store an energy, and if necessary, thanks to advanced data collection, sensing, and control methods, we will drive an electric machine that can, depending on the needs, pump water from a deep well during a drought in Africa or control the exoskeleton arm supporting a movement of the limb during rehabilitation. Universality, modularity and reliability consideration is the subject that should be taken into account at the design stage.