Analog-and-algorithm-assisted ultra-low power biosignal acquisition systems

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This book discusses the design and implementation aspects of ultra-low power biosignal acquisition platforms that exploit analog-assisted and algorithmic approaches for power savings.The authors describe an approach referred to as analog-and-algorithm-assisted signal processing.This enables significant power consumption reductions by implementing low power biosignal acquisition systems, leveraging analog preprocessing and algorithmic approaches to reduce the data rate very early in the signal processing chain.They demonstrate savings for wearable sensor networks (WSN) and body area networks (BAN), in the sensors stimulation power consumption, as well in the power consumption of the digital signal processing and the radio link. Two specific implementations, an adaptive sampling electrocardiogram (ECG) acquisition and a compressive sampling (CS) photoplethysmogram (PPG) acquisition system, are demonstrated.