Measuring and extraction of biological information on new handheld biochip-based microsystem

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Abstract: This paper proposes techniques for the extraction of biological information in a recently developed handheld biochip-based microsystem. The microsystem is based on a magnetoresistive array biochip composed of a number of sensing sites with magnetic tunneling junctions (MTJ) and diodes. Different techniques are addressed to drive the MTJs with different types of signals. Different filtering strategies that allow the recovery of biological signals from the noise without overly increasing either the time required for accessing the sensors or the power consumption of the board are proposed. Finally, new techniques and algorithms are proposed to deal with the variability of the fabrication parameters of the MTJ and the diodes. Experiments with the system in a setup to detect actual biological signals are presented with encouraging results.

Author Keywords: Biochip; Biomolecules; Magnetic sensors; Microsystem; Signal processing

Year: 2010
Source title: IEEE Transactions on Instrumentation and Measurement
Volume: 59
Issue: 1
Art. No.: 4652562
Page : 56-62
Link: Scorpus Link
Document Type: Conference Paper
Source: Scopus

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