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PII: S0263-2241(16)30287-1
DOI: http://dx.doi.org/10.1016/j.measurement.2016.06.007
Reference: MEASUR 4127

To appear in: *Measurement*

Received Date: 2 December 2015
Revised Date: 30 May 2016
Accepted Date: 7 June 2016

Please cite this article as: M. Schmidt, D. Penner, A. Burkl, R. Stojanovic, T. Schümann, P. Beckerle, Implementation and Evaluation of a Low-Cost and Compact Electrodermal Activity Measurement System, *Measurement* (2016), doi: http://dx.doi.org/10.1016/j.measurement.2016.06.007

Implementation and Evaluation of a Low-Cost and Compact Electrodermal Activity Measurement System

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Abstract

In psychological research, acquiring information about mental excitement or central nervous activity is fundamental for assessment. Such information can be used as a psychological measure in various investigations like the embodiment of technical artifacts, e.g., in terms of tool use or human-machine systems. A promising method is measuring a subject'selectrodermal activity (EDA) , i.e., acquiring information about skin conductance or resistance. However, most commercially available measurement systems are expensive and/ or not mobile. The system presented in this paper uses low-cost components, has a small footprint, and is easy to rebuilt for scientific applications. It measures EDA by applying a constant voltage and achieves reasonable resolution by individually amplifying slow and fast electrodermal effects, i.e., level and response. Based on a design from the literature, the paper explains the functionality, extensions, and implementation of the system. A comparative study with a commercial laboratory system is conducted and discussed: although the presented system offers a lower resolution, the quality of the recorded data is deemed sufficient for psychological studies.

Keywords: electrodermal activity, measurement system, comparative study, psychological assessment, low-cost implementation

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