

Accepted Manuscript

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

M. Schmidt, D. Penner, A. Burkl, R. Stojanovic, T. Schümann, P. Beckerle

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>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

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

M. Schmidt^a, D. Penner^a, A. Burkl^a, R. Stojanovic^a, T. Schümann^{a,b},
P. Beckerle^{a,c,*}

^a *Technische Universität Darmstadt, Germany*

^b *Work and Engineering Psychology Research Group*

^c *Institute for Mechatronic Systems in Mechanical Engineering*

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's electrodermal 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 rebuild 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

*Corresponding author

Email address: beckerle@ims.tu-darmstadt.de (P. Beckerle)

Download English Version:

<https://daneshyari.com/en/article/7122915>

Download Persian Version:

<https://daneshyari.com/article/7122915>

[Daneshyari.com](https://daneshyari.com)