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SOFTWARE METAPAPER

ExpTimer: timer software to facilitate complex, multi-step procedures

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ExpTimer is free, user-friendly timer software that can come in handy when you are running timed, multi-step protocols, e.g. behavioral experiments, histological stainings or any other (scientific) procedure consisting of a set of consecutive actions. It was written in Visual C# and can be found at http://sourceforge.net/projects/exptimer. You can easily upload your own protocol and ExpTimer will guide you through the different steps of your procedure. The program shows the progress and current stage of your protocol, what the next step will be and notifies you with a sound signal of when to take it. As such, ExpTimer facilitates your experiments by simplifying the execution of complex, multi-step procedures and by improving accuracy and replicability, particularly when time is an important factor.

Keywords: behavioural experiments, immunohistological procedures, multi-step protocols

(1) Overview

Introduction

ExpTimer was developed as an easy-to-use timer to facilitate complex, multi-step protocols. The need for appropriate timer software arose when we were conducting complex fear conditioning experiments which required several actions with different animal subjects on a strict time schedule. An earlier version of the software has proven to be very useful during these studies[1, 2, 3, 4, 5].

The advantages of ExpTimer are that it takes away the fiddling around with typical lab timers, which have to be reset after each action, and at the same time it shows you what to do next. You just enter your own protocol, press "start" and you do not have to worry about timers anymore, especially when you already have your hands full with your protocol. If something goes wrong during your experimental procedure, just press "pause" (to pause the timer) or "reset" (to start all over again).

Implementation/architecture

The program was developed in Visual C#, using the .NET framework in Microsoft Visual Studio Express 2012.

Quality Control

Unit testing, functional testing, load testing (up to 100 000 steps) and end-to-end testing have been carried out in Microsoft Windows

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XP (SP2 & SP3), Windows 7 & Windows 8 (64-bit).

(2) Availability

Operating system
Microsoft Windows XP (SP2 & SP3), Vista, 7 & 8 (32-bit & 64-bit)

Programming Language
Visual C#

Additional system requirements
- Memory: 50 MB
- Disk space: 3 MB
- Processor: Any x86 processor
- Computer speakers (if you wish to hear the sound signal)

List of contributors

- Laura Luyten, Learning Psychology and Experimental Psychopathology, KU Leuven, Leuven, Belgium & Experimental Neurosurgery and Neuroanatomy, KU Leuven, Leuven, Belgium, laura.luyten@ppw.kuleuven.be. Role: Initiating software development, using the software, writing the paper.
- Frederik Van Cappellen, Independent Researcher (no affiliation). Role: Software development, writing the paper.

Both authors contributed equally to this work.

Archive

Name
Sourceforge

Persistent identifier
http://sourceforge.net/projects/exptimer/files/ExpTimer_v3.1.zip/download
SHA1: 049d7f7a15fe579e9c9bb175952e3dfb3f30f956

License
GNU General Public License version 3

Publisher
Frederik Van Cappellen

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Code repository

Name
Sourceforge

Identifier
http://sourceforge.net/p/exptimer/code/ci/59a68c6fcbd1675c49e82d19570903955d91299e/tree/

License
GNU General Public License version 3

Date published
20/2/13

Language
English

(3) Reuse potential

ExpTimer is an easy-to-use timer to facilitate complex, multi-step protocols. Because of its generic design, it has a vast reuse potential, as illustrated by the two concise examples below. A detailed software manual with examples and accompanying example files can be found in the zip file containing the ExpTimer software (http://sourceforge.net/projects/exptimer).

We frequently use ExpTimer when conducting complex fear conditioning experiments which require several actions with different animal subjects on a strict time schedule (see Fig. 1). Apart from its usefulness for complex and timed behavioral experiments, it can also be very helpful when carrying out e.g. (immuno) histological staining procedures, which need to be carefully timed as well (see Fig. 2).

Note that these behavioral and staining protocols are just two examples. Every researcher who uses multi-step procedures on a strict time schedule (of the order of hours, minutes and seconds) can benefit from this software. Not only in the field of behavioral (neuro)science or (immuno)histology, but also in other fields like bioscience engineering, chemistry, molecular biology, etc.

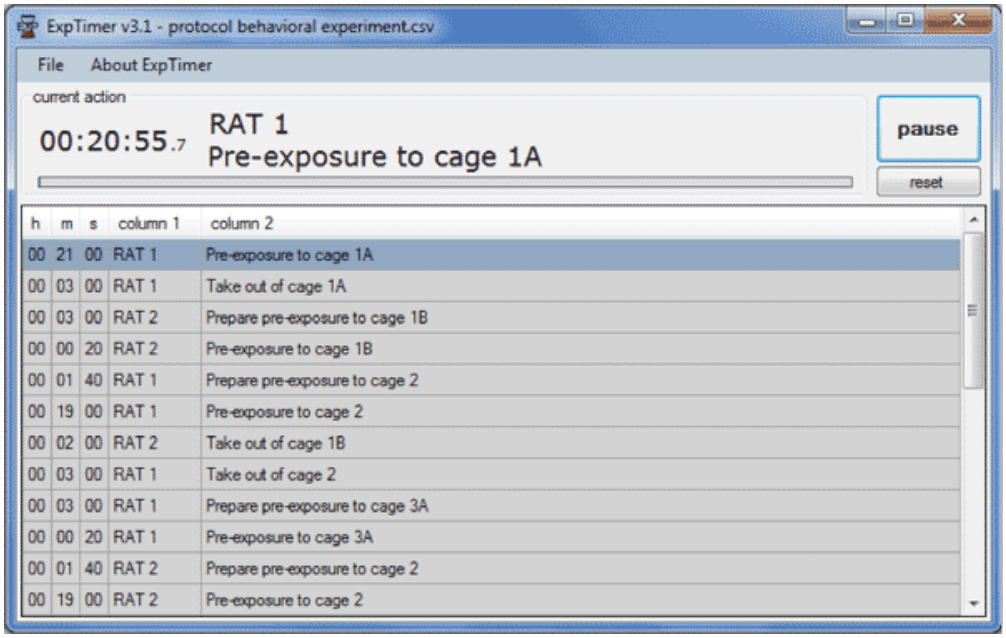

Fig. 1: ExpTimer running a behavioural protocol.

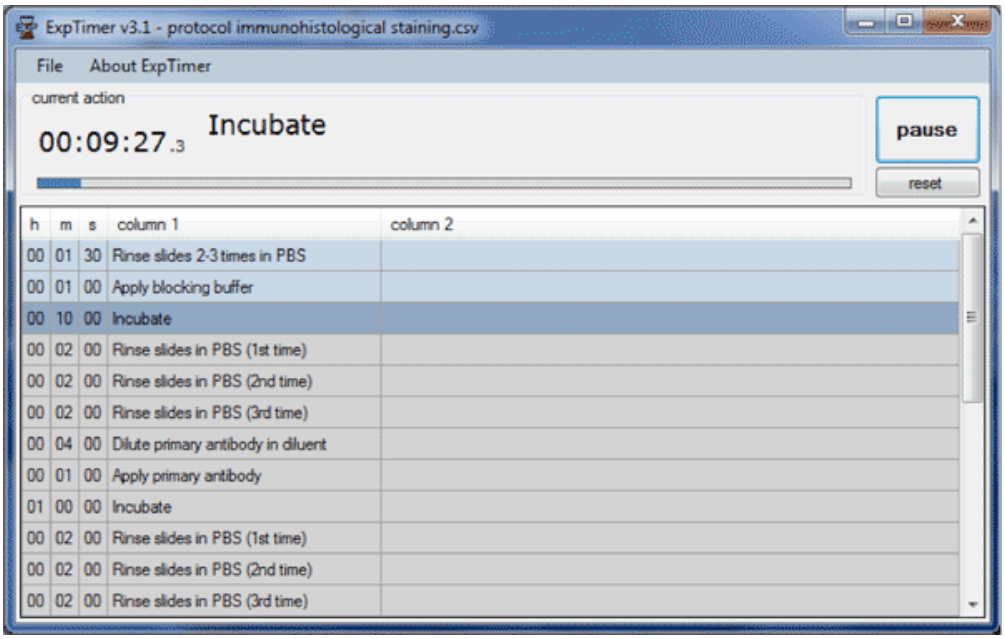

Fig. 2: ExpTimer running an immunohistological protocol.

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