TECHNICAL UNIVERSITY OF KOŠICE

FACULTY OF ELECTRICAL ENGINEERING AND INFORMATICS

Analysis of non-auditory effects on contextual plasticity

in spatial hearing

Master thesis

Appendix C

System Handbook

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Content

1   Purpose of software application

The entire software application consists of several executable scripts (.m files), which purposes are to perform different data analyses and data visualizations, in order to get valuable scientific outputs, usually in the form of various graphs.

2   Solution analysis

The results of data analyses are described in master thesis itself. The executable scripts (.m files) were developed in MATLAB v 8.1, which is a high-level technical computing language with interactive environment for numerical computation, visualization, and programming [1], especially for research purposes in the various scientific fields.

3   Description of software application

As was mentioned the software application is in the form of scripts (.m files). The both experiments have own scripts for data analysis. Every different analysis is performed by one script, which means we have script for: bias analysis, temporal profile analysis, analysis of correlation coefficients and analysis of standard deviations.

The scripts in general consists of these sections:

- selection of subjects included in analysis

- loading of input files (.mat files)

- algorithm of specific analysis

- output in the form of figures

Purposes of scripts:

Experiment A:

- Bias_exp_A.m

    - analysis of biases in responses

- Bias_exp_A_extra.m

    - analysis of biases in responses, extra plots (Appendix D)

- Temporal_profile_exp_A.m

  - analysis of temporal profile in responses

- CC_analysis_exp_A.m

  - analysis of correlation coefficients

- CC_analysis_exp_A_extra.m

  - analysis of correlation coefficients, extra plots (Appendix D)

- STD_analysis_exp_A.m

  - analysis of standard deviations

- STD_analysis_exp_A_extra.m

  - analysis of standard deviations, extra plots (Appendix D)

- STD_analysis_loudserpeakers_exp_A.m

  - analysis of standard deviations as a function of loudspeakers

Experiment B:

- Bias_exp_B.m

  - analysis of biases in responses

- Bias_exp_B_extra.m

  - analysis of biases in responses, extra plots (Appendix D)

- Temporal_profile_exp_B.m

  - analysis of temporal profile of responses

- Temporal_profile_exp_B_extra.m

  - analysis of temporal profile of responses, extra plots (Appendix D)

- CC_analysis_exp_B.m

  - analysis of correlation coefficients

- CC_analysis_exp_B_extra.m

  - analysis of correlation coefficients, extra plots (Appendix D)

- CC_analysis_loudspeakers_exp_B.m

  - analysis of correlation coefficients as a function of loudspeakers

- STD_analysis_exp_B.m

    - analysis of standard deviations

- STD_analysis_exp_B_extra.m

    - analysis of standard deviations, extra plots (Appendix D)

- STD_analysis_loudspeakers_exp_B.m

    - analysis of standard deviations as a function of loudspeakers

4 Description of input and output files

The input files, which are necessary for data analysis are saved as .mat files and contains the information about experiments including responses of subjects. The output files are usually in the form of figures, which can be saved in various graphics file formats. All input files are attached in a folder with script.

Description of input files:

Experiment A:

- *_m_mdms.mat

    - responses of subjects in the form of matrices (* refers to subject)

- all_values.mat

    - transformed (Fisher Z-transformation) correlation coefficients (cc) into atanh values calculated for each run, all loudspeakers and all subjects

- first3_all_values.mat

    - transformed cc (Fisher Z-transformation) into atanh values calculated for each run, first three loudspeakers and all subjects

- last3_all_values.mat

    - transformed cc (Fisher Z-transformation) into atanh values calculated for each run, last three loudspeakers and all subjects

- all_sds2.mat

    - standard deviation values calculated for each run, all loudspeakers and all subjects

- facing_in_runs.mat, green_minus_red.mat, peDT.mat, peTD.mat

    - auxiliary data for analysis of standard deviations

Experiment B:

- *_mdms.mat

    - responses of subjects in the form of matrices (* refer to subject)

- at_all_values.mat

    - transformed cc (Fisher Z-transformation) into atanh values calculated for each run, all loudspeakers and all subjects

- first3_at_all_values.mat

    - transformed cc (Fisher Z-transformation) into atanh values calculated for each run, first three loudspeakers and all subjects

- last3_at_all_values.mat

    - transformed cc (Fisher Z-transformation) into atanh values calculated for each run, last three loudspeakers and all subjects

- all_sds_modified2.mat

    - standard deviation values calculated for each run, all loudspeakers and all subjects

5 Compilation of software application

The code sources of MATLAB are not needed to be compiled. The system requirements for MATLAB running are following [2]:

-   Microsoft Windows XP, Vista, 7 or 8

-   1 GHz or faster processor

-   2 GB RAM

-   10 GB free hard disk space

6 List of source code files

Experiment A:

- Bias_exp_A.m

- Bias_exp_A_extra.m

- Temporal_profile_exp_A.m

- CC_analysis_exp_A.m

- CC_analysis_exp_A_extra.m

- STD_analysis_exp_A.m

- STD_analysis_exp_A_extra.m

- STD_analysis_loudserpeakers_exp_A.m

Experiment B:

- Bias_exp_B.m

- Bias_exp_B_extra.m

- Temporal_profile_exp_B.m

- Temporal_profile_exp_B_extra.m

- CC_analysis_exp_B.m

- CC_analysis_exp_B_extra.m

- CC_analysis_loudspeakers_exp_B.m

- STD_analysis_exp_B.m

- STD_analysis_exp_B_extra.m

- STD_analysis_loudspeakers_exp_B.m

7 Assessment of solution

The developed scripts met the requirements for performing different analyses to explore influence of non-auditory factors on contextual plasticity in special hearing.

Bibliography

[1] MathWorks: MATLAB The Language of Technical Computing, [cit.: 2014-4-23], Available at: [http://www.mathworks.com/products/matlab/]

[2] MathWorks: MATLAB The Language of Technical Computing: System Requirements, [cit.: 2014-4-23], Available at: [http://www.mathworks.com/support/sysreq/current_release/