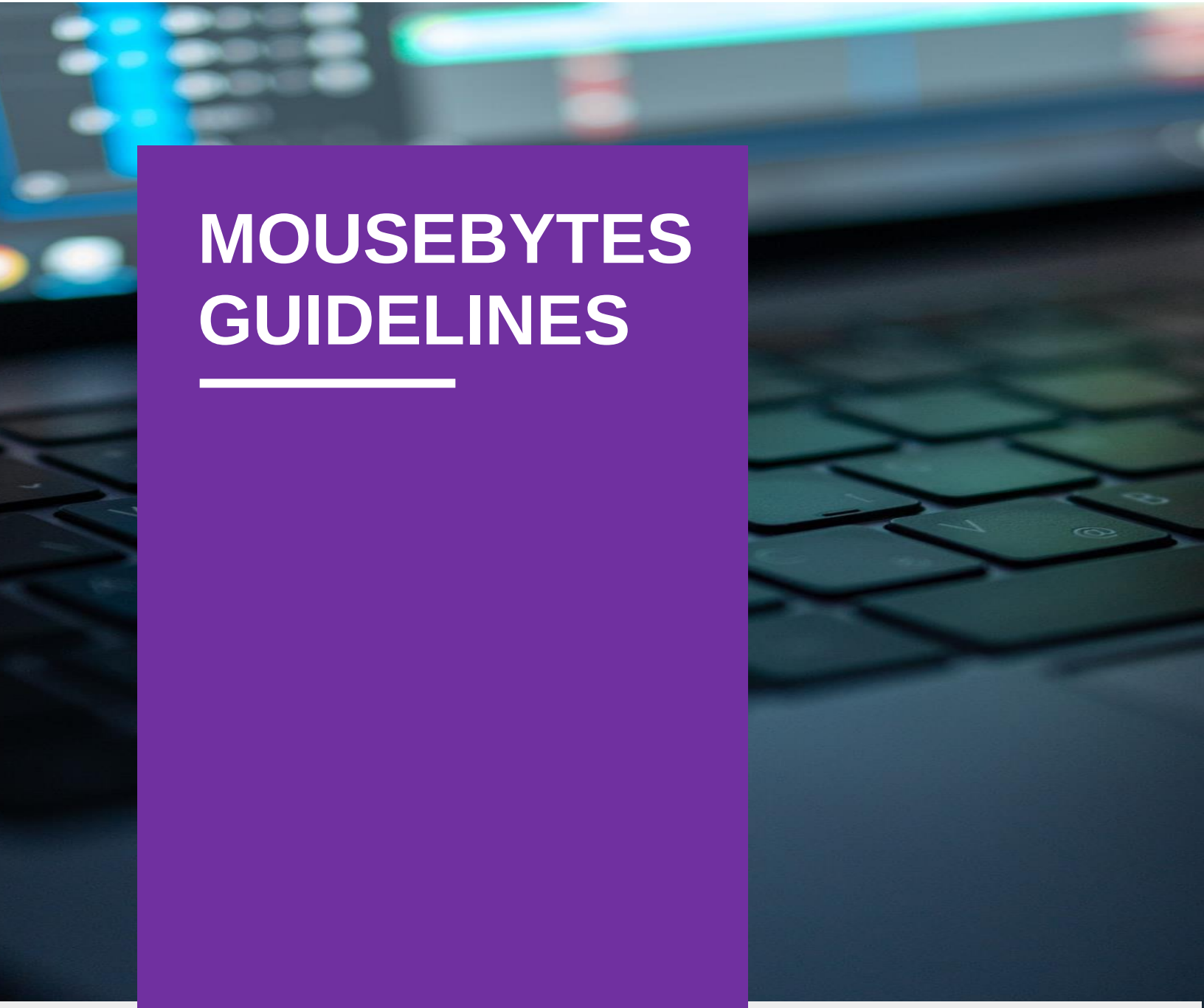

MOUSEBYTES GUIDELINES

April 7, 2021

MOUSE BYTES

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MOUSEBYTES

MouseBytes (https://mousebytes.ca/home) is an open-access high-throughput pipeline and database for rodent touchscreen-based cognitive assessment. It employs advanced web technologies and is connected to a database/repository of cognitive data obtained using touchscreen technology which allows its use without any software installation. Not only can users deposit their original data, but they are also able to extract, export, share and re-analyze data obtained from other laboratories and benefit from data visualization. The goal of this module is to show participants how to use different functionalities in MouseBytes. The MouseBytes tool offers a variety of different applications based on intent of use. As a MouseBytes user, please adhere to the following practices when designing, implementing and utilizing your projects in MouseBytes.

FEATURES

Some pages and functionalities are accessible to the public, while others require an account.

Home

This feature directs the user to the homepage of the website.

Dashboard

This feature allows the use to see the overview of data deposited into MouseBytes. Dashboard has two tabs: “Cognitive Task” and “Experiment”. The first tab shows the proportion of all data w.r.t. age, sex, strain and cognitive task while the second task shows the similar information for each experiment/dataset in MouseBytes.

Tutorials

This feature provides tutorials and training videos about MouseBytes.

1. Guidelines
    - This subsection provides examples of data extraction through the data lab page.
2. Video Tutorials
    - This subsection provides videos illustrating features such as instructions, guidance, error handling, and example situations in MouseBytes.

Resources

This feature provides additional services for users.

1. Contact Us
    - Contact information for MouseBytes administration team can be found here (mousebytes@uwo.ca)
2. Forms
    - If certain MouseBytes features do not have options that fits the user’s criteria, this subsection contains forms to request additional options.
    - Forms included:
        - Adding new cognitive task
        - Adding new PI
        - Adding new age

        - Adding new mouse line
    - If the user needs additional options that could not requested by forms included, then the user can contact the MouseBytes administration team.
3. Terms of Service
    - Terms and Condition of Use for MouseBytes can be found here.

<u>Touchscreen Data</u>

This feature includes subsections that allow users to search and upload touchscreen data.

1. Data Lab
    - This subsection allows the user to find specific public research data to download for re-use.
2. Data Visualization
    - This subsection allows the user to visualize public data corresponding to specific cognitive tasks.
        i. Users select the cognitive task they would like to see graphs for.
        ii. Users can then filter the data through the filter panel located on the right side of the window.
    - Filter options available:
        i. **Experiment Name**
        ii. **Task**
        iii. **PI**
        iv. **Animal Sex**
        v. **Animal Strain**
        vi. **Animal Genotype**
        vii. **Animal Age (Months)**
        viii. **Stimulation Length (ms)**
        ix. **IsIntervention**
        x. **Intervention Description**
        xi. Additional filters based on the specific task.
3. Search
    - This subsection shows all of the experiments/datasets along with their corresponding metadata.
4. Experiment
    - This subsection allows the user to create, an experiment to deposit the data related to a cognitive task and collected within a specific period.
5. Upload
    - This subsection allows the user to upload data files that correspond to the user's experiments.
6. Animal
    - This subsection allows the user to add animals and corresponding information that pertain to the user's experiment.
7. Upload Log

- This subsection houses a detailed log of the uploaded data files which are flagged and have faced any errors that have occurred during uploading.

TOUCHSCREEN COGNITION

This feature directs the user to the MouseBytes partner website, Touchscreen Cognition.

Touchscreen Cognition (http://touchscreenrecognition.org) is an interactive platform with information, current news and cognitive behavioural tasks related to touchscreen technology. This application also hosts a forum to discuss MouseBytes concerns, news, updates, etc. (https://touchscreencognition.org/forums/forum/general-discussion/).

SEARCH

Searching for an Experiment

1. Hover the mouse over "TOUCHSCREEN DATA" feature in the main top menu.
2. Click on "SEARCH" sub-feature to be directed to search page.
3. User can search and find the experiments based on the following features in the search area above the table:
    - Experiment Name
    - Cognitive Task
    - Status
    - Age
    - Strain
    - Genotype
    - Start Date – End Date
    - Researcher
    - DOI

NOTE: The table at this page includes all the experiments documented in MouseBytes.

EXPERIMENT

Browsing Experiments

If the user has created multiple experiments, these experiments can be found and browsed through a drop-down list found in the "EXPERIMENT" sub-feature.

Creating an Experiment

1. Hover the mouse over "TOUCHSCREEN DATA" feature in the top menu.
2. Click on the "EXPERIMENT" sub-feature to be directed to experiment page.
3. Hover your mouse over the + sign.
4. Click on + sign to open the experiment form.
5. Fill all the following required fields and submit the form.
    - **Experiment Name**
    - **Estimated Start and End Dates of Experiment**
    - **Species**
    - **Cognitive Task**

    - Each experiment is for a cognitive task (e.g. 5C, PAL, LD, etc.).
    - If the experimental data corresponds to several cognitive tasks, a separate experiment should be created for each cognitive task.
    - Please fill the appropriate form located under Resources > Forms if a specific cognitive task does not exist (https://mousebytes.ca/forms).
- **PI & Institution**
    - The user may select several PIs when signing up, but the main PI for each experiment is selected.
- **Status**
    - If the user is not ready to share their research data with others then select “Private”; otherwise, select “Public”.
- **Experiment Description**
    - Provide a brief description of the experiment.
- **DOI**
    - If a paper is published based on the experimental data, the user can enter the DOI of the paper.
- **Does your experiment include multiple sessions for an animal within a single day?**
    - If your experiment does, selecting this option is necessary to ensure that your files will satisfy the quality control check.
- **Do you have a complementary data repository associated with the experiment?**
    - If so, you can select the appropriate repository based on the title.

Editing and Deleting Experiments

1. Select the intended experiment from the drop-down list on the experiment page.
2. Once the experiment is selected, the details of the selected experiment can be seen in the right side of the Experiment panel.
3. Click the “Edit” icon at the top right corner of the Experiment Panel to edit the experiment.
    a. An experiment (dialog) window will appear where the user can edit all the fields except "Cognitive Task".

NOTE: If the wrong task has been selected, then the user should delete this experiment and create a new one with the correct cognitive task selected.

4. Click the “Delete” icon at the top right corner of the Experiment Panel to delete the experiment.

NOTE: If an experiment is deleted, all the data files and animals added to the experiment will be deleted from the system.

SUB-EXPERIMENT

Throughout an experiment, animals that are a part of the experiment may be tested at different ages (e.g. 3 months, 7 months, etc.) with/without intervention. In order to account for such differences, the user should create separate sub-experiments for different criteria.

Browsing Sub-Experiments

If the user has created multiple sub-experiments for a specific experiment, these sub-experiments can be found and browsed through a drop-down list found in the "EXPERIMENT" page.

Creating a Sub-Experiment

1. Select the intended experiment from the drop-down list on the experiment page.
2. Once the experiment is selected, a new drop-down list will appear.
3. Hover your mouse over the + sign.
4. Click on + sign to open the sub-experiment form.
5. Fill all the following required fields and submit the form.
    - **Sub-Experiment Name**
    - **Age Range** (age at the beginning of the experiment)
        - 3-6 months
        - 7-10 months
        - 11-13 months
        - 14-19 months
        - 20-25 months
            - If your animal does not fit the categorize into the given age ranges or needs to be tested at a different age range, please fill out the appropriate form located under Resources > Forms
    - **Images**
        - This feature is only available for tasks involve Images as stimuli like PAL, PD, CPT, etc.
        - If more than two images is selected for PD, or more than three images were selected for PAL, a new feature **Image Description** will appear to provide reasons why more images were chosen from the list
    - **Intervention**
    - **Additional Questions**
        - How are the mice housed in your facility?
        - How is your light cycle in your facility?

Editing and Deleting a Sub-Experiment

1. Select the intended experiment from the drop-down list on the experiment page.
2. A table including list of all the created sub-experiments for the selected experiment will show up at the bottom of the experiment panel.
3. Click the Edit icon under "Edit" column in the table.
    a. A sub-experiment form will appear.
    b. User can edit the required fields and submit the form.
4. Click the Delete icon under "Delete" column in the table.
    a. A dialog will appear asking for confirmation to delete the sub-experiment.

NOTE: If the user deletes the sub-experiment, all the files presently uploaded to that sub-experiment will be removed from the system.

ANIMALS

Browsing Animals

If the user has added multiple animals for a specific experiment, these animals can be found and browsed through a drop-down list found in the "ANIMAL" page.

Adding Animals

1. Hover the mouse over "TOUCHSCREEN DATA" feature in the main top menu.
2. Click on "ANIMAL" sub-feature to be directed to animal page.
3. Select the intended experiment from the drop-down list in the experiment panel.
4. Once the experiment is selected, a table will appear just below the experiment panel.
5. Click on "Add New Animal" at the top right corner of the table.
6. Animal (dialog) form will appear.
7. Fill all required fields and submit the form.
    - **Animal ID**
    - **Animal Sex**
    - **Animal Strain**
    - **Animal Genotype**
        - The values of Genotype in this form is based on the selected option in Animal Strain.
        - If the particular strain of the animal is not found, please fill the appropriate form located under Resources > Forms (https://mousebytes.ca/forms).

NOTE: There is a reference link provided that will direct the user to a website (e.g. jax.org) that includes all the information about that genotype.

Searching, Editing and Deleting Animals

1. Go to the animal page and select the experiment from the list in the experiment panel.
2. The user can search and find the animal based on **Animal ID** in the search area.
3. Click the Edit icon in the table.
    a. Animal dialog form will appear.
        - The user can edit all the fields except Animal ID.
        - If the Animal ID needs to be edited, the animal must be deleted, and a new animal can be added with the correct ID.

NOTE: if an animal is deleted, all uploaded files corresponding to the Animal ID will be deleted.

4. Click the Delete icon in the table.
    a. Confirmation Dialog will appear.
    b. Click "Confirm" button to delete the animal.

UPLOADS

XML files

It would be better that all the XML files experimented at specific age (e.g. 3-6 months or related to a particular intervention) are saved in a separate folder once users are collecting data using

touchscreen and ABET II software. It is important to upload your files to the CORRECT sub-experiment considering what the age and intervention is.

Uploading Files

1. Hover the mouse over “TOUCHSCREEN DATA” feature in the top menu.
2. Click on “UPLOAD” sub-tab to be directed to UPLOAD page.
3. Select the experiment from the list in the experiment panel.
4. Select the sub-experiment based on age range that fits the age of the animals whose corresponding files the user wants to upload.
5. Select the type of session from the drop-down list (e.g. Habituation 1, etc.)
6. Then, Upload area appears.
7. The user can click or drag the multiple XML files to the upload area.
8. A dialog will appear and ask to confirm that the files to be uploaded are correct

NOTE: While the XML files are uploading, the content of the files are checked against the quality control (QC) rules. For more information about the QC rules, contact the MouseBytes administration team.

Searching and Deleting Uploaded Files

1. Hover the mouse over “TOUCHSCREEN DATA” feature.
2. Click on “EXPERIMENT” sub-feature to be directed to experiment page.
3. Select the experiment from the list in the experiment panel.
4. A table including a list of all sub-experiments for the selected experiment will appear at the bottom of the experiment panel.
5. Select the radio button found in front of each sub-experiment in the table OR select the sub-experiment from the drop-down list in the experiment panel
6. Another table will appear below the experiment panel that includes all of the XML files uploaded to particular sub-experiment,
7. The user can search any file by entering file name or Animal ID in the search area above the table and below the experiment panel.
    a. **Status:** this is a feature in the table that indicates if the uploaded file passed the pre-processing QC rules
8. The user can delete any file by clicking the Delete icon in the table.
9. The user can download any file by clicking the download icon in the table.

POST-PROCESSING QUALITY CONTROL RULES

Running Post-processing Quality Control rules

Each animal ID should have specific number of files in the system. For example, each animal ID should have at least one "Initial Touch” session in the entire project life cycle. Post processing QC checks for such information and provide the user with the report if any file related to a specific session is missed for the animal.

1. Go to experiment page and select the experiment from the list in the experiment panel.
2. A table including a list of all sub-experiments for the selected experiment will appear at the bottom of the experiment panel.

3. Click “**Run Post-Processing QC**” button under "Post-Processing QC" column in the sub-experiment table.
4. Once post-processing QC is done, click "**Show Result**" to see the report.

UPLOAD ERRORS

Browsing Errors Occurring During Data Upload

1. Hover the mouse over "TOUCHSCREEN DATA" feature.
2. Click on "UPLOAD LOG" sub-feature to be directed to UPLOAD LOG page.
3. Select the Experiment from the list in the experiment panel.
4. Two tables appear below the experiment panel:
    - First table indicated errors related to:
        - QC rules
        - Missing Animal Information: If sex, genotype, and strain is missed, the content of the file will not be transferred to the database, and the issue should be first resolved.
    - Second table includes the following errors:
        - Duplication: if a file already uploaded, and you try to upload it again.
        - Wrong Experiment: If a file uploaded to the wrong experiment. For example, if you try to upload the PAL file to the experiment whose cognitive task is 5-choice.
        - Missing Animal ID: If your file does not contain Animal ID.

QC related error

In "Manage Error" column, the user can either download the file using the download icon, correct its content and upload it again OR can delete the file by clicking on Delete File button.

Missing Animal Information Error

1. Click "Resolve Issue"
2. An Animal form will appear.
3. The user can add the required animal information and submit the form.

NOTE: when the user adds the animal information, the information applies to all XML files with the same Animal ID. This results in all of the files include that Animal ID being removed from the first table in UPLOAD LOG page.

4. The user can also delete the animal by clicking “Delete Animal”.

NOTE: If the animal is deleted, all of the corresponding files will be removed from the system.

5. The user can also download the file by clicking on the download icon.

NOTE: The user can search and find all of the files with the same Animal ID by entering the Animal ID in the search area above the first table in UPLOAD LOG page.

DATA LAB

This page is open to everyone and does not require log in. However, the user can extract data of experiments whose status is PUBLIC. But, if the user signs into the system, they will be able to extract and make reports from PUBLIC experiments and PRIVATE experiments belonging to

the user. Data in MouseBytes can be extracted either trial-by-trial or using the aggregation function.

Extracting Data

1. Hover the mouse over “TOUCHSCREEN DATA” feature.
2. Click “DATA LAB” sub-feature to be directed to data lab page.
3. In Query Database panel, series of drop-down lists will appear to find the specific data the user is looking for.
    a. **Species**
    b. **Cognitive Task**
    c. **Experiment**
        - The experiments list will be based on the selected cognitive task.
    d. **Session**
    e. **Key Features**
        - Key features are constant. It does not matter what task and session are select selected.
    f. **Required Features**
        - These features pertain to a specific task and session.
        - The user can also search for the feature in this list.
    g. **PI & Institution**
        - If the user down not select any PI & institution, all of them are automatically selected from the list.
    h. **Trial by Trial**
        - If this option is selected, then Aggregation feature is disabled.
        - If this option is not selected, then Aggregation is activated.
    i. **Aggregation**
        - Can present the data as different functions.
            - MEAN: average
            - STDEV: standard deviation
            - COUNT: total
4. Click “Get Data” to extract the data.

Exporting Extracted Data

1. After the data is extracted, the data will appear in the table below the "Query Database" panel.
2. Click “Export Data” at the top left corner of the result table.
3. The content of the table is exported in CSV format and saved in the user’s computer.

Sharing Extracted Data

1. After the data is extracted, the data will appear in the table below the "Query Database" panel.
2. Click “Generate Link” button at the top left corner of the table.
3. A new dialog including the link will appear.
    - The user can use this link to share the data with others.

- Copy and paste the link in another tab or another browser to view the data.