

USER GUIDE

ABAI : Authored By AI



Version 0.0.1 (May 2024)

Contents

1	Introduction	3
1.1	Purpose of ABAI	3
1.2	Main features	3
1.3	The scope	3
1.4	What is ABAI's audience?	3
1.5	Usage licence	4
1.6	Legal mentions	4
1.6.1	Privacy	4
1.6.2	Disclaimer clause	4
2	Installation	5
2.1	Requirements	5
2.1.1	Python	5
2.1.2	Docker	5
2.2	Download	6
2.3	Extract	6
2.4	First steps	7
2.4.1	Local application	7
2.4.2	Web application	8
3	Usage	9
3.1	Local application	9
3.1.1	Database	10
3.1.2	Configuration	11
3.1.3	Train, Test, and Validate	13
3.1.4	Detect Origin	14

3.2	Web based application	15
3.3	How to guides	16
3.3.1	How to use the web/local application to detect the author of a given text?	16
3.3.2	How to use the local application to add local texts to the dataset?	17
3.3.3	How to use the local application to delete texts from the dataset?	20
3.3.4	How to use the local application to train, test and validate models with a new configuration?	22
4	Help	25
4.1	Troubleshooting	25
4.1.1	Pip is not recognized as internal/external command	25
4.1.2	WSL not supported	25
4.2	FAQ	26
4.2.1	I have unintentionally deleted the database, what do I do now?	26
4.2.2	Is it possible to perform actions on all models at once?	26
4.2.3	I have used every option from the configuration menu. Is it supposed to be this slow?	26
4.2.4	The Python GUI window is stuck and doesn't respond to input. What can I do ?	26
5	About	27
5.1	License	27
5.1.1	Can I redistribute the application ?	27
5.1.2	Can I modify the application?	27
5.2	Contact	27

1 Introduction

1.1 Purpose of ABAI

In a world where generative AI has been made available to the public (in the shape of various tools), demand for a tool capable of authorship attribution has emerged. Authorship attribution is the task of identifying the author of a given text. ABAI was created specifically for this purpose. It will assist you in identifying the source of a certain piece of text.

1.2 Main features

Once provided with correct text data, ABAI will be capable of detecting whether a particular piece of text has been written by a human author, or whether it has been generated by a generative AI model (ChatGPT). The tool itself is powered by a machine learning model.

1.3 The scope

ABAI in its current state has been trained on datasets of raw essays of various subjects. Even though it can be used to cover a vast majority of subjects, it will perform best on texts structured and shaped similarly to those used during training. ABAI will not verify if the input given to it has the correct structure. It will also not perform any language checks. Please be sure to provide correct data and structure it according to the examples provided with the program.

1.4 What is ABAI's audience?

ABAI has been built with the following purpose in mind : detect if a student has made use of generative AI to generate an essay answer to a given prompt for a school project or exercise. The essay to be analyzed will be sliced into different paragraphs as to determine whether a certain paragraph has more odds to have been generated by generative AI.

As the trend of generative AI keeps rising, this feature could prove itself essential to have in one's toolbox while assessing a piece of writing.

No specific prior knowledge in the field of machine learning or text analysis is needed for basic usage of the tool. However, a basic level of knowledge about machine learning parameter selection could be beneficial for a more advanced and customized usage on the local user interface of the application.

1.5 Usage licence

The ABAI project is licensed under the MIT License and it's local GUI (based on the PyQt5 python module) is licensed under the GPLv3 License. For more information, please read the [license](#) segment in the [about](#) section.

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

1.6 Legal mentions

1.6.1 Privacy

ABAI does not collect any user data at any state. We respect user privacy and do not engage in data collection or tracking activities. Your usage of ABAI is confidential and no personal information is stored or shared.

1.6.2 Disclaimer clause

Remember not to use ABAI as a primary decision-making tool but rather as a complementary method of determining the source of a piece of writing.

2 Installation

2.1 Requirements

Depending on the features you wish to access and the platform you prefer using, you should head to the corresponding website of each requisite. For each method, the requirements and their details are explained in the following segments.

2.1.1 Python

This requirement can be skipped if you plan on relying solely on the Docker platform to start ABAI.

First, please head over to the official [Python website](#) and navigate to the download page. Once you see the versions of python available to download, select the latest released stable version and follow the instructions to download and install python on your machine.

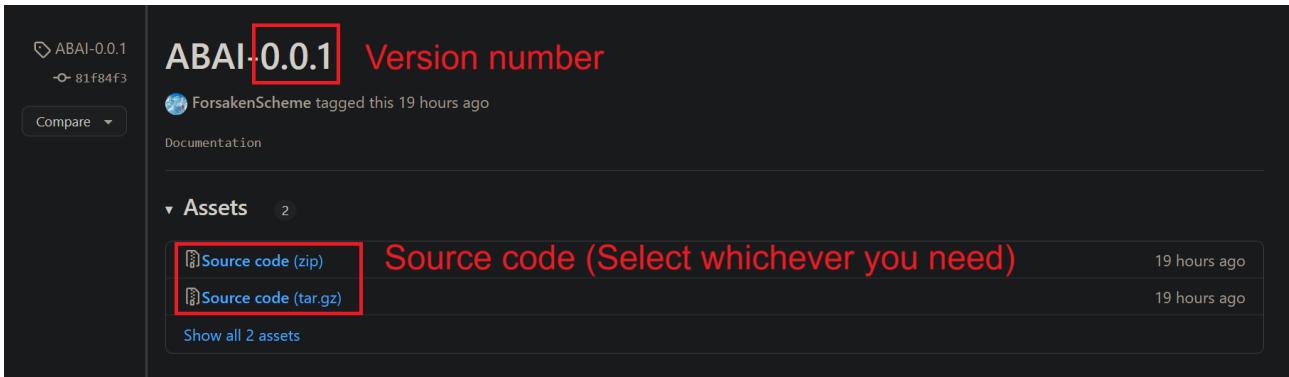
2.1.2 Docker

This requirement can be skipped if you plan on relying solely on the command line terminal and Python to start ABAI.

First, please head over to the official [Docker website](#) and navigate to their Docker Desktop download page under the products section. Alternatively (or if your OS environment doesn't have a desktop deployable version), you can try to follow the official Docker Engine [installation guide](#).

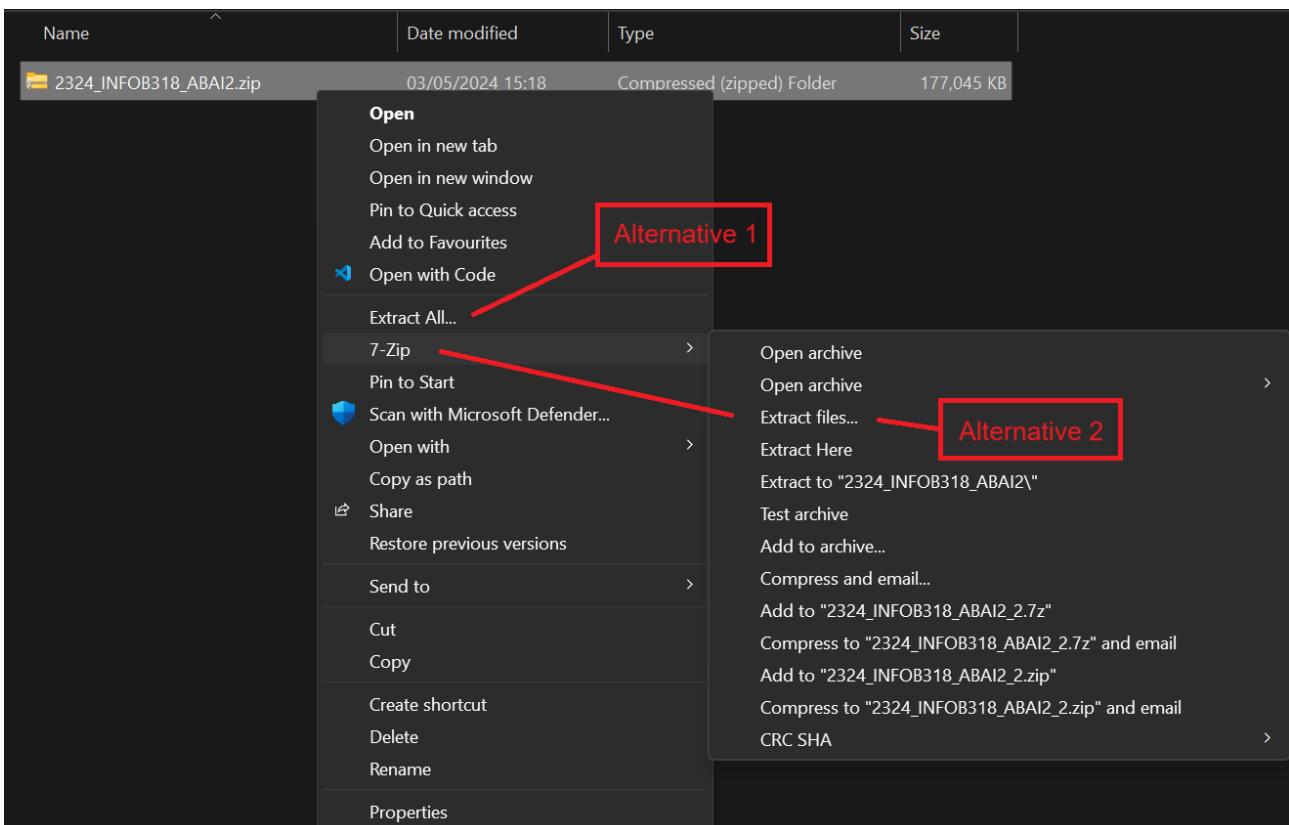
2.2 Download

Now that you meet the requirements from the previous steps, you are ready to download the tool. For this, download the compressed ABAI .ZIP project folder directly from it's [GitHub repository release page](#).



2.3 Extract

Once the download is complete, select your favourite extraction method (built-in OS feature or any additional file archiver software like [7-Zip](#)), and extract the content of the compressed project folder into the installation folder at the location of your choice.



After extraction, you should have the following folders:

Name	Date modified	Type	Size
2324_INFOB318_ABAI2	17/04/2024 19:27	File folder	Uncompressed
2324_INFOB318_ABAI2.zip	03/05/2024 15:18	Compressed (zipped) Folder	177,045 KB

The uncompressed folder should contain the file structure shown as preview on the GitHub project page. The compressed folder can be safely deleted after having extracted and placed the 2324_INFOB318_ABAI2-[version number] folder where you want to store it to run the program from.

2.4 First steps

After finishing the previous steps ([2.1](#), [2.2](#), [2.3](#) and [2.4](#)), you should now be able to start the tool. The steps to start ABAI may vary depending on what features and platform you plan to use. A walk-trough with steps for the local and web based application can be found at section [2.4.1 Local application](#) and [2.4.2 Web application](#).

2.4.1 Local application

If you want to start the local application, you will have to use the standalone **python** GUI. For this, proceed as follows :

- Navigate to the 2324_INFOB318_ABAI2-[version number] folder and, inside the folder, run the command:

```
pip install -r requirements.txt.
```

- Still inside the folder, run the command:

```
python -O .\code\backend\main.py.
```

- A window will open, this is the python GUI menu.

2.4.2 Web application

If you want to start the web application, you are able to use the command-line terminal with Python or Docker (Docker Desktop GUI).

Python

- First, open a terminal and navigate to the 2324_INFOB318_ABAI2-[version number] folder.

- Inside the folder, run the command:

```
pip install -r requirements.txt.
```

- Still inside the folder, run the command:

```
python -O .\code\django_abai\manage.py runserver 0.0.0.0:8000.
```

- Open your favorite browser and go to: <http://localhost:8000/>.

Docker

- First, open a terminal and navigate to the 2324_INFOB318_ABAI2-[version number] folder.

- From the current working directory, run the command:

```
docker-compose -f docker/docker-compose.yml build.
```

- Then, still from the 2324_INFOB318_ABAI2-[version number] current working directory, run the command:

```
docker-compose -f docker/docker-compose.yml up abai-website
```

or

On the Docker Desktop GUI chose the abai-web image and start the container with a name of your choice and specify the port 8000.

- Open your favourite browser and go to:

<http://172.28.112.1:8000/> (accessible from any device in the local network)

or

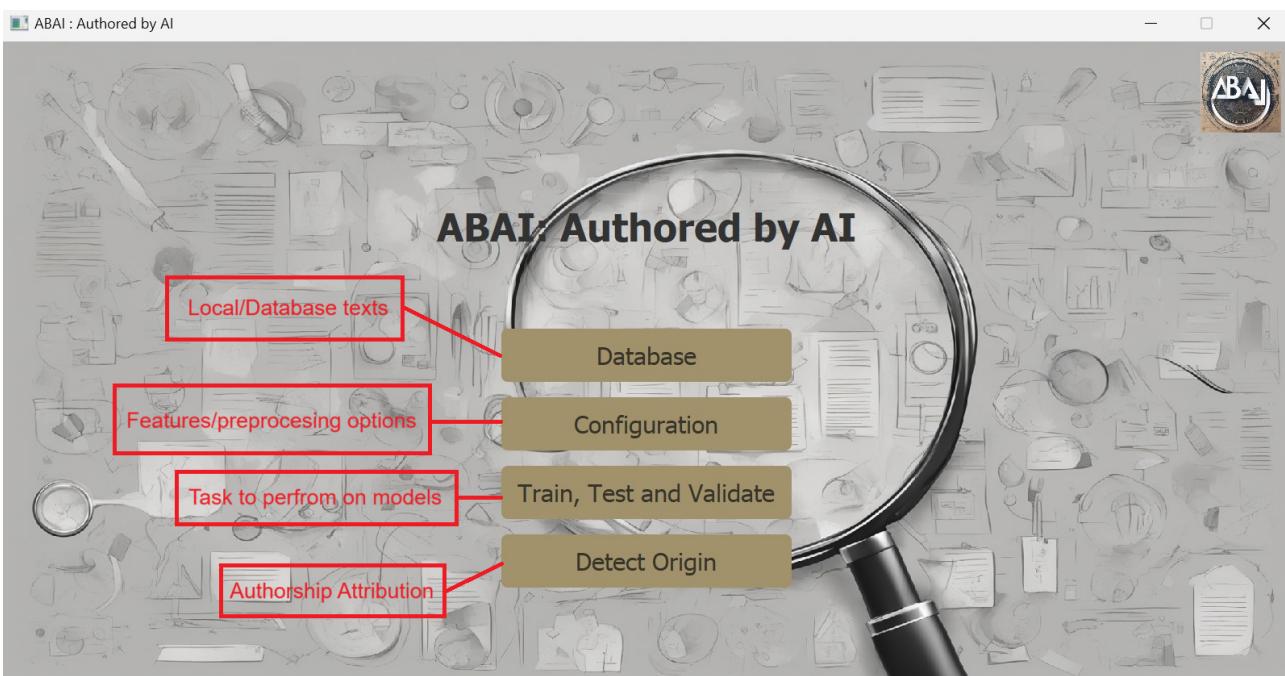
<http://localhost:8000/> (accessible from local host device only).

3 Usage

ABAI can be broken down into two smaller programs. You will be able to use the **local application** if you want to customize the data, the models and their feature extraction processes. The **web based application** is a simplified tool that uses pre-trained models to perform the authorship attribution task based on the model you select.

3.1 Local application

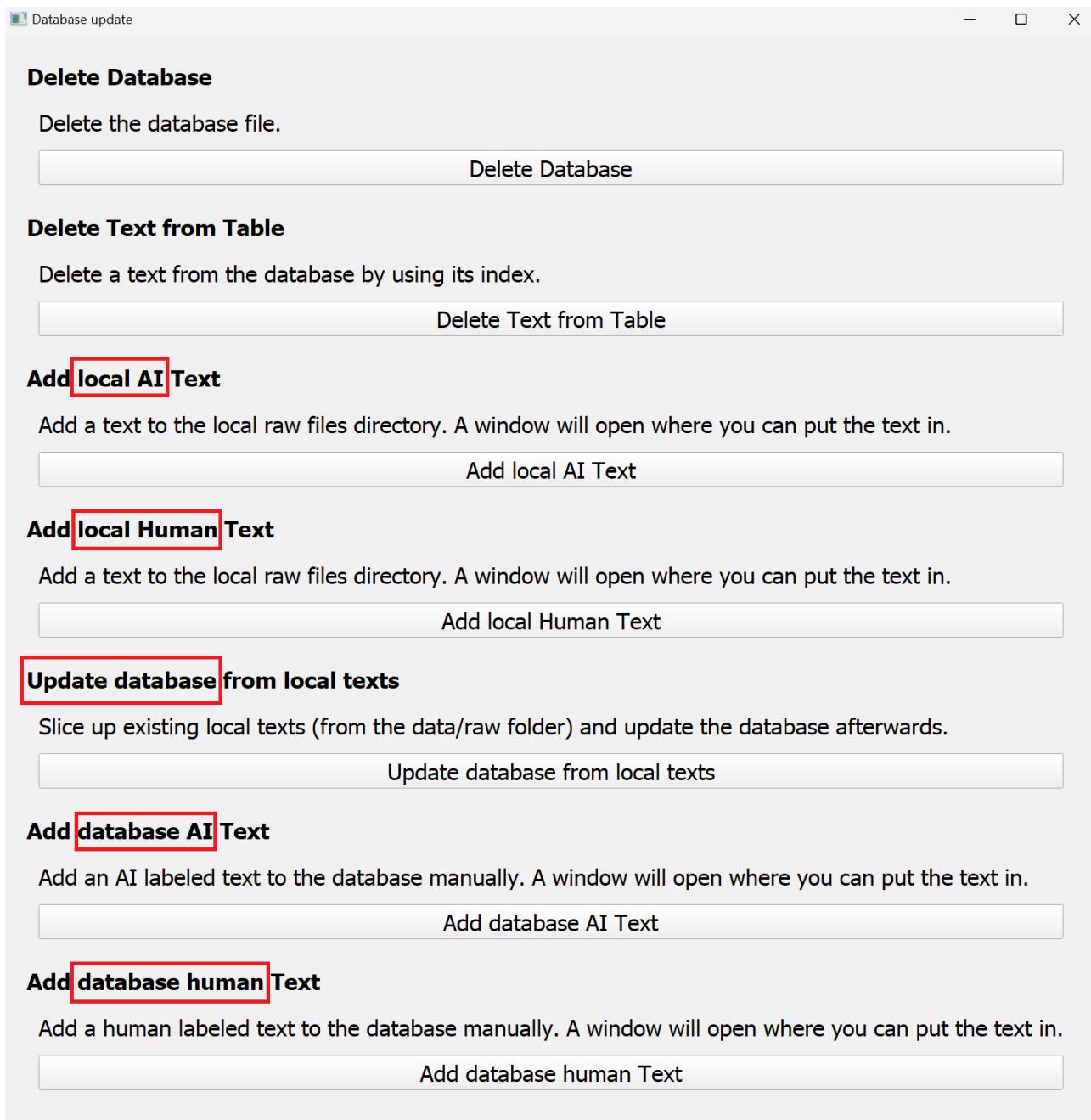
The GUI for the local application consists of a main application window and is then divided into multiple sub-windows for each menu option. If you close the main window or any sub-window, their child windows will also be closed.



Now, let's break down the menu and its options into smaller parts further explained in the following sections.

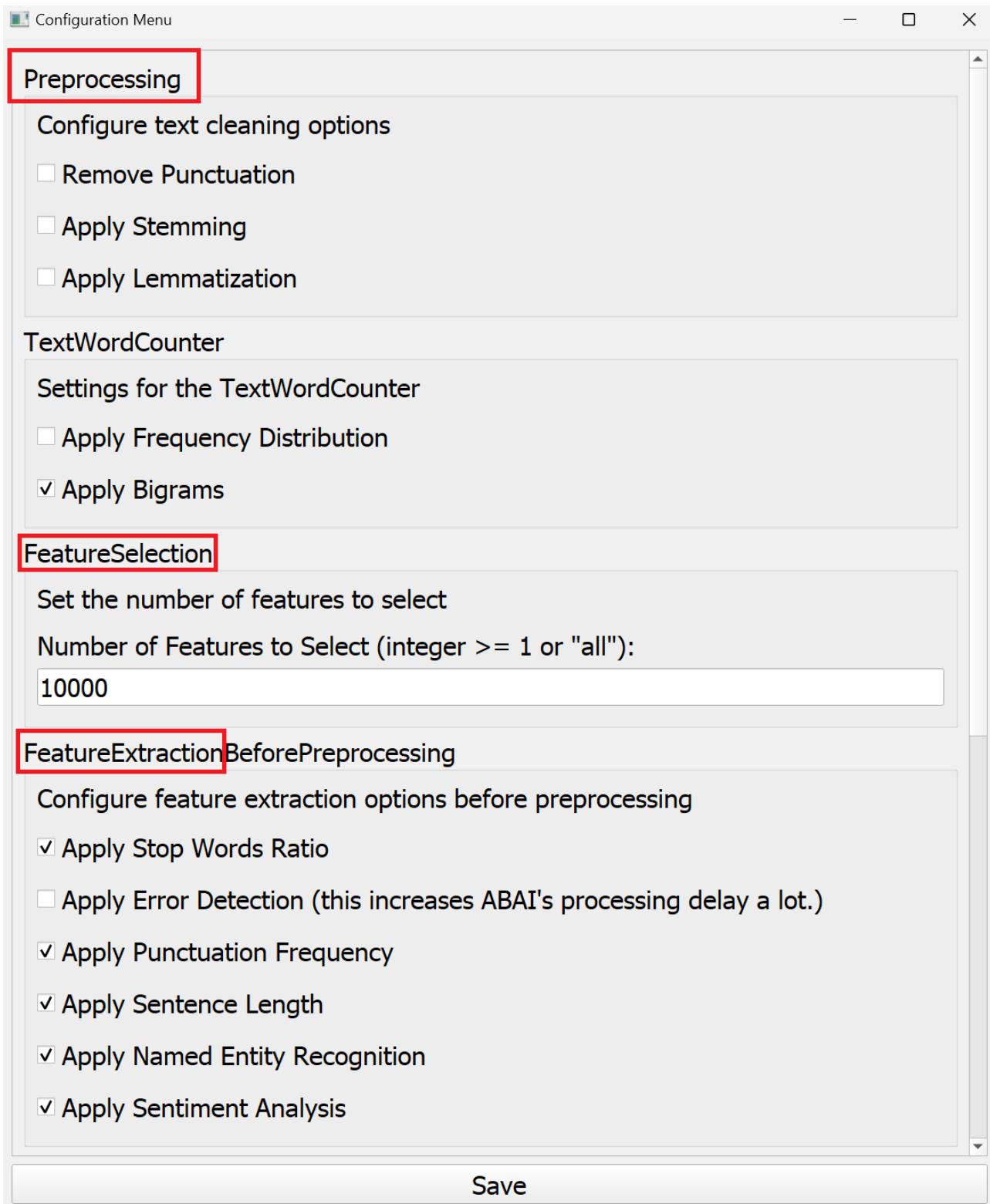
3.1.1 Database

In the database sub-window, you will be able to modify everything related to the databases and local files ABAI will draw from during the training of it's models. It's possible to add/remove directly to/from the SQLite database as well as storing local .TXT files.



3.1.2 Configuration

In the configuration sub-window, you will be able to set options for different methods of feature extraction, cross-validation and random state used during processing tasks.



A brief explanation

- **Preprocessing**

Configure the text cleaning options. These options include removing punctuation, applying stemming, and lemmatization.

- **TextWordCounter**

Choose between frequency distribution or tf-idf calculation, as well as whether to include bigrams in addition to unigrams.

- **FeatureSelection**

Specify the number of features to select for Kbest feature selection using the chi2 function. This setting allows you to control the dimensionality of your features.

- **FeatureExtractionBeforePreprocessing**

This segment includes several feature extraction options that will be performed before preprocessing. These include applying stop words ratio, error detection for grammar and misspells (which may prolong the processing time because of API calls), punctuation frequency, average sentence length, named entity recognition, and sentiment analysis.

- **FeatureExtractionAfterPreprocessing**

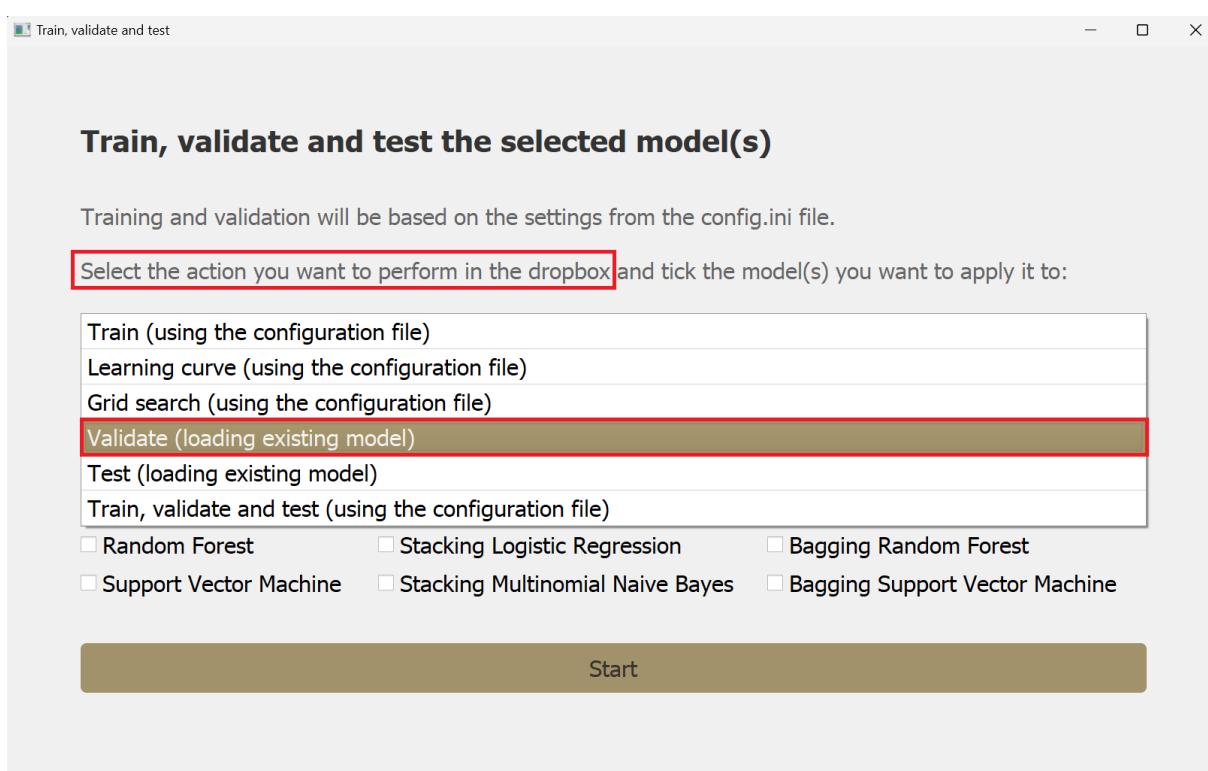
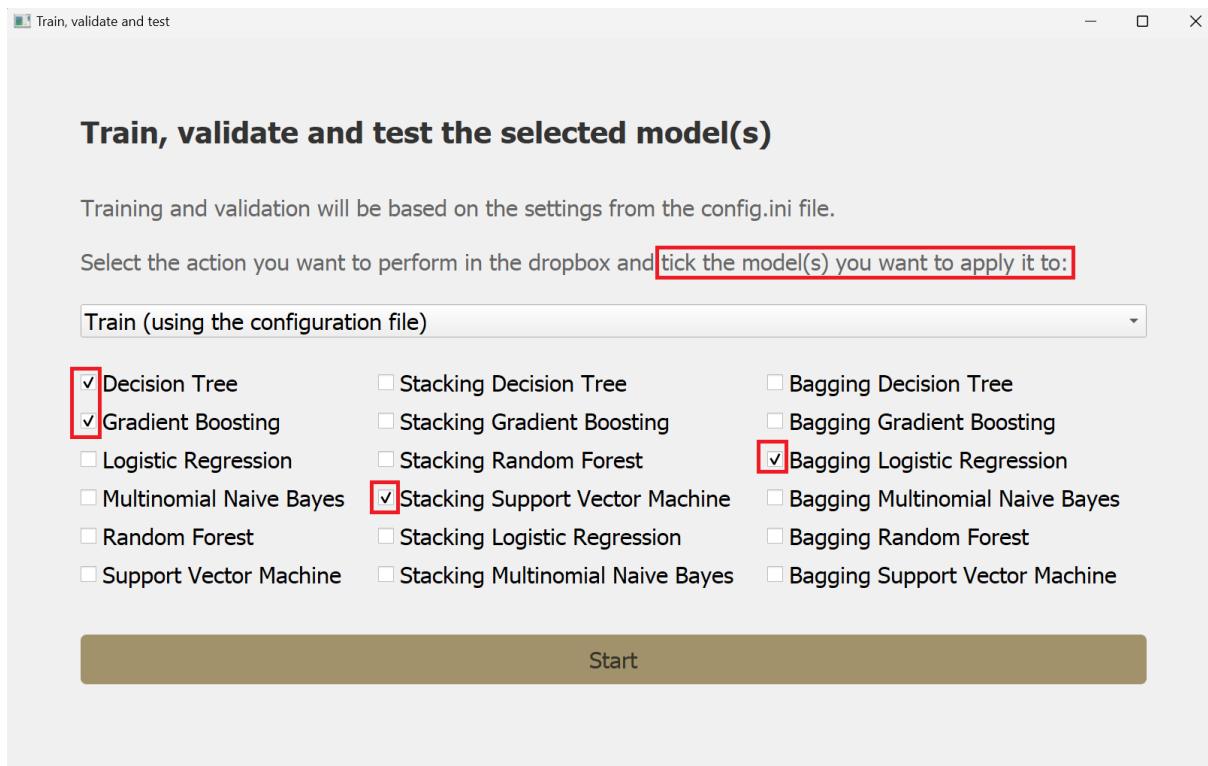
Apply additional feature extraction methods that will be performed after preprocessing. These include text word counting, average word length, and vocabulary size.

- **CrossValidation**

Set the number of folds for cross-validation.

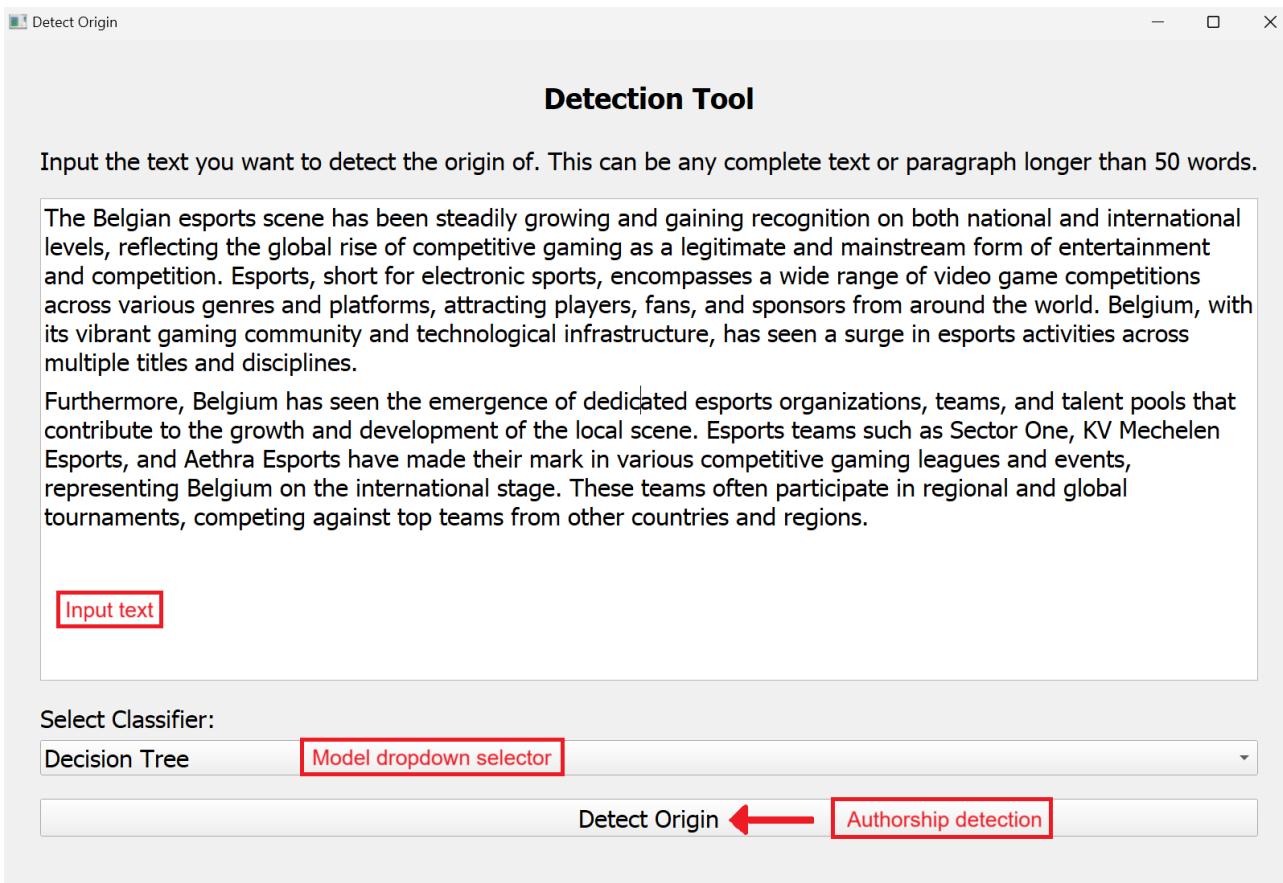
3.1.3 Train, Test, and Validate

In the train, test and validate sub-window you will be able to select the models you want to use (multiple simultaneous selections are allowed) and which task you want to perform for them. After the task has finished, a new window will open with the result.



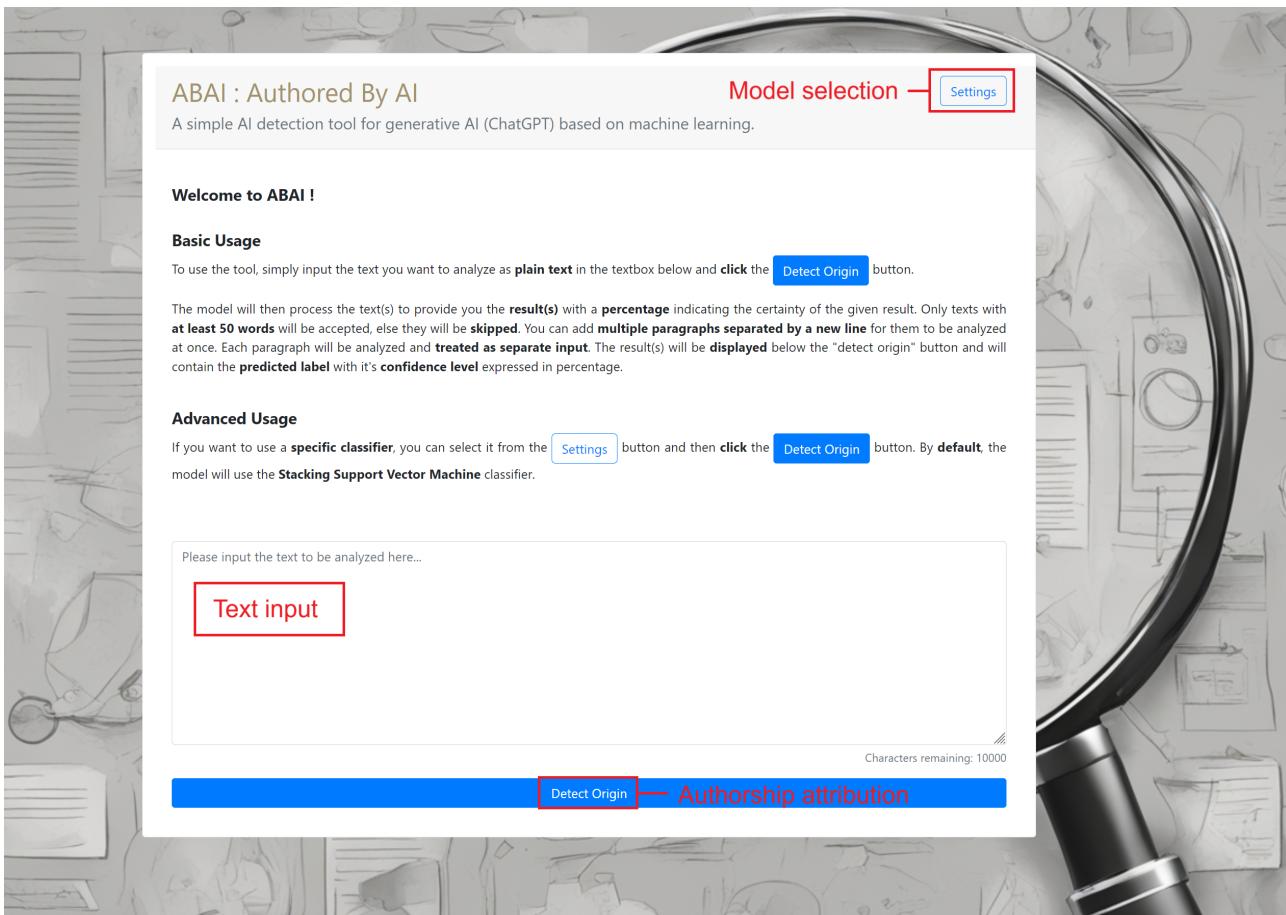
3.1.4 Detect Origin

In the detect origin sub-window you will be able to select the model you want to use to perform the authorship detection task with. Copy and paste the text you want to analyze into the corresponding text box. Then press the Detect Origin button and wait for the task to finish. A new window will open with the result.



3.2 Web based application

The web application has a simplified interface. It contains text guidance on how to use the authorship detection feature, a text box to input the text to be analyzed and a button to start the process.



For a comparison between the different pre-trained models, the advanced usage let's you select a different model than the default one (Stacking Support Vector Machine). You do this by pressing the settings button situated in the top-right corner of the interface.

Select a classifier

Classic classifiers

- Decision Tree
- Gradient Boosting
- Logistic Regression
- Multinomial Naive Bayes
- Random Forest
- Support Vector Machine

Bagging Classifiers

- Bagging Decision Tree
- Bagging Gradient Boosting
- Bagging Logistic Regression
- Bagging Multinomial Naive Bayes
- Bagging Random Forest
- Bagging Support Vector Machine

Stacking Classifiers

- Stacking Decision Tree
- Stacking Gradient Boosting
- Stacking Random Forest
- Stacking Multinomial Naive Bayes
- Stacking Logistic Regression
- Stacking Support Vector Machine

When ready, press the detect origin button and wait for the results to be displayed below the Detect Origin button.

Characters remaining: 8850

Detect Origin

Result paragraph 1 Text appears to be written with the help of generative AI (97.45% confidence).**Result paragraph 2** Text appears to be written with the help of generative AI (59.71% confidence).

Paragraph index

Predicted author

Confidence level

Disclaimer: The results are not 100% accurate and should be taken with a grain of salt. The tool is still in development and should not be used as a definitive source of truth.

3.3 How to guides

3.3.1 How to use the web/local application to detect the author of a given text?

1. Open the [web-based](#) version of the application or launch the [local](#) application using the appropriate method from the [installation](#) steps.
2. Once the application started, locate the **input box** (navigate to the Detect Origin window for the local application) where you can paste the text to be analyzed. Copy the text you want to analyze and paste it there. Ensure that the text does not exceed the maximum **10 000 character limit** for the web application.

When a text overtly declares "this is an example," it serves as a meta-textual cue, signaling to readers that the following content is illustrative, didactic, or demonstrative in nature. This meta-commentary on the text itself can be found across various genres and disciplines, each employing the statement for different purposes and effects.

In educational contexts, particularly in textbooks, tutorials, or instructional materials, the use of examples labeled as such is commonplace. For instance, in a mathematics textbook, a problem-solving section may include sample equations with the header "this is an example," guiding students through step-by-step solutions and strategies. This approach helps learners differentiate between theoretical explanations and practical applications, facilitating comprehension and skill development.

Similarly, in technical writing or manuals, labeling content as examples is crucial for clarity and comprehension. A software user guide, for

Text Box

Character limit

Characters remaining: 7002

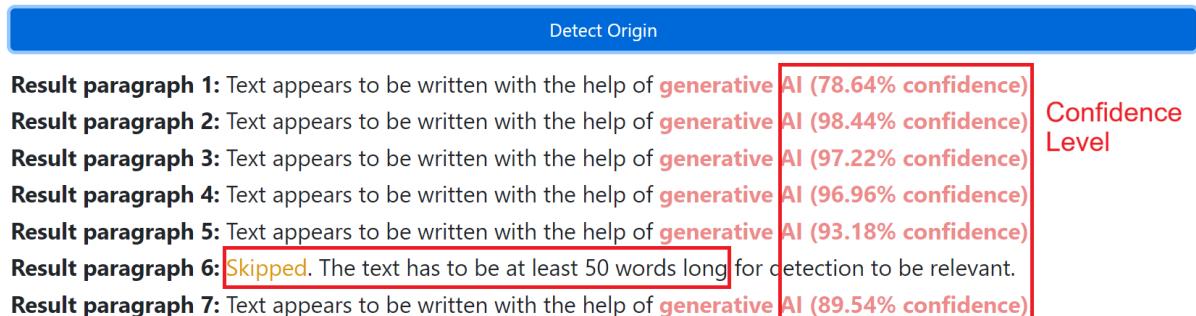
3. After pasting the text, look for the Detect Origin button and click it to initiate the analysis process.

Detect Origin



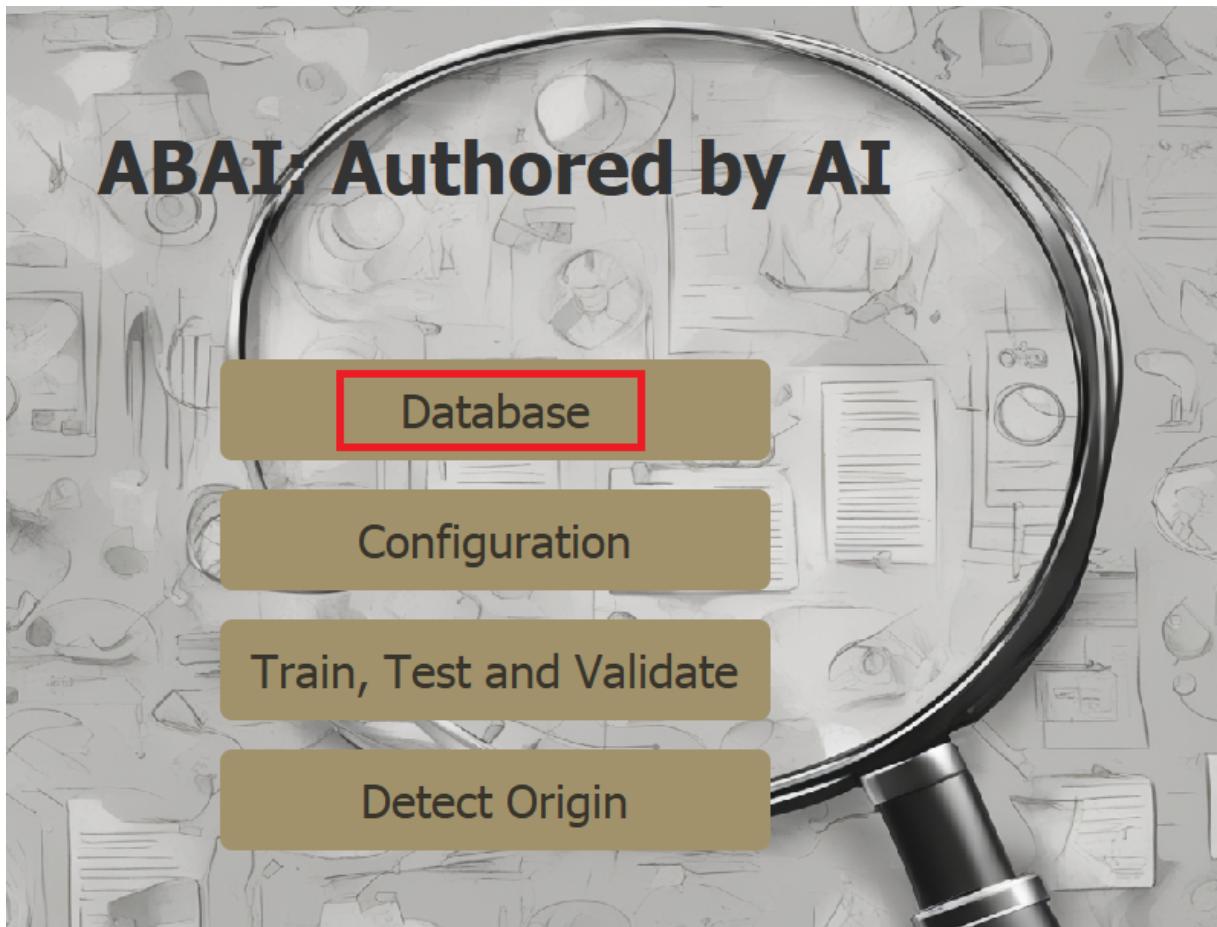
4. Wait for the analysis to complete. Depending on the complexity of the text and the processing steps, this may take a few moments.

5. Once the analysis is finished, review the results displayed by the application. The results will indicate whether the text is likely to be authored by a human or generated by an AI model with a certain level of confidence. The result will also indicate if a paragraph doesn't meet a requirement like word length.

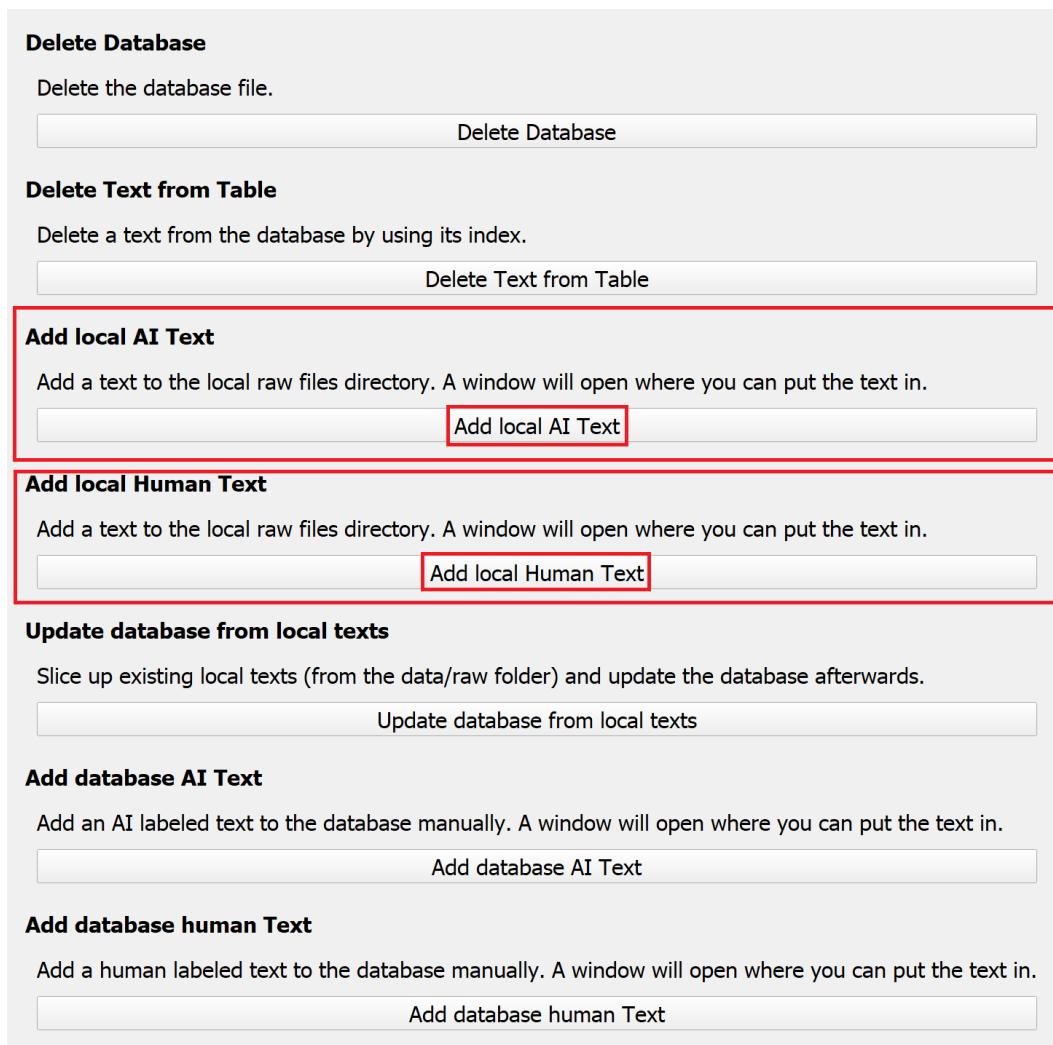


3.3.2 How to use the local application to add local texts to the dataset?

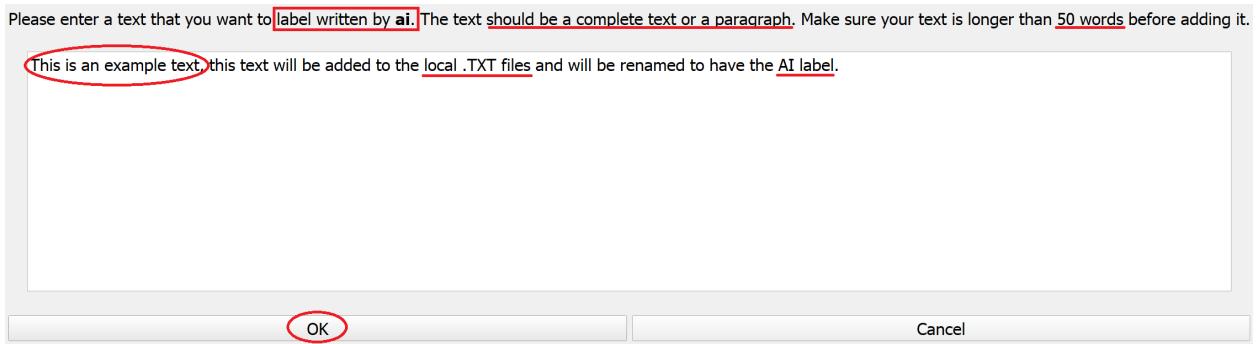
1. Open the [web-based](#) version of the application or launch the [local](#) application using the appropriate method from the [installation](#) steps.
2. Navigate from the main menu to the [Database](#) sub-window.



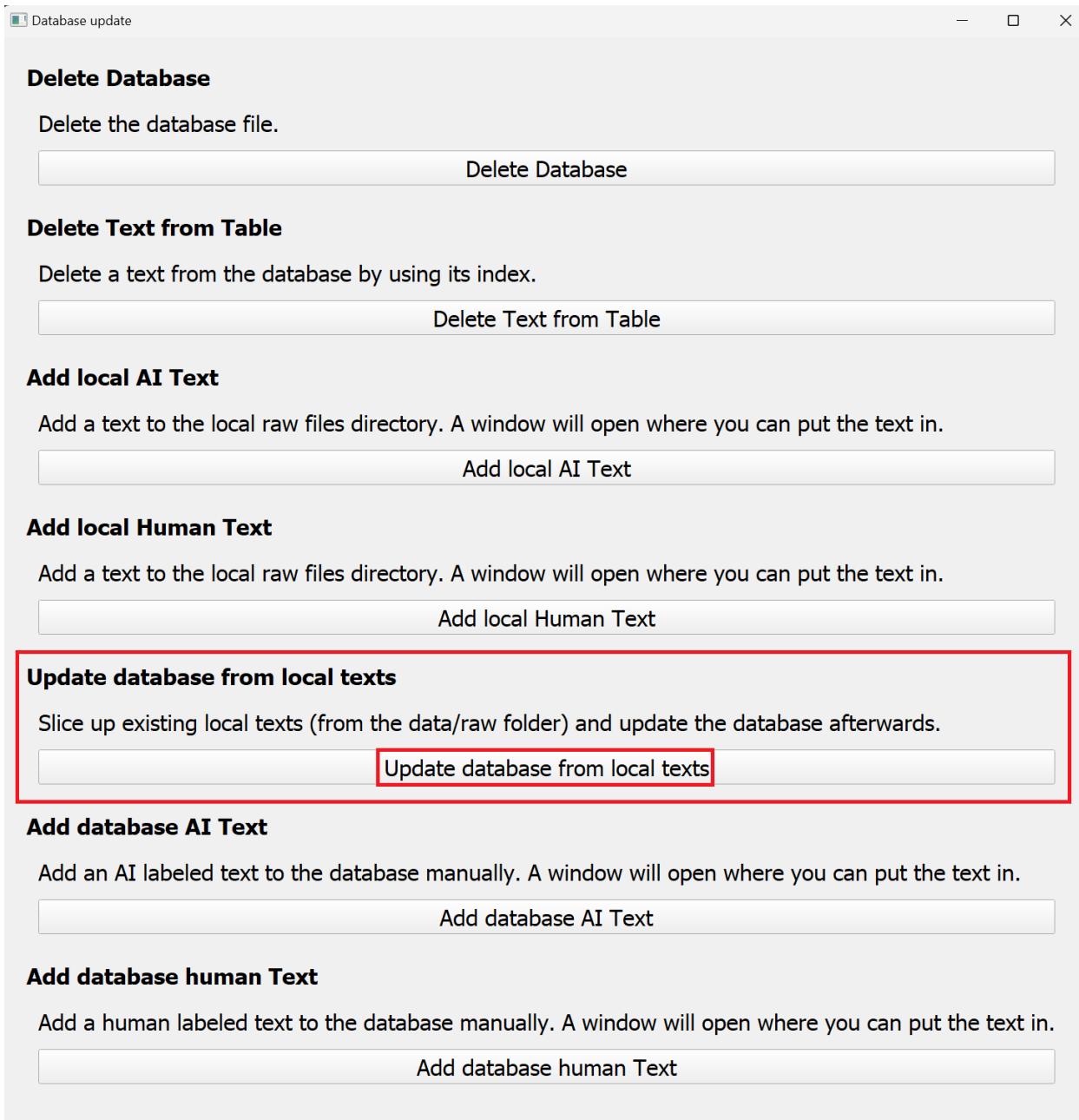
3. On the database sub-window select the button to add a text to the local texts with the corresponding label (human or AI).



4. Paste the text into the text box and click the OK button to save.

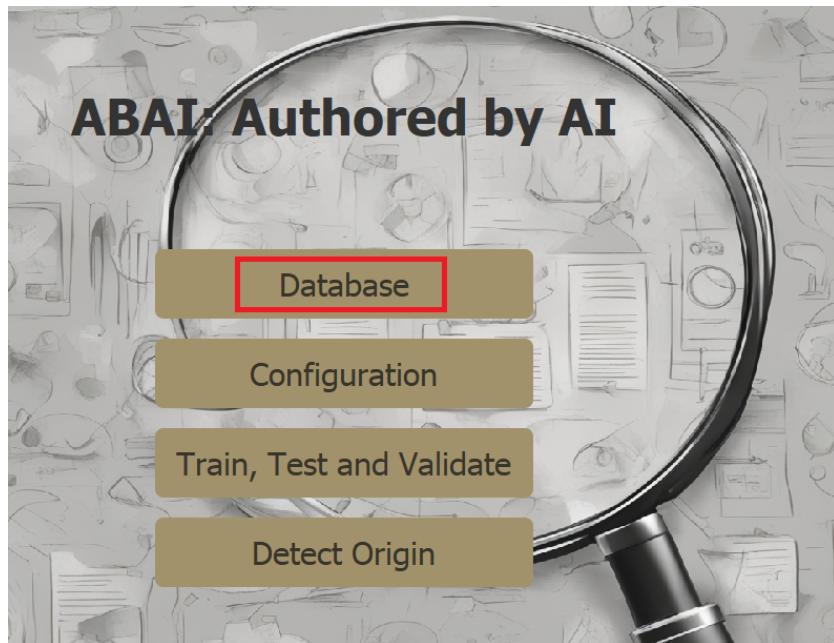


5. Navigate back to the [Database](#) sub-window and click on the Update database from local texts button to include the freshly added local texts in the database.

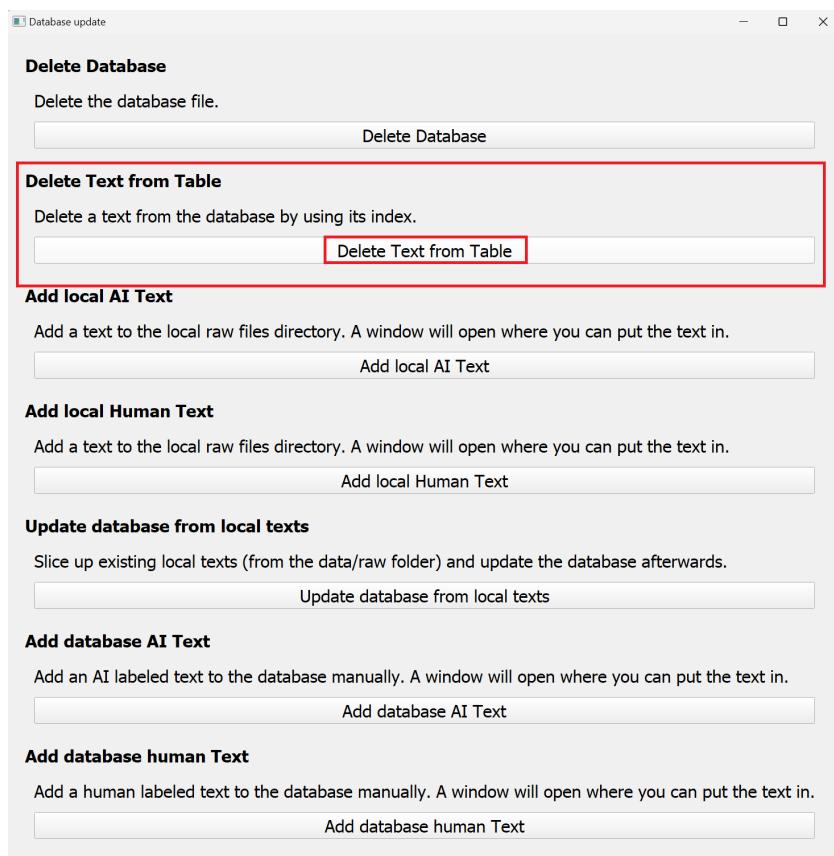


3.3.3 How to use the local application to delete texts from the dataset?

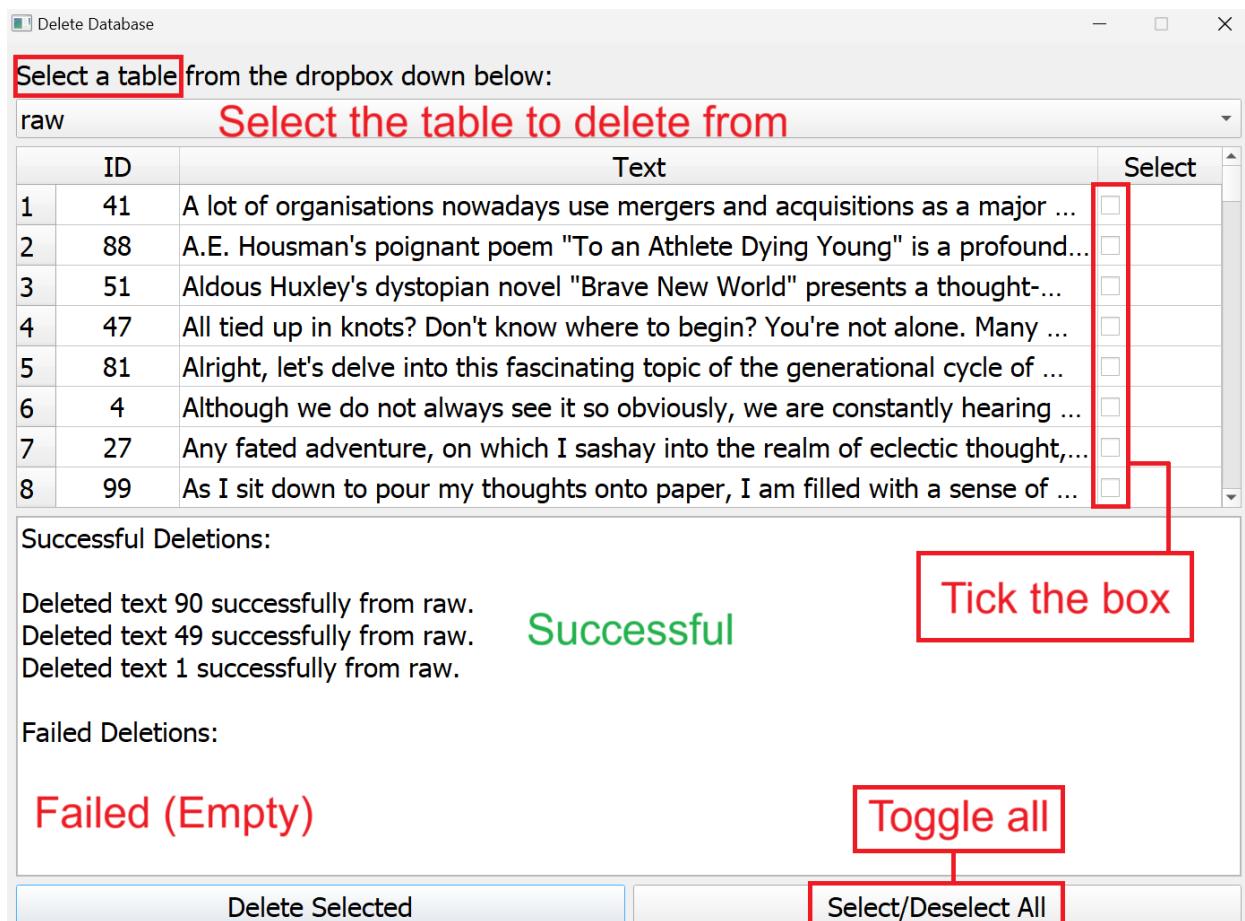
1. Open the [web-based](#) version of the application or launch the [local](#) application using the appropriate method from the [installation](#) steps.
2. Navigate from the main menu to the [Database](#) sub-window.



3. On the database sub-window select the button Delete Text from Table.

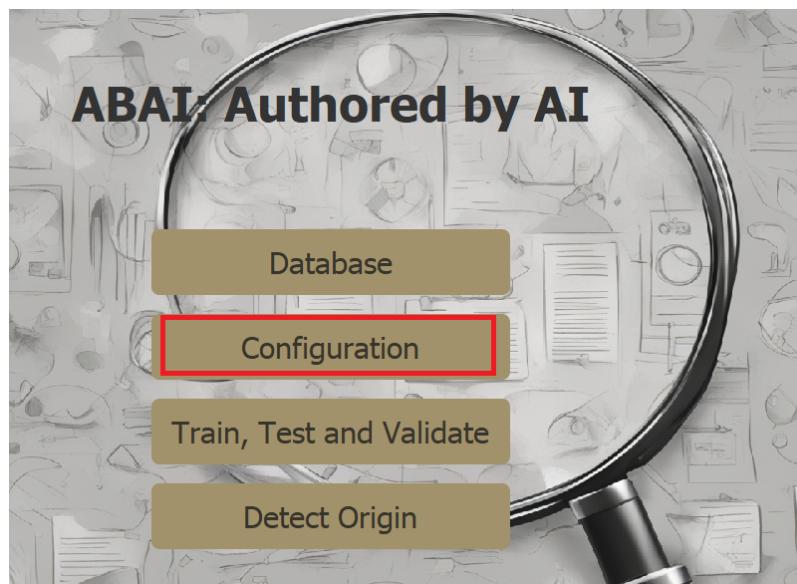


4. On the newly opened deletion window, select the text to delete from the preview list by ticking the corresponding box and then click on the Delete Selected button to confirm. Deletion will output the result under the preview panel.

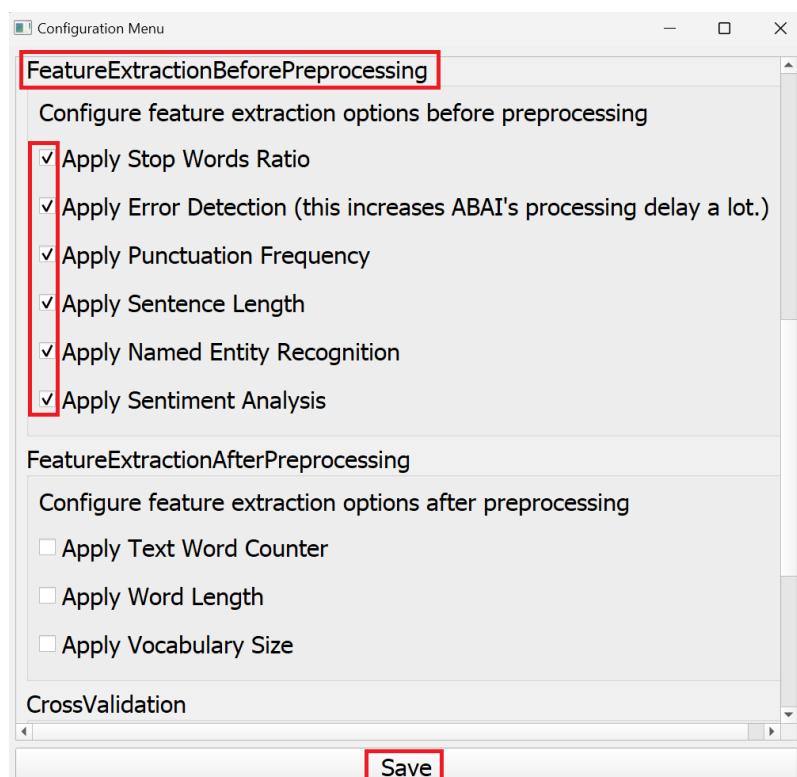


3.3.4 How to use the local application to train, test and validate models with a new configuration?

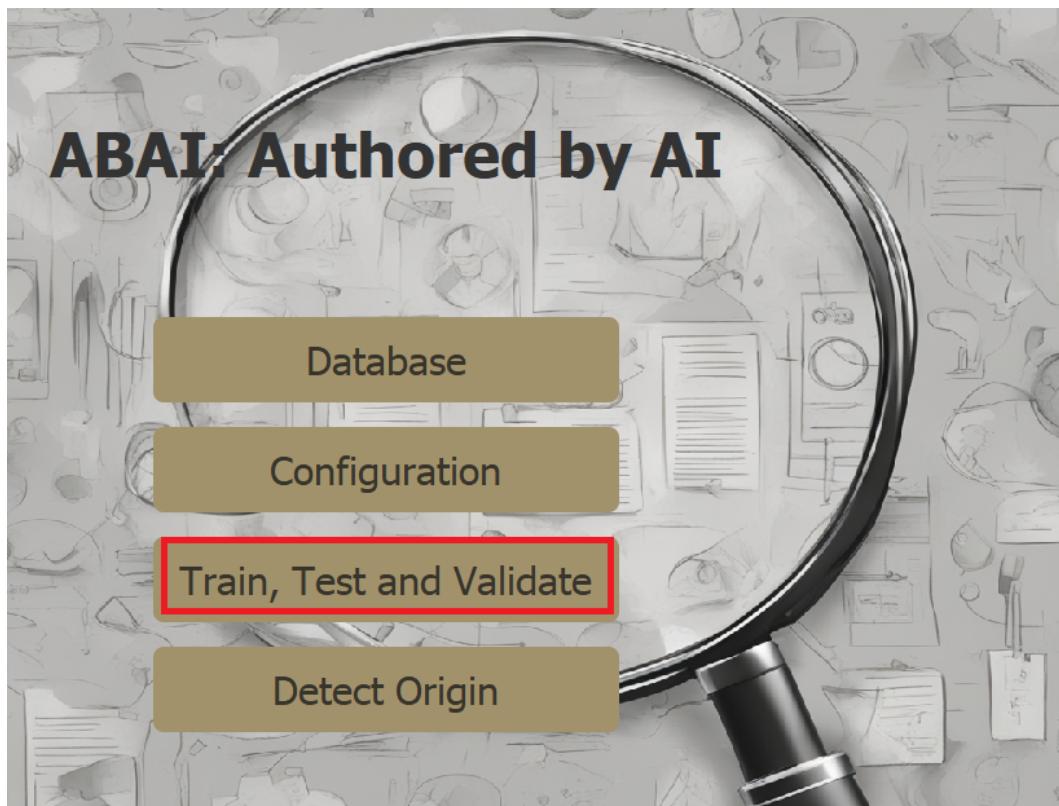
1. Open the [web-based](#) version of the application or launch the [local](#) application using the appropriate method from the [installation](#) steps.
2. If you have the desired configuration, you can skip to step 4, else navigate to the Configuration sub-window.



3. On the Configuration sub-window select the options (brief explanation [here](#)) you want. To illustrate this example, let's say we only want to keep all features extracted before pre-processing.



4. Navigate from the main menu to the [Train, Test and Validate](#) sub-window.



5. On the Train, Test and Validate sub-window select the action you want to perform. For this how-to, select Train, validate and test from the dropdown list.

Train, validate and test the selected model(s)

Training and validation will be based on the settings from the config.ini file.

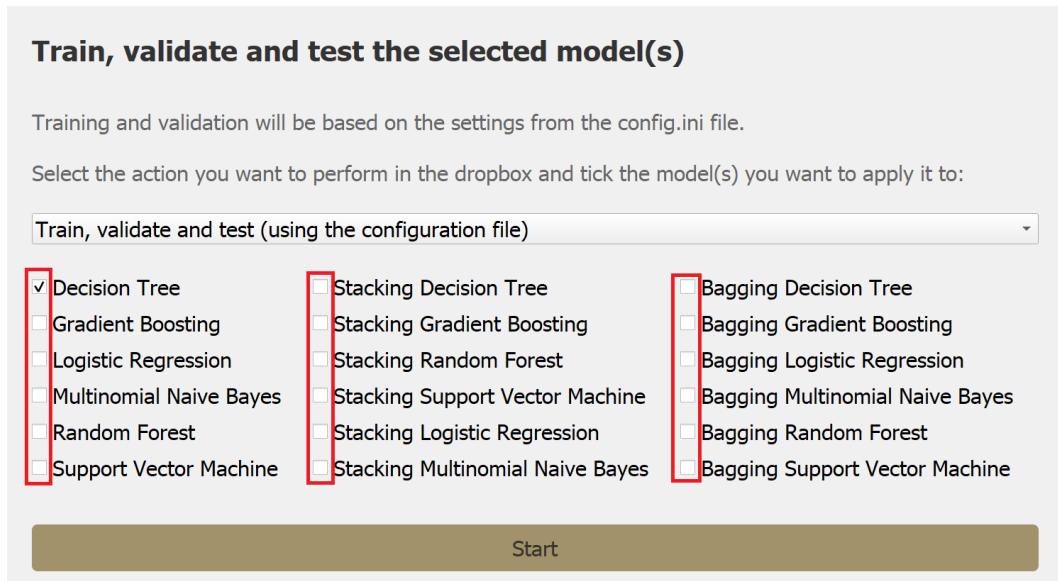
Select the action you want to perform in the dropdown and tick the model(s) you want to apply it to:

- Train (using the configuration file)
- Learning curve (using the configuration file)
- Grid search (using the configuration file)
- Validate (loading existing model)
- Test (loading existing model)
- Train, validate and test (using the configuration file)**

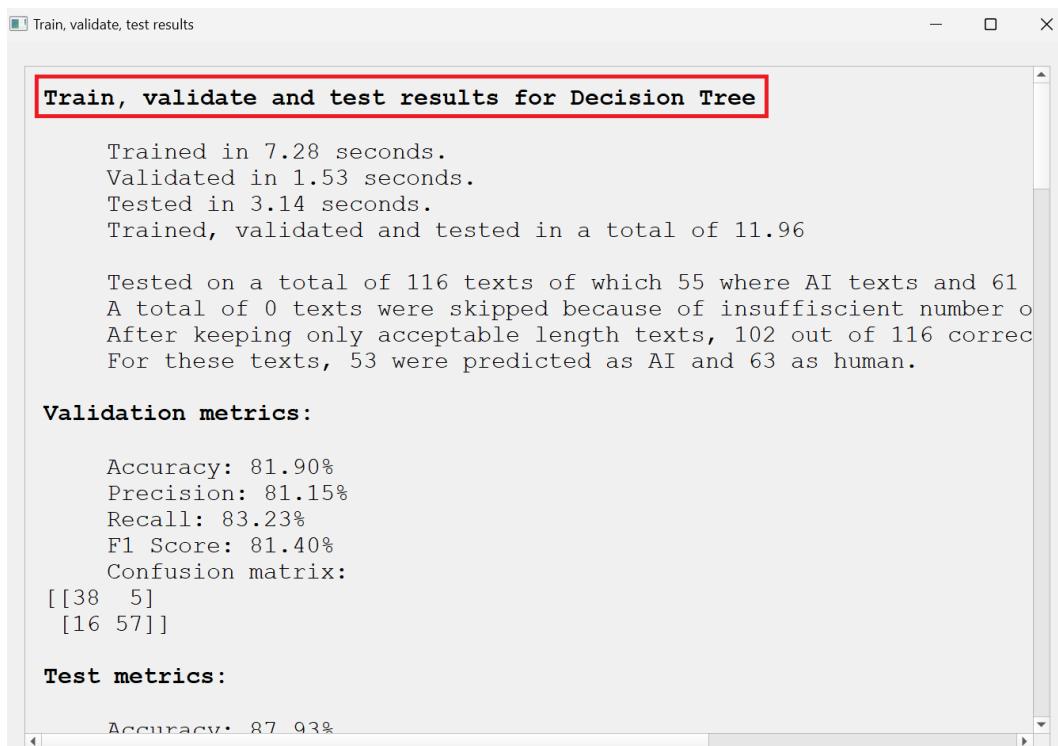
Random Forest Stacking Logistic Regression Bagging Random Forest
 Support Vector Machine Stacking Multinomial Naive Bayes Bagging Support Vector Machine

Start

6. On the same window, select the model(s) to perform the action on, by ticking the corresponding box and then click on the Start button to confirm.



7. Please wait patiently for the action to finish, the window may look stuck for a while depending on the complexity of the action. When ready, a new window will open to display the results.



4 Help

4.1 Troubleshooting

4.1.1 Pip is not recognized as internal/external command

Error Message: This error occurs when pip is not in your PATH environment variable. You can try the following instructions to solve this problem:

1. If you are running Linux, try using pip3 instead of pip.
2. Add pip to your PATH environment variable by following this [tutorial](#).
3. Reinstall Python and pip.

4.1.2 WSL not supported

The error message indicates that your Windows machine is not able to run WSL. This could be caused by a **disabled Windows feature** called “Virtual Machine Platform”. WSL depends on it. And in turn, Docker Desktop depends on WSL.

For more information on WSL and **virtualisation** on windows, please check out the following guides :

1. [Windows Subsystem for Linux](#)
2. [Windows 11 Virtualisation](#)
3. [Windows 10 Hyper-V](#)

4.2 FAQ

4.2.1 I have unintentionally deleted the database, what do I do now?

You can regenerate the database at all times from the local .TXT files that are shipped with the program or that you have saved yourself. To do this, check out the [Database](#) sub-window.

4.2.2 Is it possible to perform actions on all models at once?

Yes, you are always able to select a single or **multiple** models **simultaneously** to perform actions on them. This is especially interesting if you decide to change around settings in the configuration file and want to train, validate or test models in **bulk**.

4.2.3 I have used every option from the configuration menu. Is it supposed to be this slow?

During feature extraction before pre-processing, if error detection is enabled as feature, the computation will be slowed down significantly because of multiple API calls to the [LanguageTool API](#).

4.2.4 The Python GUI window is stuck and doesn't respond to input. What can I do ?

If this happened while performing a complex and resource intensive task and you estimate having waited for long enough, try shrinking the task into smaller and easier sub-tasks to check if it's a performance issue.

If the issue persists and you remember how to replicate the issue, you could also [contact](#) me with the details and I'll look into it. Furthermore, you can open an issue ticket on the [GitHub](#) page of the ABAI project. Every feedback is welcome !

5 About

5.1 License

5.1.1 Can I redistribute the application ?

Yes, you can redistribute the application even under another license, but you must be cautious about how you handle the GPL3-licensed Python module. The GPL3 license requires that any derivative work or modifications made to the GPL3-licensed module must also be licensed under the GPL3 or a compatible license. Therefore, if your modifications are to the GPL3-licensed module itself, those modifications must also be released under the GPL3 license.

5.1.2 Can I modify the application?

Yes, you can modify the application, but again, you need to consider the implications of the GPL3 license for the module. If your modifications are limited to the MIT-licensed parts of the application and do not involve modifications to the GPL3-licensed module, then you are free to modify the MIT-licensed portions as you see fit. However, if your modifications extend to the GPL3-licensed module, those modifications must comply with the GPL3 license terms, including the requirement to release the modified code under the GPL3 or a compatible license.

5.2 Contact

If you have any questions or requests, feel free to send me an email at the following address: Kevin.schweitzer@student.unamur.be