[Version 3.21]
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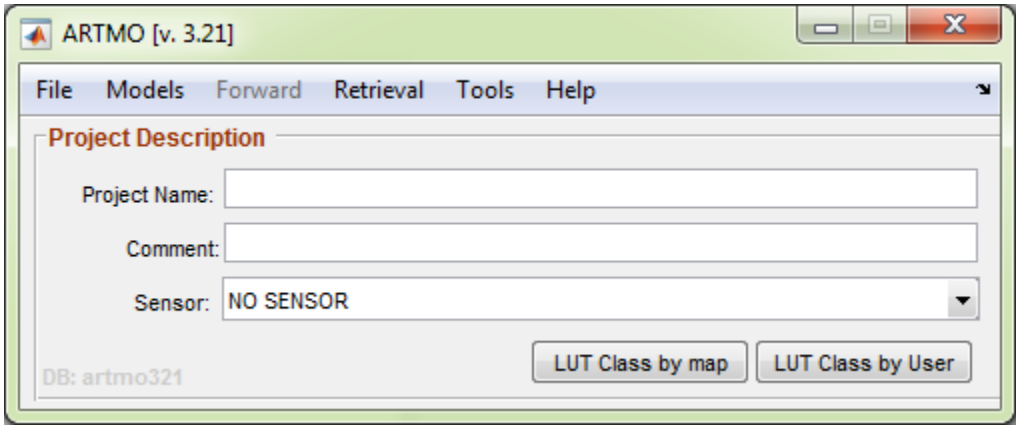
ARTMO v. 3.21



[ARTMO v. 3.21 Installation Guide]

The **Automated Radiative Transfer Models Operator (ARTMO)** GUI software package provides a seamless link between inputs and outputs required for running radiative transfer models. This document provides the **Installation Guide.**

1 Revision History

Version	Date	Revision Description	Authors
3.0	26/10/2013	First public release of ARTMO v3.00 and its documentation including this Installation guide.	J. Verrelst & J.P. Rivera
3.10	13/01/82015	Update of the Manual and Installation Guide.	J. Verrelst & J.P. Rivera
3.19	06/06/2016	Update of the Manual and Installation Guide.	J. Verrelst & J.P. Rivera
3.21	01/02/2017	Update of the Manual and Installation Guide.	J. Verrelst & J.P. Rivera

2 Instructions

2.1 Software requirements

The ARTMO package is a GUI toolbox that facilitates the running of radiative transfer models and post-processing tools. ARTMO is to be installed locally on a Windows™ environment. Make sure to have reading and writing permissions enabled. The software package runs in Matlab™ 7.12 (R2011a) or higher and is connected with a MySQL™ server (**5.5 or 5.6, but not 5.7**) that needs to be locally installed. MySQL server 5.7 is currently not compatible with ARTMO.

We aimed to develop ARTMO without additional Matlab toolboxes. However, for some functionalities it appeared that a command of a Matlab toolbox was used. We are aware of the necessity of the following Matlab toolboxes for some options (mostly for the MLRA toolbox): '**Image Processing Toolbox**', '**Machine Learning Toolbox**', '**Neural Networks**' and the '**Parallel Computing Toolbox**'.

2.1.1 Installation MySQL

ARTMO stores its simulations and results into a locally installed MySQL database. MySQL Community Edition is freely downloadable. The MySQL community server can be downloaded from http://dev.mysql.com/downloads/mysql/. Follow the instructions of the MSI Installer. Essentially you only need to install a MySQL server. It will ask for a **password — make sure to remember it (!)**, as ARTMO needs the password for connecting with the database. By default, a password of '**123456'** is assigned, but any password can be created. It is recommended to provide your own unique password.

It also may be an issue that all privileges are granted, e.g., writing data, modifying tables. This is by default the case if you are the administrator of your PC. Consult the http://mysql.com/ website for instructions on how to modify privileges.

2.1.2 Getting started

Matlab 7.12 (R2011a) or higher is required to run ARTMO. The program may also run on earlier versions of Matlab, but there might be problems with Java handling.

The following steps are required to run ARTMO:

1. In the folder browser of Matlab's desktop, the path of the folder ARTMO package (where the main script '**atmo.p**' is stored) has to be assigned as the current directory, preferably somewhere in the **C directory**, e.g.: 'C:\ARTMO'.
2. Type '**ARTMO'** in the command window.

- ARTMO will start by first checking the connection with MySQL. The password ‘123456’ is assumed, but in case another password was provided to MySQL, the following window will appear:

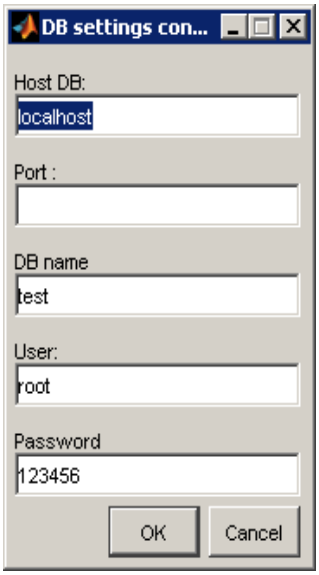


Figure 2-1: MySQL setting window where the new password can be entered.

In ‘Password’ the MySQL password can be provided. By clicking on ‘OK’ the new password is stored.

The first time ARTMO is launched, it will connect with the '**test**' database, available by default. However, it is recommended that a new database be created, which can be done within ARTMO. During the startup, ARTMO will check the MySQL connections for the availability of models and modules and will then open ARTMO.

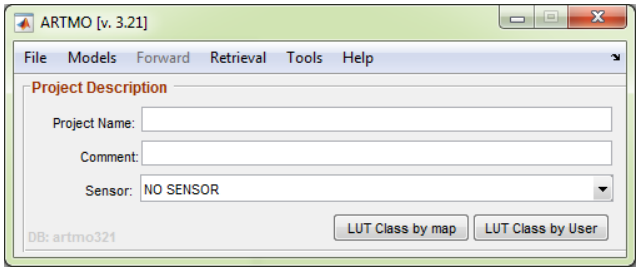


Figure 2-2: ARTMO's main window.

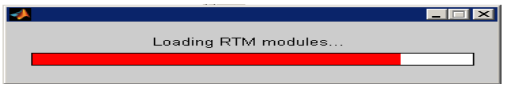


Figure 2-3: Process bar during startup.

2.2 License

From v. 3.21 an ARTMO license has been introduced. This license allows that anybody can use ARTMO, including companies for commercial activities. At the same time, the license file will check whether users are registered in order to avoid uncontrollable copying. The user will be invited to request for a license file during start up. It can be chosen not apply a license file but then the mapping (retrieval) options will be disabled.

2.2.1 Requesting a license file

When starting up for the first time, you will be invited to request for a license file (Figure 2-4). In that window you are requested to give your email address and the purpose of using ARTMO.

- The **email address should be the same as the one used to register on the webpage**. That will be checked against the database of users.
- The purpose of using ARTMO can be either **Academic**, **Scientific** or **Commercial**. This label will determine the number of images that can be processed that is assigned to the license.

For academic or scientific purposes a number 200 images will be given to process. For commercial users only a number of 50 images will be given, which should be enough to become familiar with the software. When running out of images then the mapping (retrieval) option will be disabled. The idea is that commercial partners can then purchase options to process more imagens.

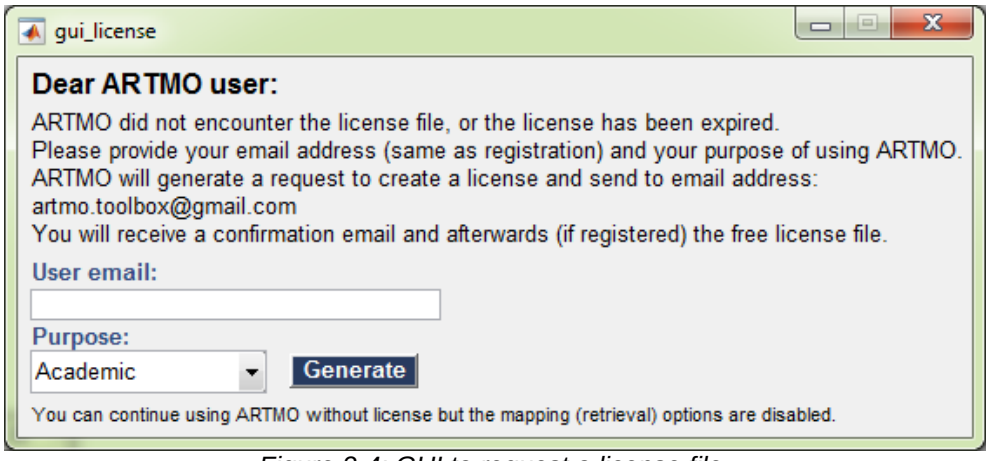


Figure 2-4: GUI to request a license file.

Once having email and purpose given, by clicking on '**Generate**' then an email will be sent to the ARTMO team. **The request will then be validated and the license will be sent back to the user email address.** By following the instructions given by email, the user has then to load the license file into ARTMO: **Help→ Info License→ License→ Load**

2.3 Starting up

Once the password and database are configured, these settings are saved and will be recalled in the future. **For first-time use it may be wise to create a new database**, *e.g. artmo and the version number*. This is done as follows:

File→ DB Administration→ New DB

A small window will appear (Figure 2-5) where a new DB can be created and named:

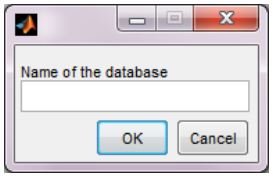


Figure 2-5: GUI to name a new database.

It is recommended **to create a new DB each time when downloading an upgraded ARTMO version**. This because it may be that the new version requires new fields in the DB. When creating a new DB the tables will be prepared according to the latest version.

Next, **in order to avoid errors related to unauthorized writing permissions** of temporally dummy files when using the retrieval toolboxes, it is recommended **to create a new folder where you writing permissions, e.g. in 'Documents'. For instance create the folder 'ARTMO'.**

In case the follow error occurs: "Can't create/write to file 'C:" then create the folder in the **D disk**.

Afterwards, in Matlab an environment variable has to be assigned to that path. This has to be done before opening ARTMO in the Matlab Command Window: >>

setenv('ARTMODATA', *'path_created_folder'*)

Following, when reopening ARTMO, point to that folder in the Settings folder:

File→ Settings

The following window will appear (Figure 2-6):

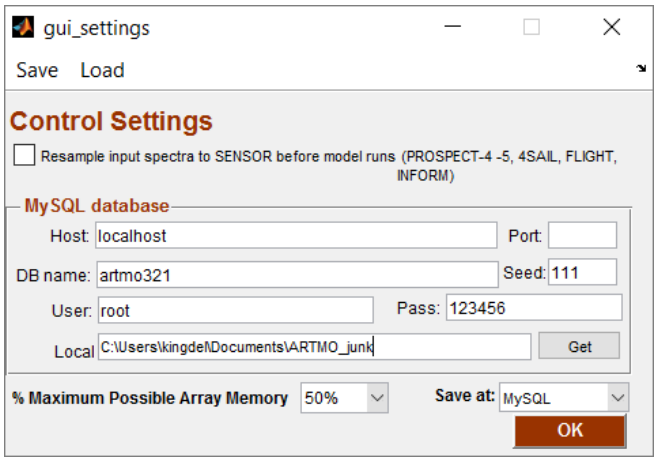


Figure 2-6. Settings menu where in 'Local' you can point to the newly created writable folder.

In 'Local' then point to that newly created empty folder. You could copy and paste the path, or by clicking to 'Get' and then select the right folder. In this way, temporary files will be stored in that folder.

ARTMO is now ready for use. In subsequent uses the newly created database will be recalled automatically as a default. Instructions about the usage of ARTMO are documented in its **Manual**.

2.4 Dealing with Java/MySQL memory problems

Using a large LUT to test different retrieval strategies may cause Java memory problems. Typically, a too large amount of data is requested to be processed by Matlab or in combination with MySQL. It may lead to the following error messages (Figure 2-7):

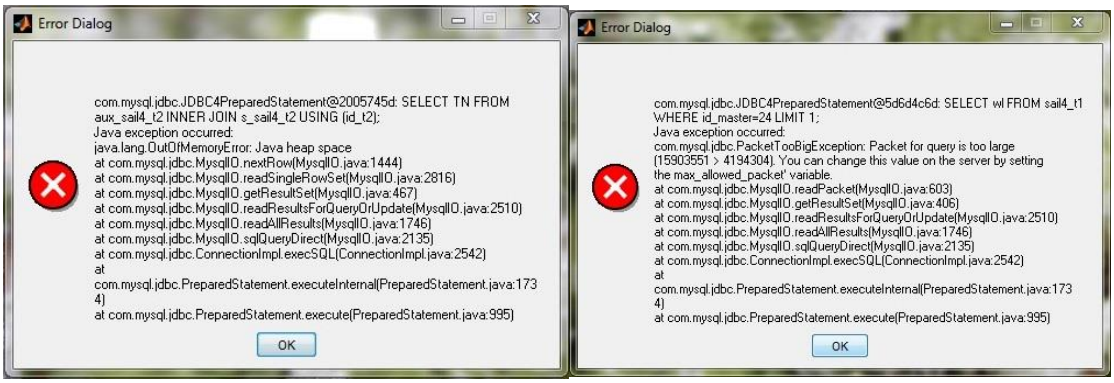


Figure 2-7. Error messages with warnings of insufficient memory.

To overcome these memory problems, you may:

1. **Increase the Java heap size in MATLAB: Preferences→ General→ Java Heap Memory.**

2. **set a higher value for the "max_allowed_packet" variable in MySQL, and/or**

To change the value of the "max_allowed_packet" variable on Windows you can edit the „my.ini" file using Notepad. To find the my.ini file on your computer right click on the MySQL Command Line Client shortcut and select Properties. In the field Target you can see something like: "C:\Program Files\MySQL\MySQL Server 5.6\bin\mysql.exe" "--defaults-file=C:\ProgramData\MySQL\MySQL Server 5.6\my.ini" "-uroot" "-p".

In case you do not find the my.in file in that folder, you should have a look in:

"**C:\ProgramData\MySQL\MySQL Server 5.x**"

Open the "my.ini" file in text editor (**open text editor as administrator**) and find the line `max_allowed_packet`. Then, set the value as appropriate for you (for example type „1024M", which is 1024 megabites). This will make the change permanent (it will not change back to its default value after restarting the MySQL server). Once have the ini file saved **you will have to restart your computer**. For more details see this site: http://stackoverflow.com/questions/8062496/how-to-change-max-allowed-packet-size

2.5 Disabling MySQL secured-file-priv option

Another source of error that may occur at various places within ARTMO is the following:

> **The MySQL server is running with the --secure-file-priv option so it cannot execute this statement**

To solve this problem, you have to open the "my.ini" file as administrator in a text editor. There you have to search the **secure-file-priv** option and disabling it by adding an empty string:

> **secure-file-priv = ""**

Note that simply commenting (#) that option may not work - better adding an empty string. You have to save and then you have **to restart your computer**. For more info, see also: http://stackoverflow.com/questions/32737478/how-should-i-tackle-secure-file-priv-in-mysql