

ADVANCED MACHINE LEARNING CLASSIFIER

1.0

Comprehensive Handbook

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Advanced machine learning classifier 1.0

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by

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CHAPTER

1

INTRODUCTION

Welcome to Advanced Machine Learning Classifier 1.0! We are delighted to introduce you to this sophisticated image classification application. This comprehensive handbook has been meticulously crafted to provide you with a seamless and insightful guide on the usage of our cutting-edge classifier. Should you have any queries or require further assistance, please do not hesitate to reach out.

Thank you for choosing our product; we trust it will meet and exceed your expectations.

1.1. KEY FEATURES

- Load and analyze images (jpg, jpeg, png)
- Extract features using Convolutional Neural Networks
- Multiple Machine Learning Algorithms (AdaBoost, Decision Trees, Gradient Boosting, Naïve Bayes, Random Forest, and Support Vector Machine)
- SVM Kernel Options
- Boosted Algorithms with Bagging
- Train-Test Split Customization

- Identify the Misclassified images along with their corresponding file names (image name)
- Predict a new set of images with the last processed algorithm
- Visualize results with interactive confusion matrices
- Detailed Classification Reports
- Refresh and Reset Options

1.2. SYSTEM REQUIREMENTS

For basic classification purposes, we recommend utilizing any Windows-based system. To ensure optimal performance, we suggest a minimum of 16 Gigabytes of RAM. Additionally, for enhanced processing capabilities, it is highly recommended to consider systems equipped with an Intel i5 or i7 processor or later model.

In scenarios involving the processing of substantial amounts of data, we advise opting for systems with a higher memory capacity, preferably a minimum of 32 or 64 Gigabytes of RAM. This will significantly enhance the efficiency and speed of data processing, ensuring a seamless experience with large datasets.

Your attention to these hardware specifications will undoubtedly contribute to a smoother and more productive computing environment.

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INSTALLATION

For a smooth installation process, we kindly request you to follow the provided instructions diligently. Your attention to detail during this phase will greatly contribute to the successful setup of our application.

Thank you for your cooperation, and we appreciate your commitment to ensuring a seamless installation experience.

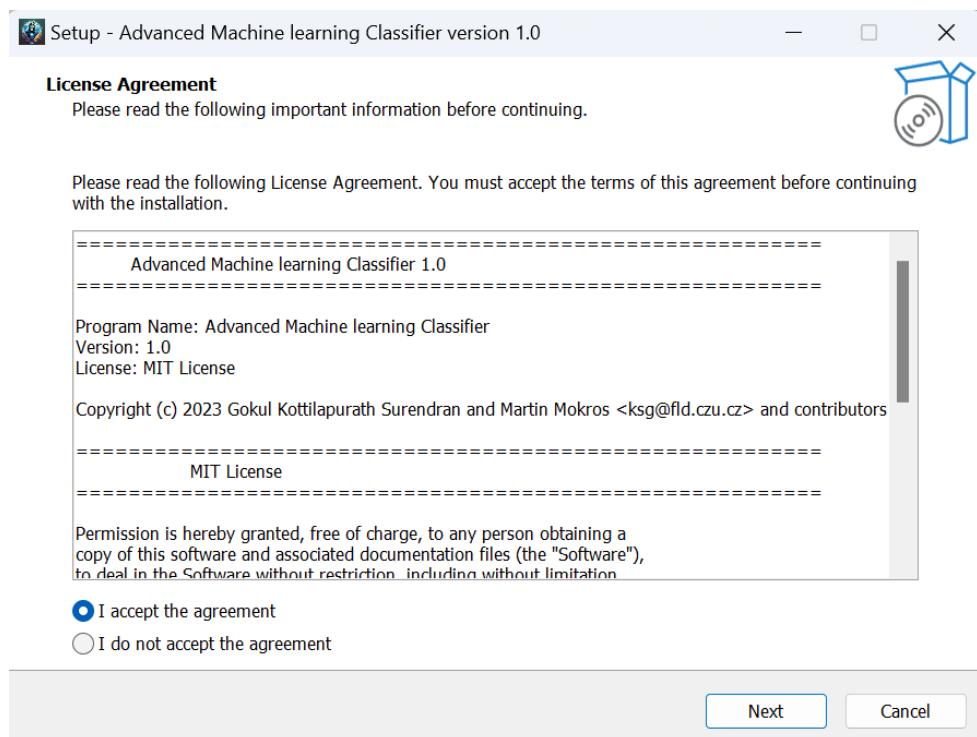
2.1. DOWNLOADING THE INSTALLER

Visit the official website or repository to download the Advanced Machine Learning Classifier installer.

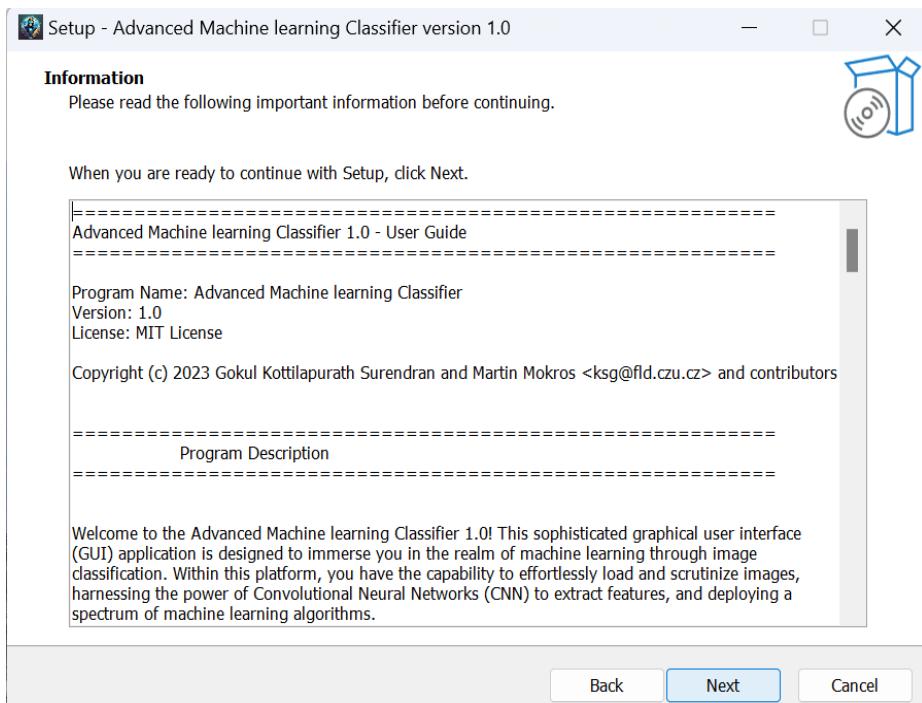
<https://github.com/Gokultcr>

2.2. INSTALLATION PROCESS

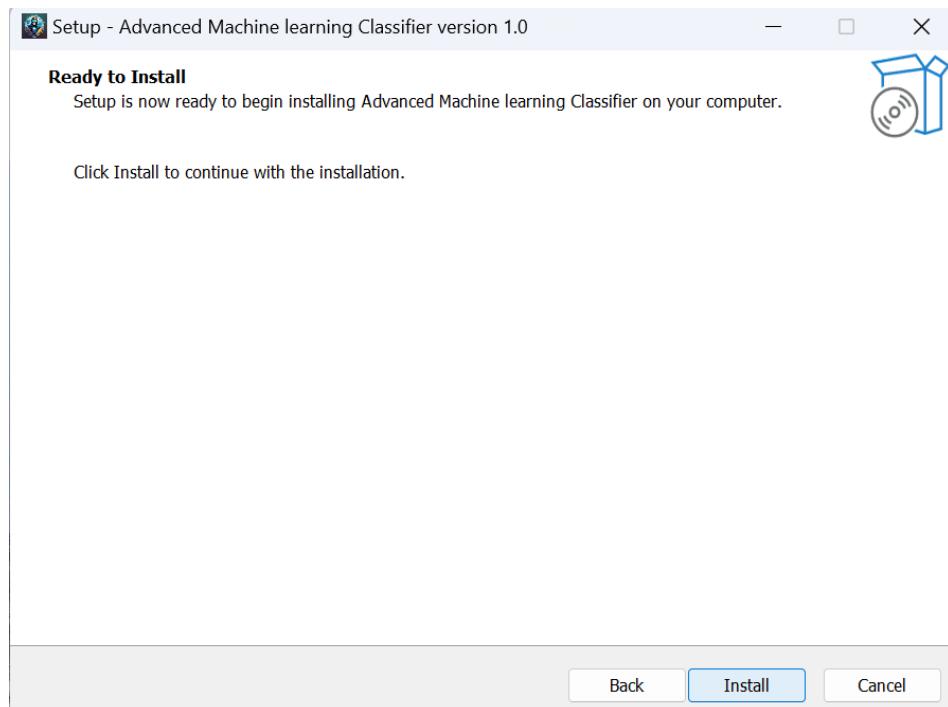
Run the installer and follow on-screen instructions for a seamless installation process.



Kindly proceed by selecting the 'I accept' option and then click on the 'Next' button



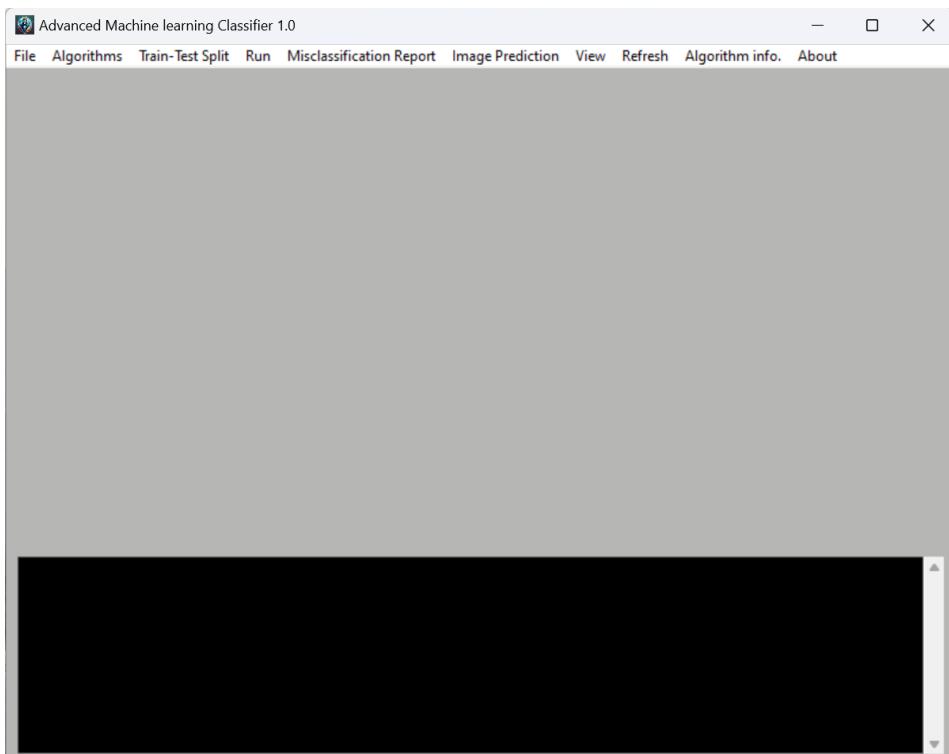
Please take a moment to review the fundamental operational details provided. Your attention to this basic working information is greatly appreciated.



Kindly proceed by clicking on the 'Install' option to initiate the application installation.

2.3. LAUNCHING THE PROGRAM

Upon successful installation, we kindly invite you to launch the program to commence your experience.



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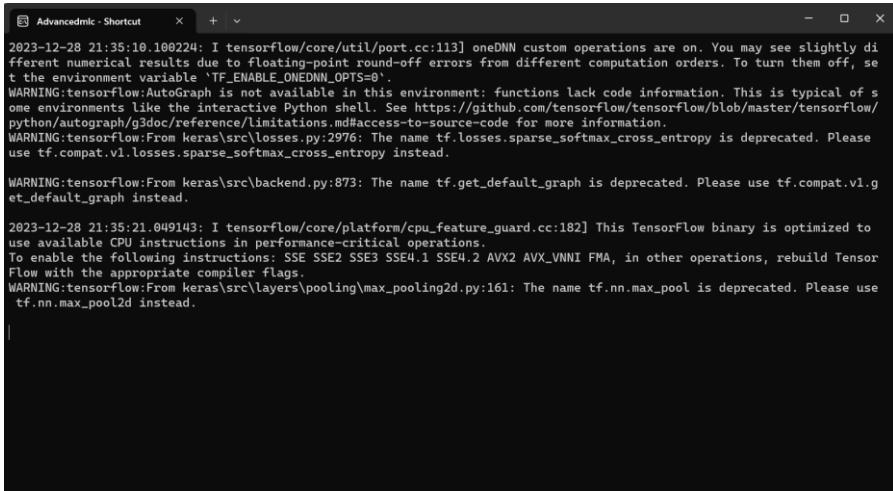
GETTING STARTED

3.1. RUNNING THE APPLICATION

While executing the application, you will observe the opening of both a console window and the main application interface. The console window is designed to display warning messages, loaded data names, and a preview of results. It serves as an initial indicator of the application's functionality. It's important to note that the comprehensive results and additional details will be displayed within the main application interface.

The inclusion of the console window is intended to provide transparency and assurance regarding the application's operational status. Your understanding of this process is sincerely appreciated.

Console Window:

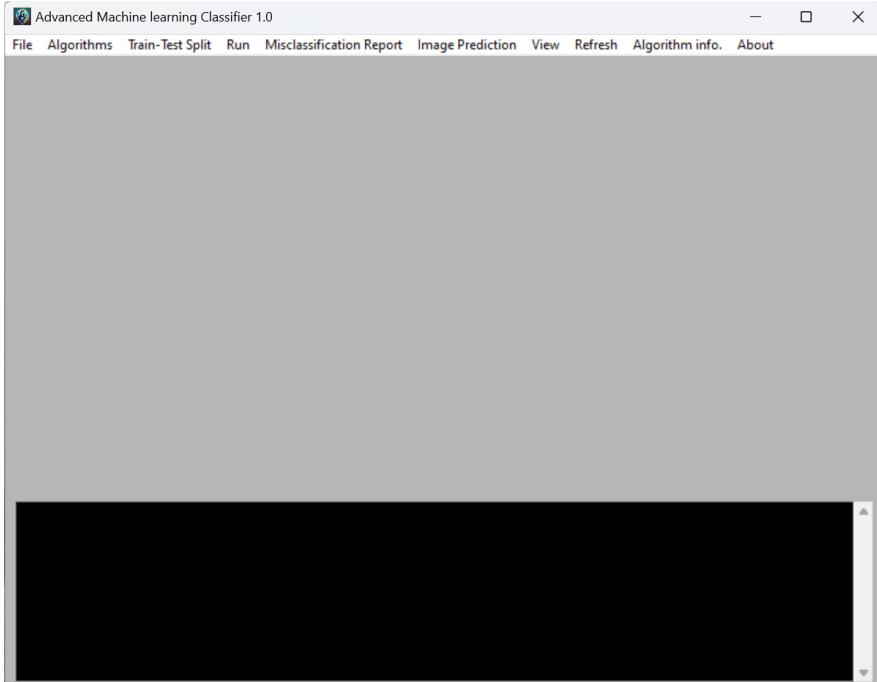


```
2023-12-28 21:35:10.100224: I tensorflow/core/util/port.cc:113] oneDNN custom operations are on. You may see slightly different numerical results due to floating-point round-off errors from different computation orders. To turn them off, set the environment variable 'TF_ENABLE_ONEDNN_OPTS=0'.
WARNING:tensorflow:AutoGraph is not available in this environment: functions lack code information. This is typical of some environments like the interactive Python shell. See https://github.com/tensorflow/blob/master/tensorflow/python/autograph/g3doc/reference/limitations.md#access-to-source-code for more information.
WARNING:tensorflow:From keras\src\losses.py:2976: The name tf.losses.sparse_softmax_cross_entropy is deprecated. Please use tf.compat.v1.losses.sparse_softmax_cross_entropy instead.

WARNING:tensorflow:From keras\src\backend.py:873: The name tf.get_default_graph is deprecated. Please use tf.compat.v1.get_default_graph instead.

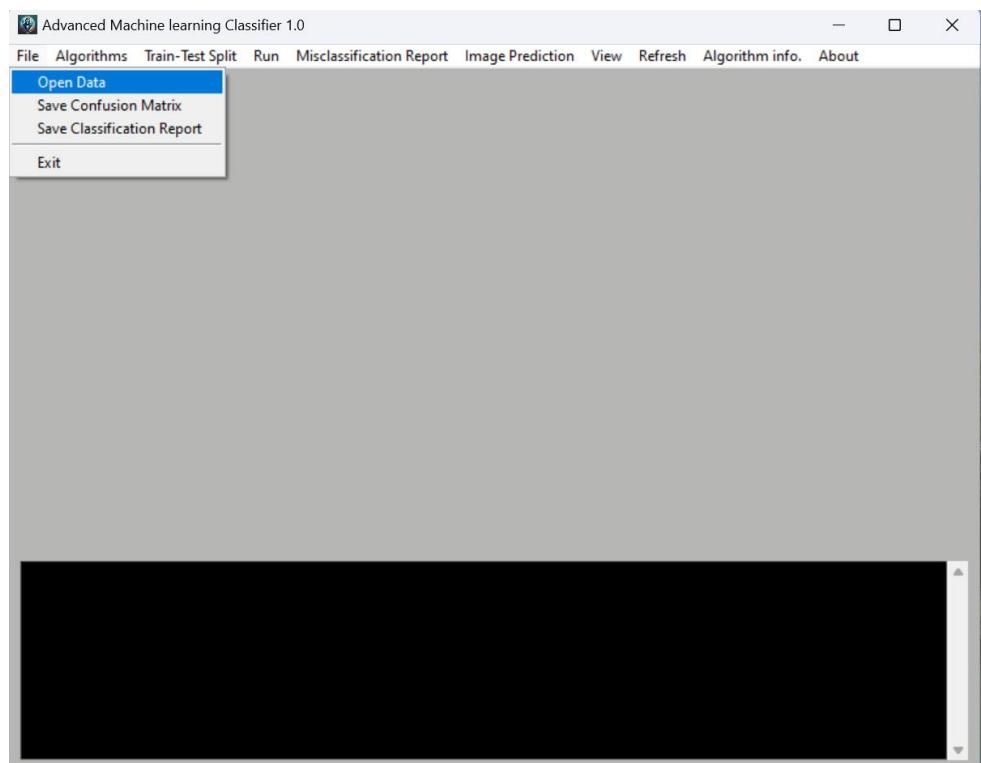
2023-12-28 21:35:21.009143: I tensorflow/core/platform/cpu_feature_guard.cc:182] This TensorFlow binary is optimized to use available CPU instructions in performance-critical operations.
To enable the following instructions: SSE SSE2 SSE3 SSE4.1 SSE4.2 AVX2 AVX_VNNI FMA, in other operations, rebuild TensorFlow with the appropriate compiler flags.
WARNING:tensorflow:From keras\src\layers\pooling\max_pooling2d.py:161: The name tf.nn.max_pool is deprecated. Please use tf.nn.max_pool2d instead.
```

Main application interface:

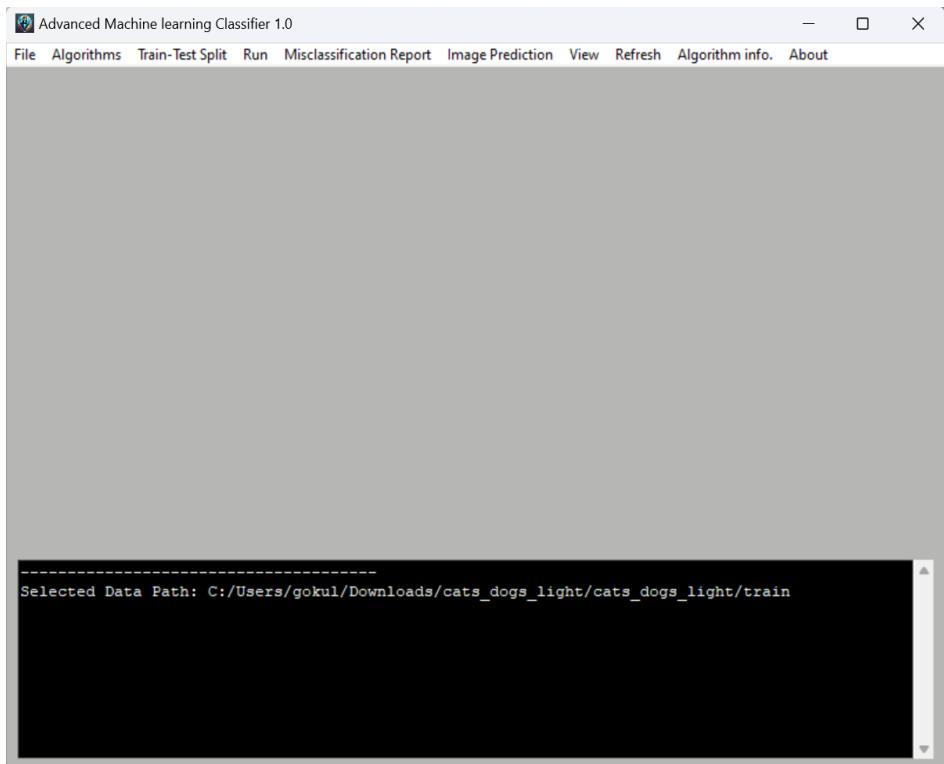


3.2. LOADING IMAGE DATA

Please navigate to the 'File' menu and select 'Open Data' to access the option for opening a folder containing image data.

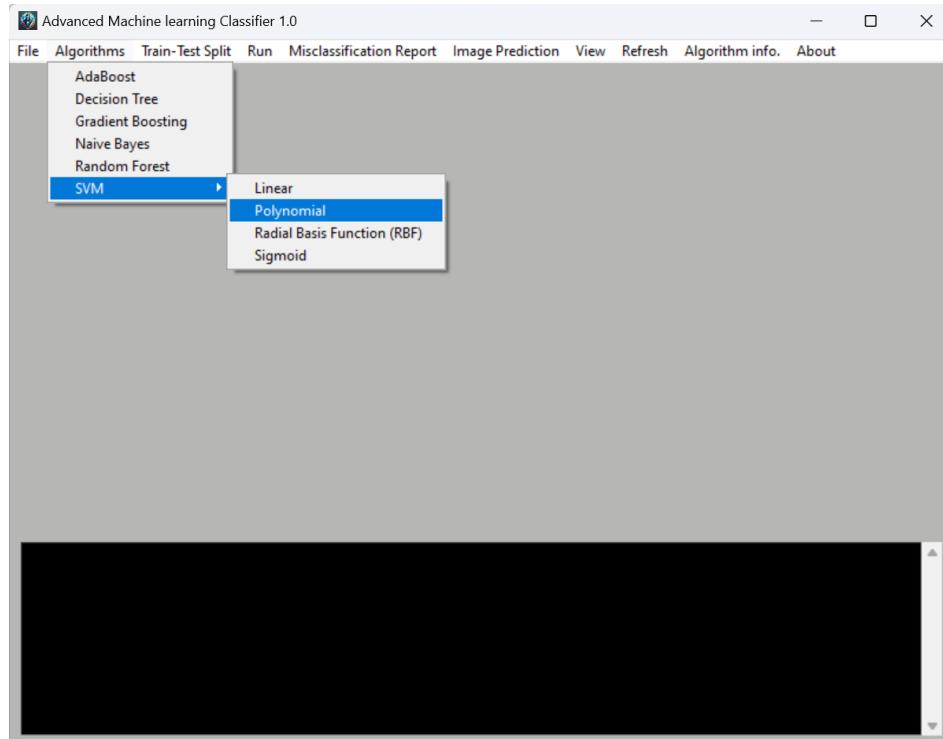


Upon selecting the datapath, you will find it displayed in the command prompt area within the main application.



3.3. CHOOSING AN ALGORITHM

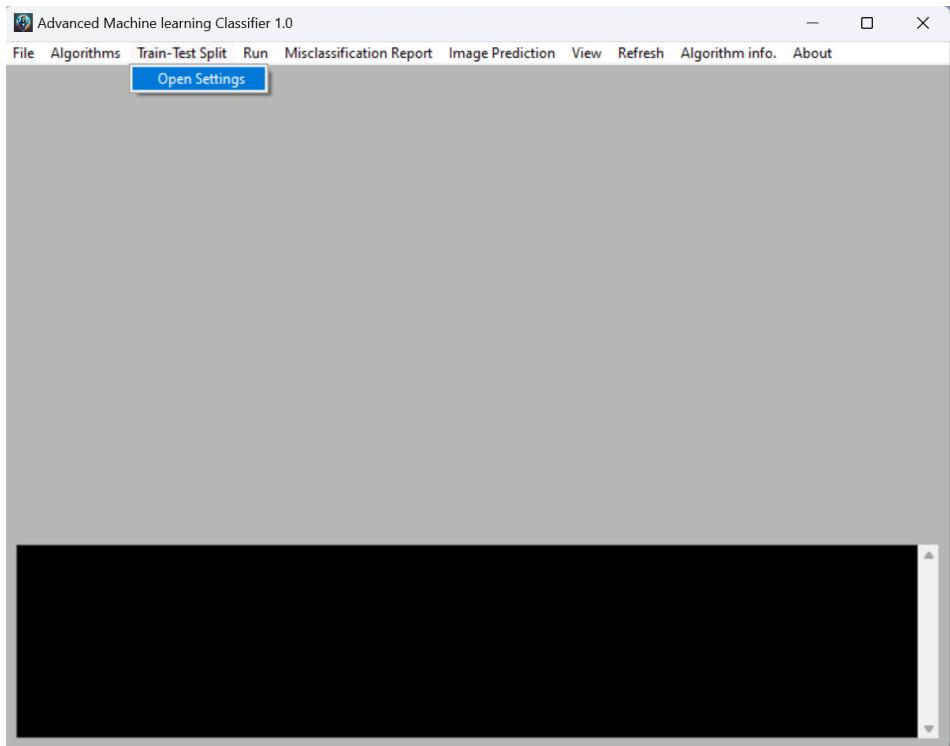
Kindly proceed by selecting an algorithm from the 'Algorithms' menu that aligns with your specific classification requirements.



We would like to bring to your attention that for Support Vector Machine (SVM), various kernel options have been made available.

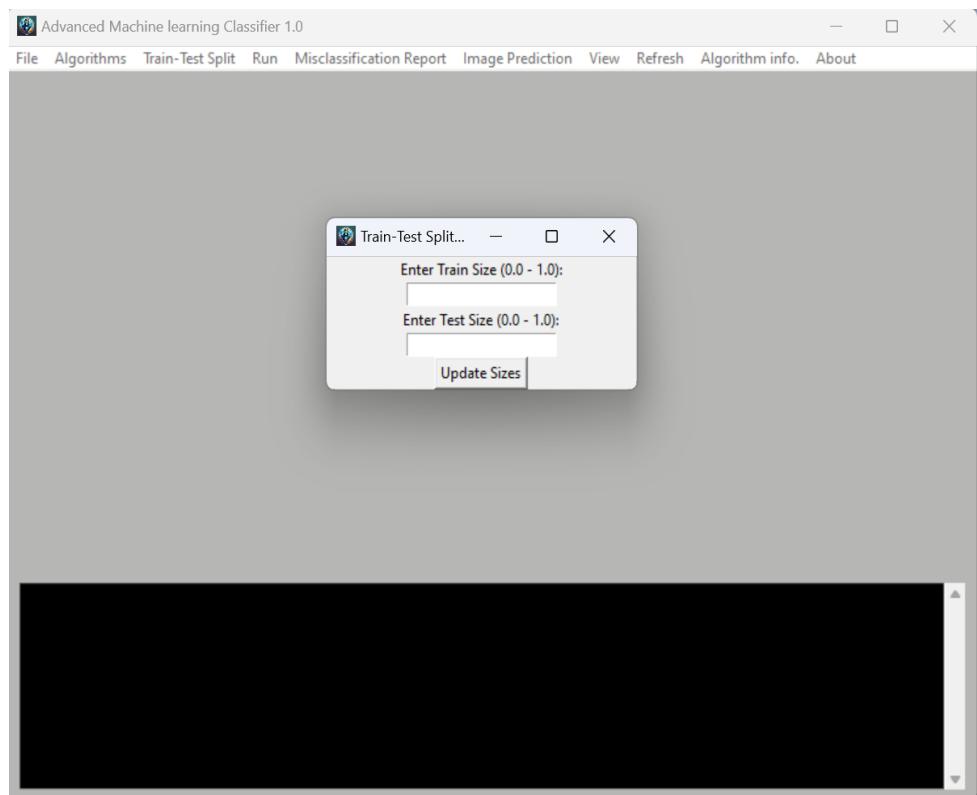
3.4. TRAIN-TEST SPLIT SETTINGS

Kindly consider adjusting the training and testing size percentages by navigating to the 'Train-Test Split' menu. However, it's worth noting that by default, the system is set to allocate 80% for training and 20% for testing.



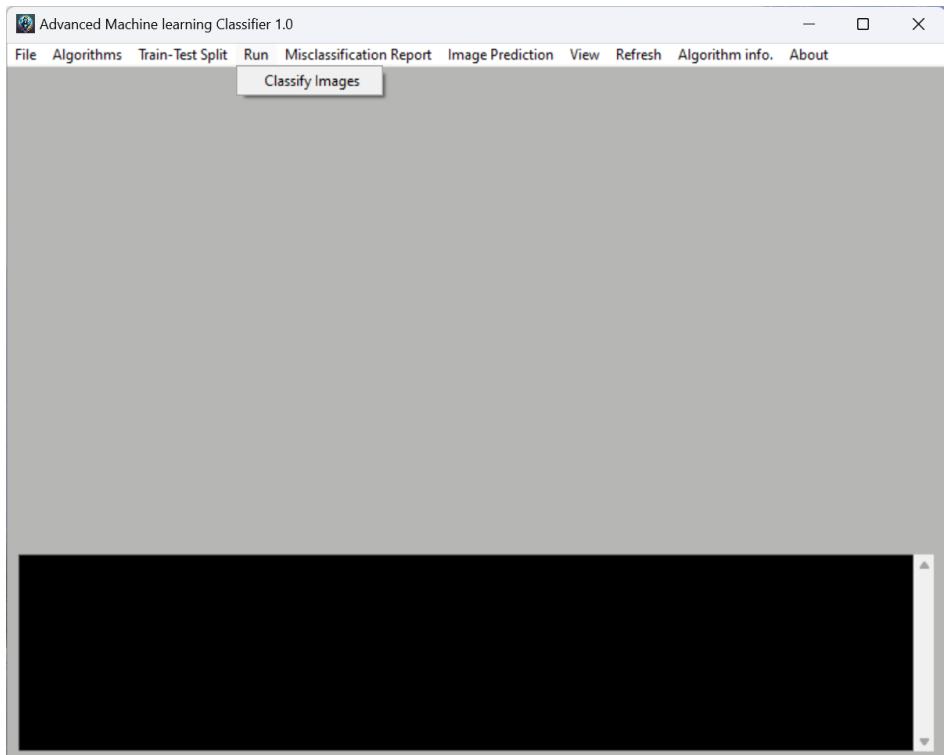
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Should you opt for a 70% split, kindly input 0.7, and for a 60% split, please input 0.6. It's important to note that the total sum of training and testing sizes must equate to 100% (1.0). In the event that the total size exceeds this limit, the system will automatically clear all inputted details. Your careful consideration of these parameters is genuinely appreciated.



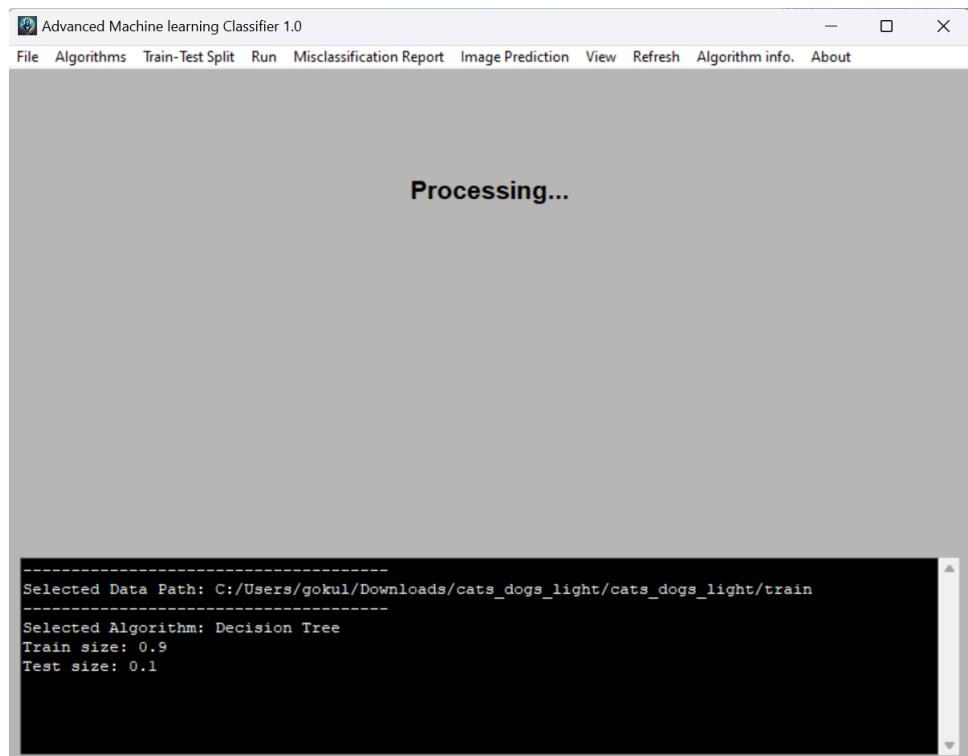
3.5. INITIATING THE CLASSIFICATION

Kindly proceed by clicking on the 'Run' menu, and then select 'Classify Images' to initiate the classification process.



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Upon initiation of the processing, the system will indicate 'Processing' to signify that the operation has commenced. Your patience during this phase is greatly appreciated.

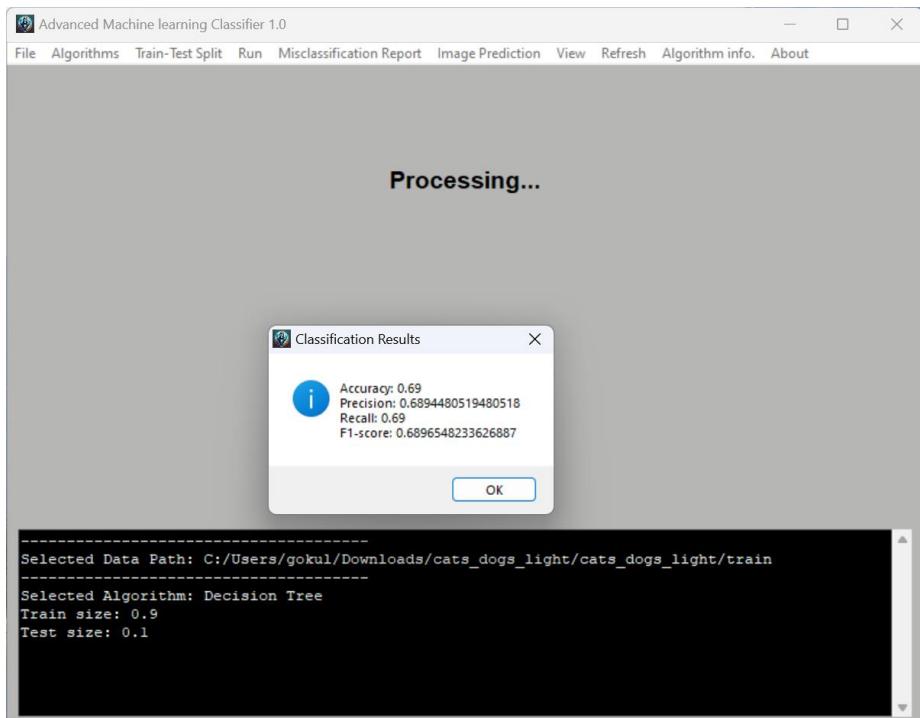


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RESULTS

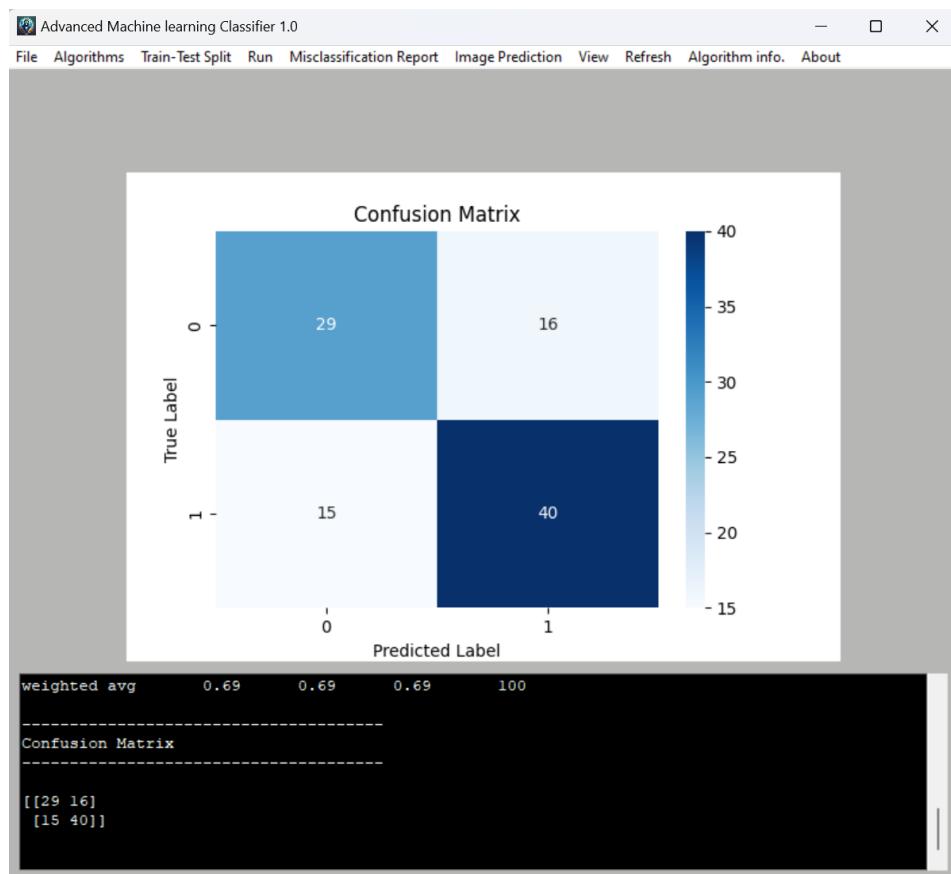
After the completion of processing, a popup will display the main accuracy scores. Kindly click 'OK' to finalize the process and access the results.



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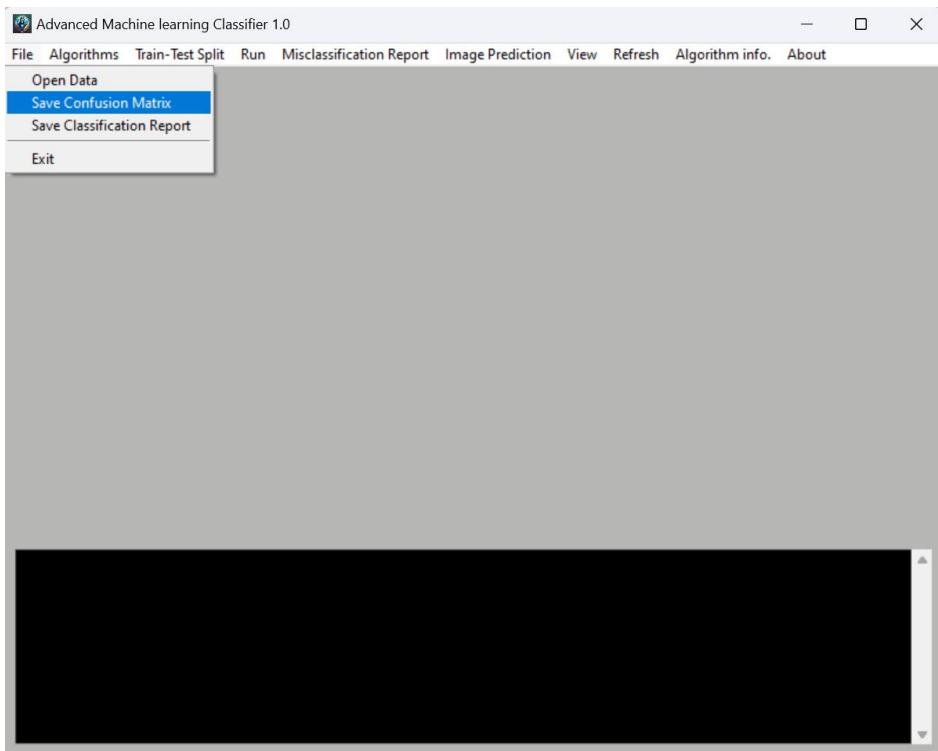
The confusion matrix will be presented in the main application window. Your attention to this crucial element is highly valued.

Additionally, the command prompt in the main application window will display essential information such as the selected data path, training-testing size, chosen algorithm, accuracy matrices, and the confusion matrix.

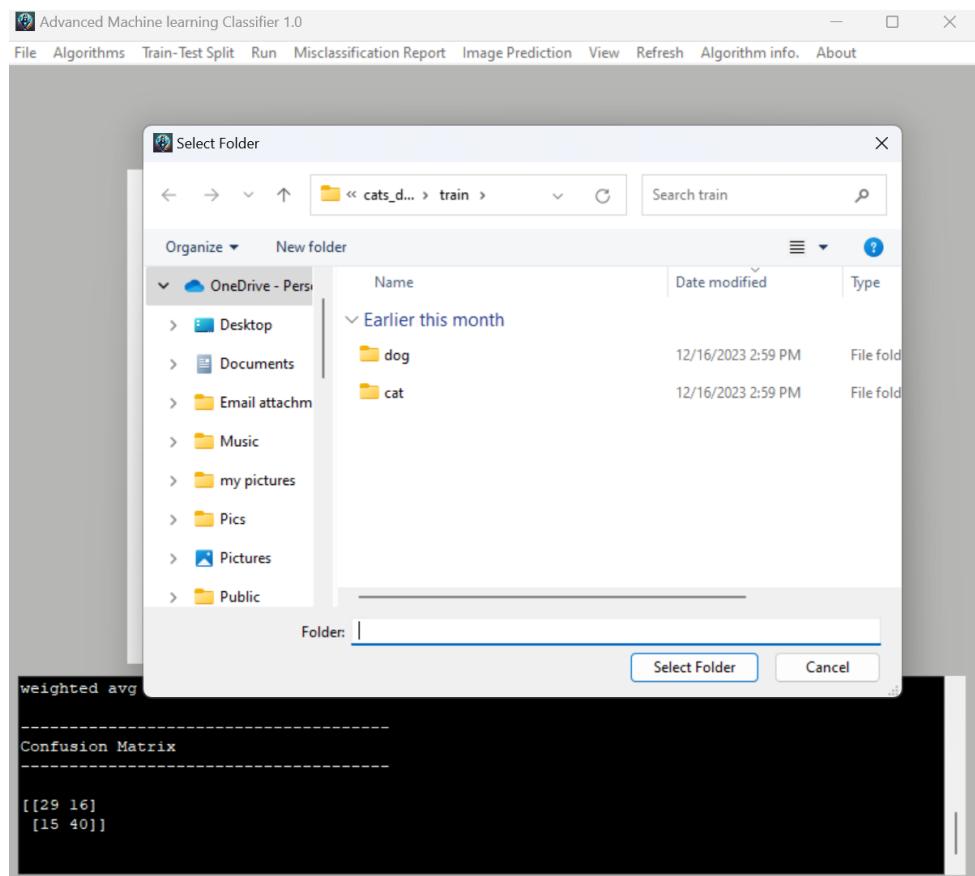


4.1. INITIATING THE CONFUSION MATRIX

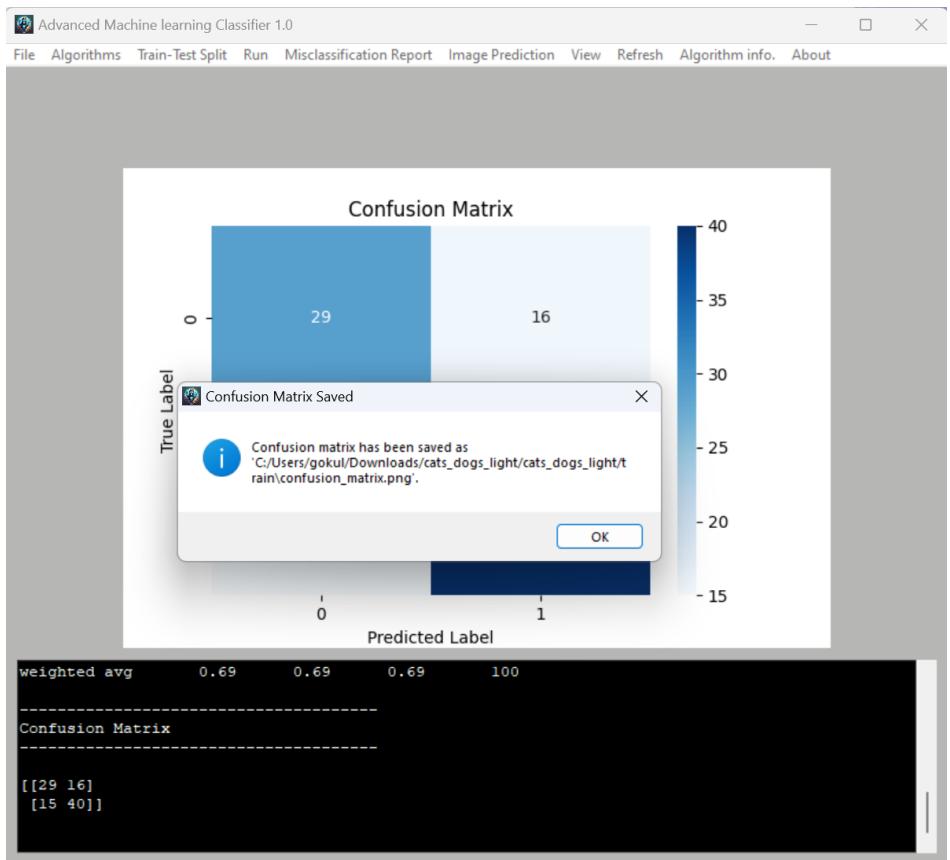
To save the confusion matrix as a PNG image, kindly navigate to the 'File' menu and select the 'Save Confusion Matrix' sub-menu. The system will prompt you to choose a folder for saving; please select the desired folder for the storage of the confusion matrix image.



Select the folder:

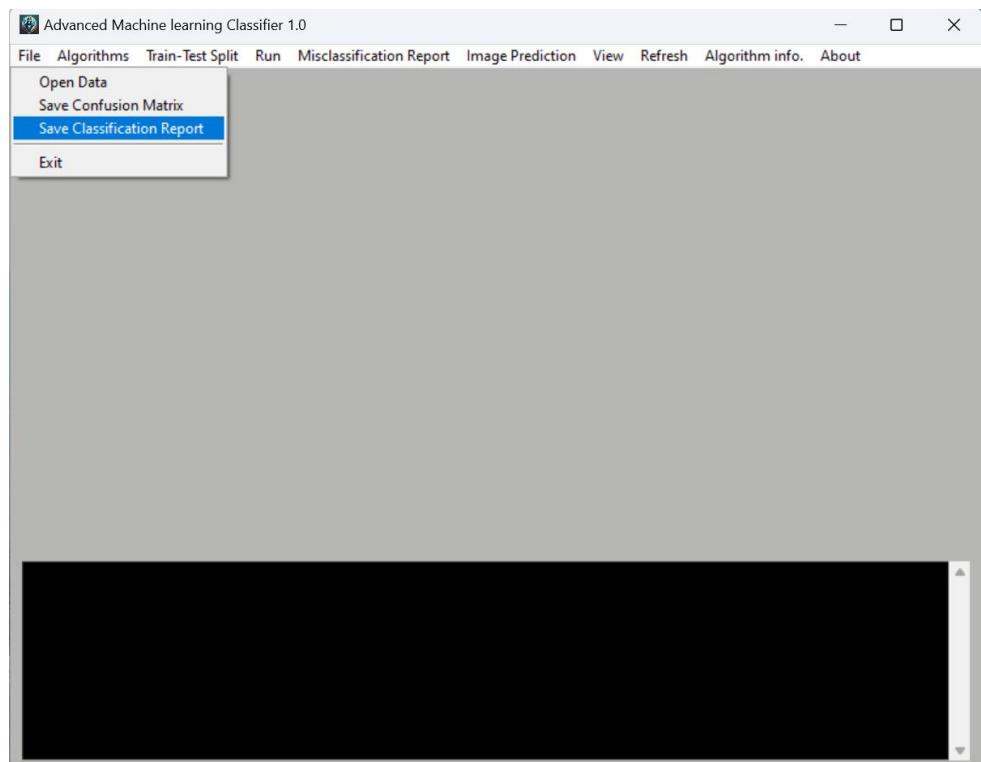


Click 'Ok' to finish the saving process.

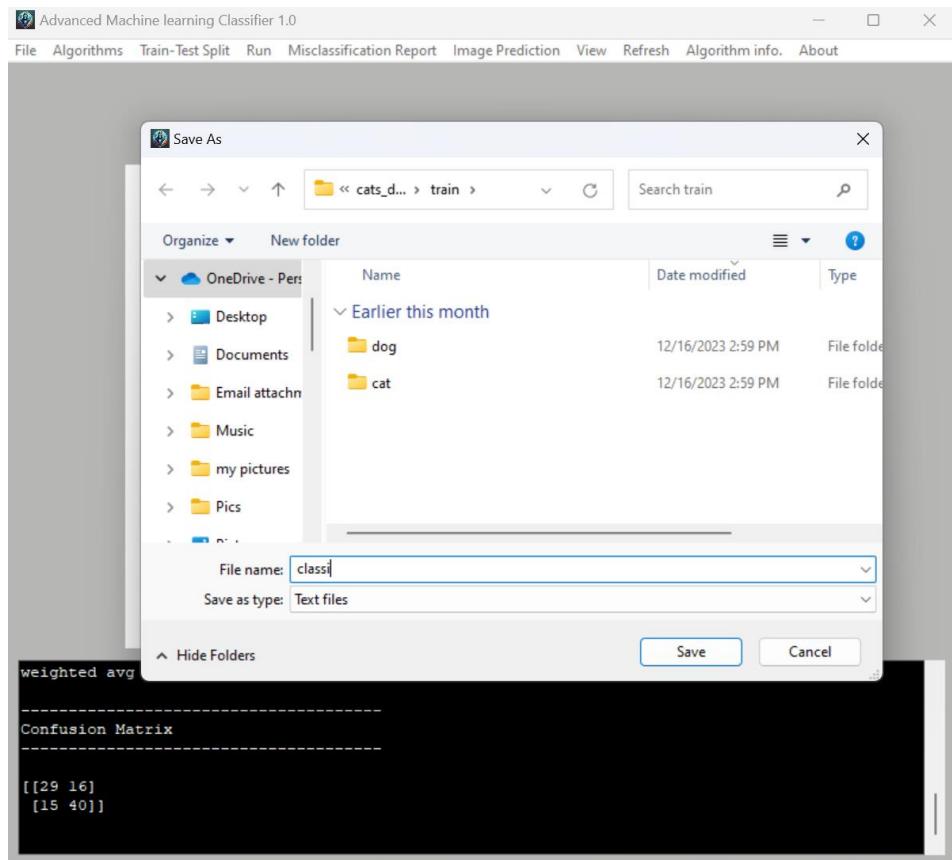


4.2. INITIATING THE CLASSIFICATION REPORT

To retain the detailed classification report as a TXT file for future reference, please navigate to the 'File' menu and select the sub-menu 'Save Classification Report.' You will be prompted to choose a location for saving, kindly select the desired folder, and provide a suitable file name.



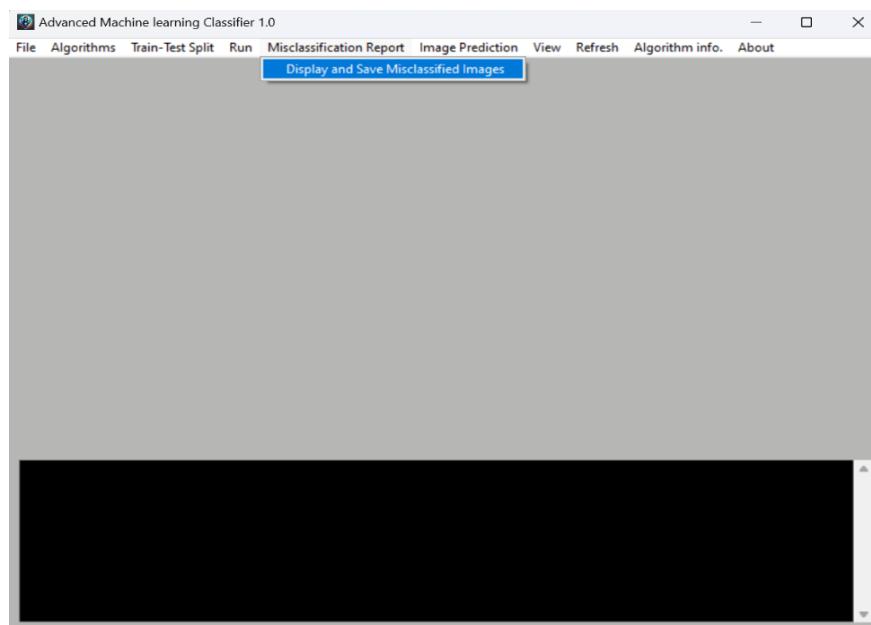
Provide the file name for Classification report:



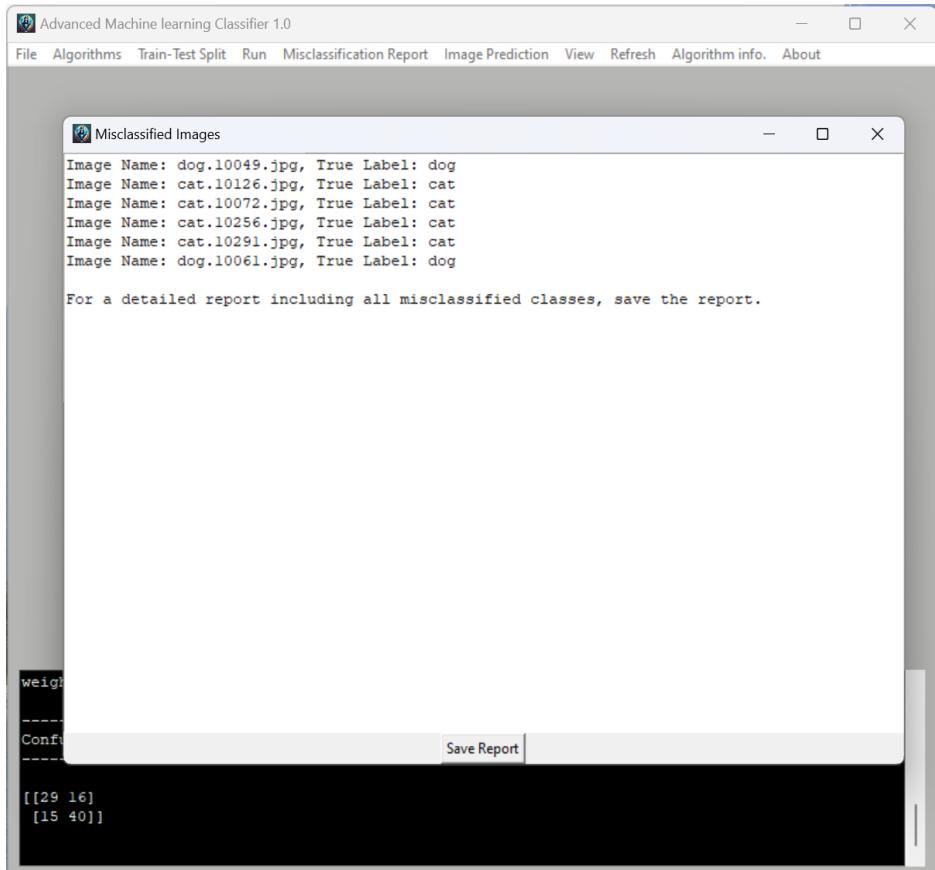


MISCLASSIFICATION REPORT

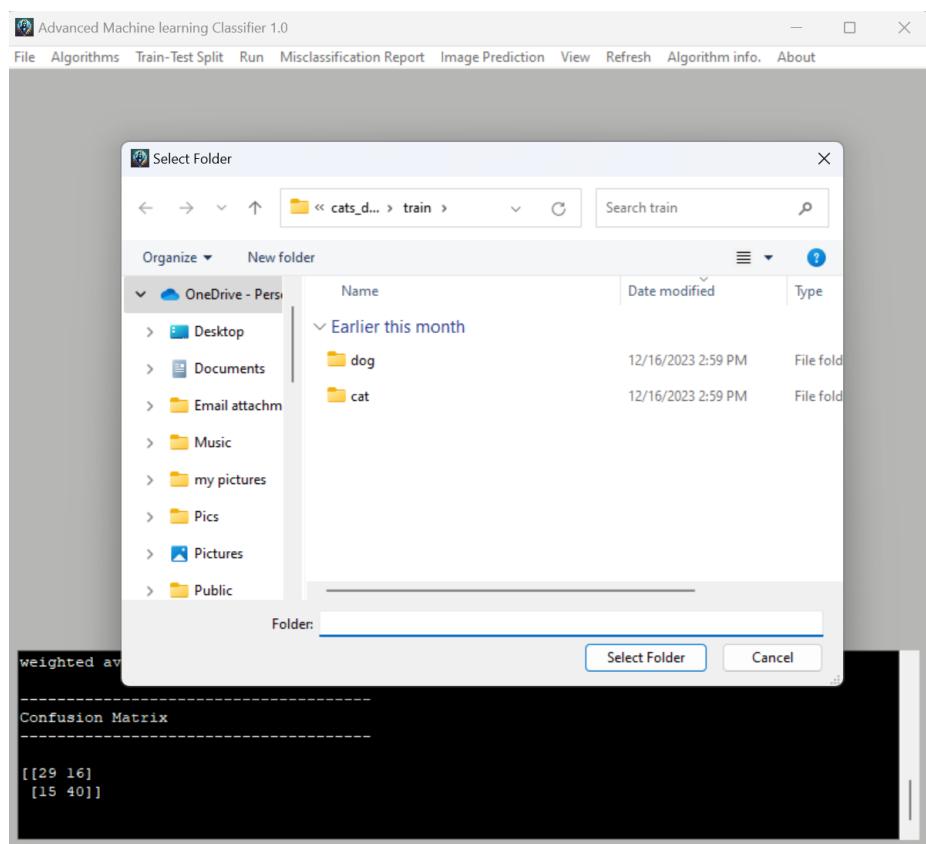
To access the details of misclassified images and generate a comprehensive report, which includes file names, original labels, predicted labels, and more, kindly click on the "Display and Save Misclassified Images" option in the menu. It is important to note that this feature is activated only after the completion of the initial training and testing processes.



The window will display only a limited set of details. For a more comprehensive report, please click on "Save Report" to save the information as an Excel file.



Please choose the preferred folder where you would like to save the report.

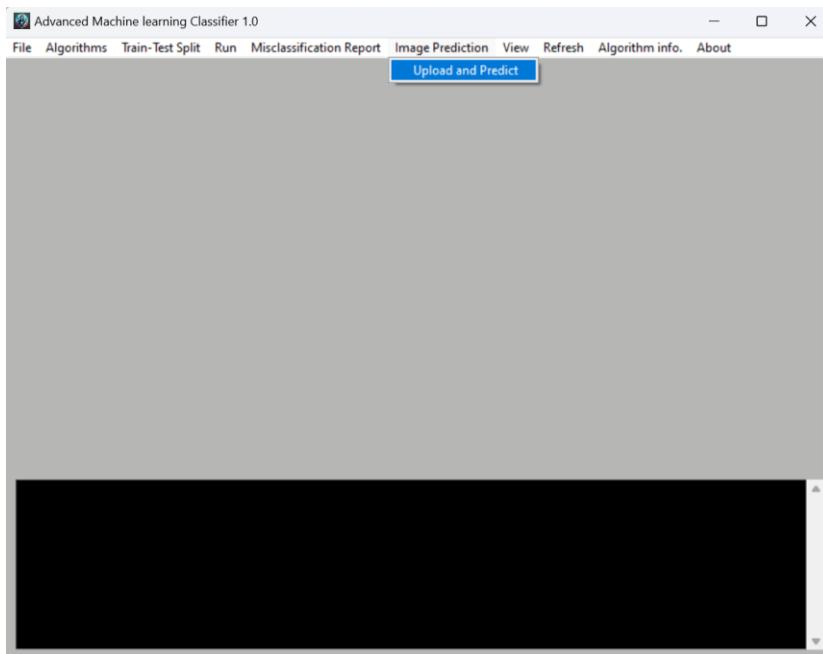


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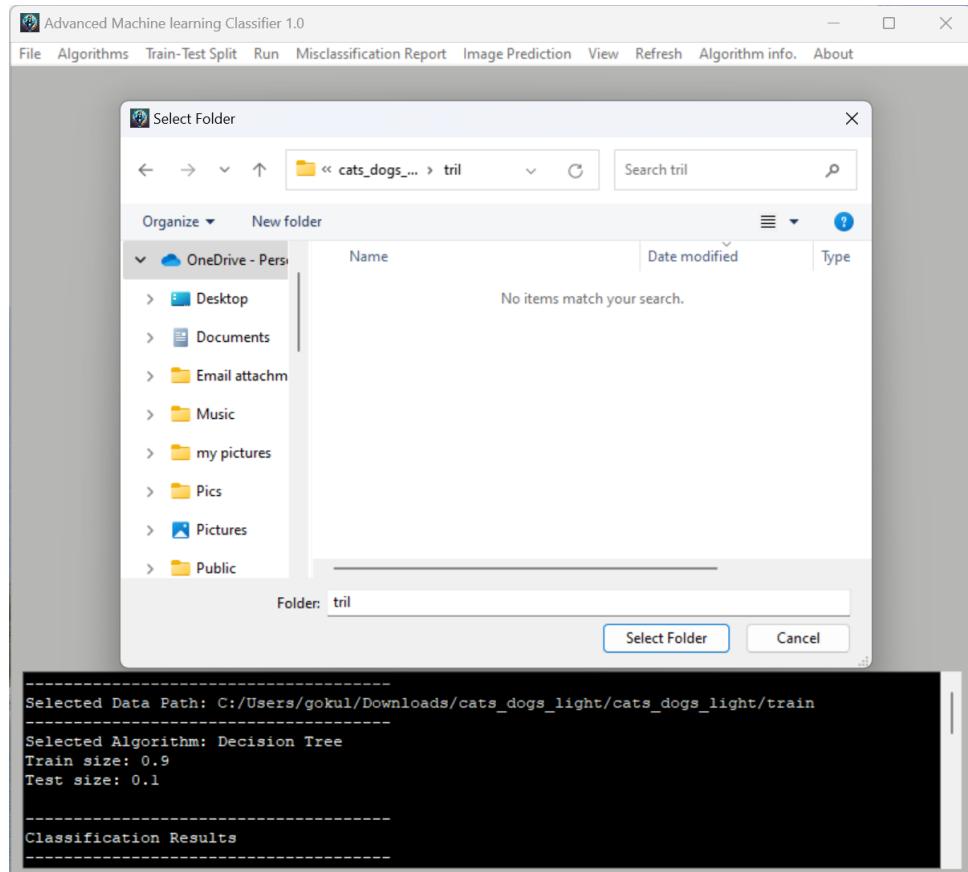
PREDICTION

To execute predictions with new image data, kindly navigate to the "Image Prediction" menu and select the folder containing the images. Please note that the image prediction task will only proceed once the algorithm has been initially trained.

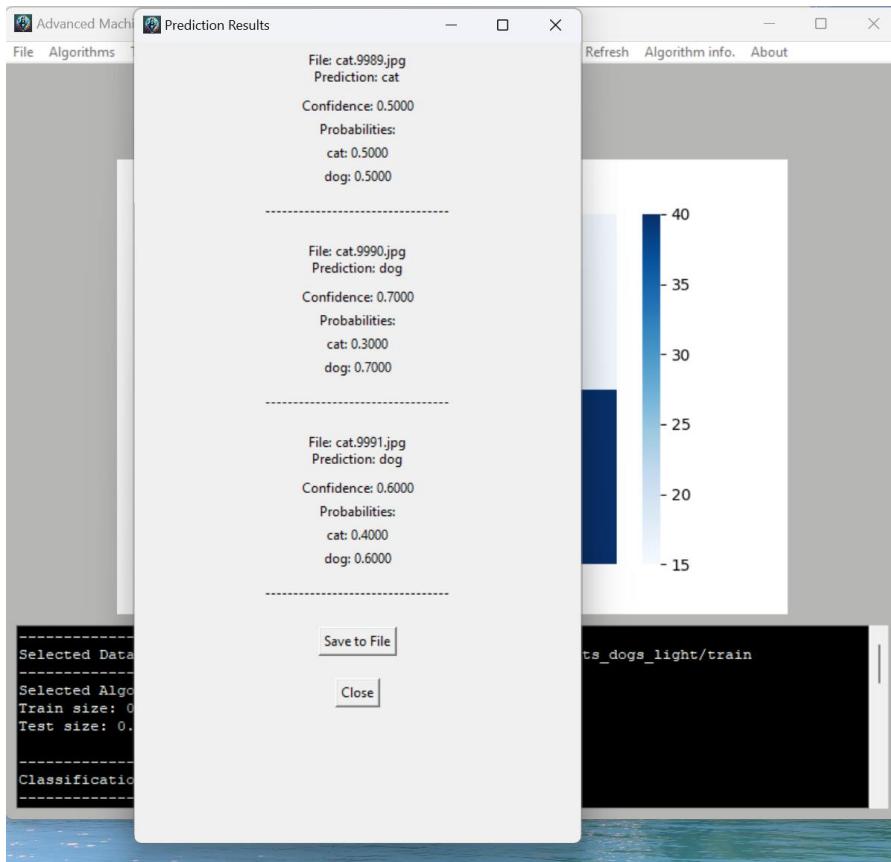


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Kindly choose the folder containing the images for prediction.

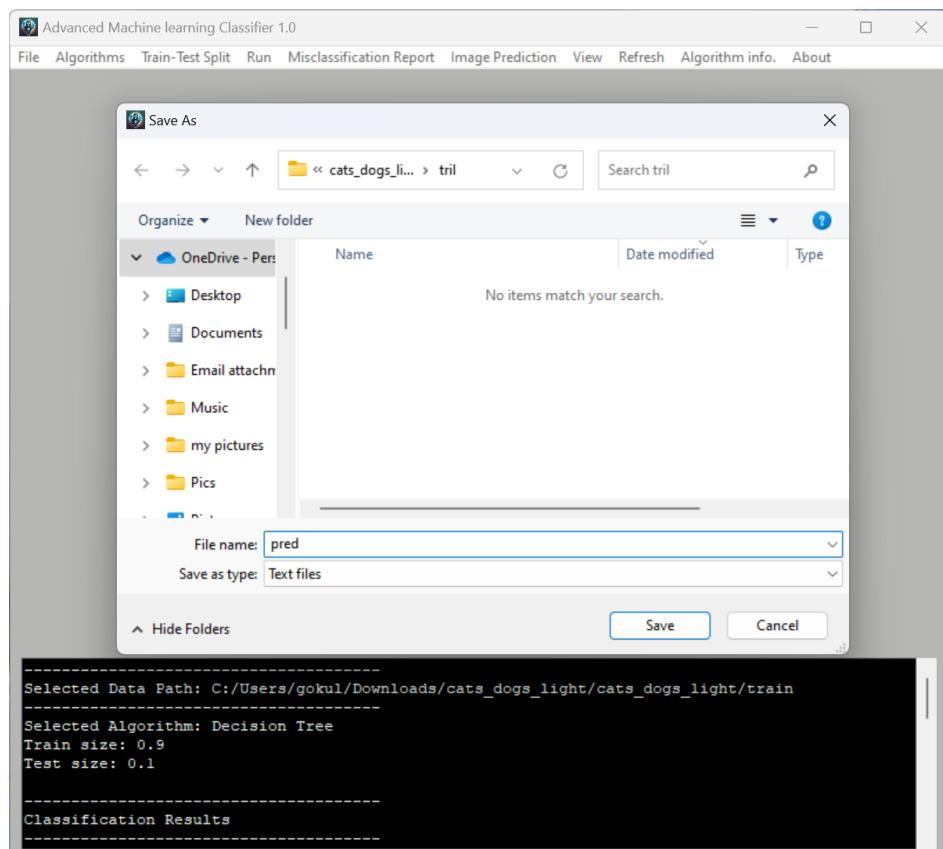


Upon completion of the prediction process, the results will be displayed. To obtain a detailed report for all predicted images, kindly select the "Save to File" option. The report will be saved as a text file.



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Please choose the preferred location to save the prediction results as a text file. Additionally, kindly provide a name for the file.

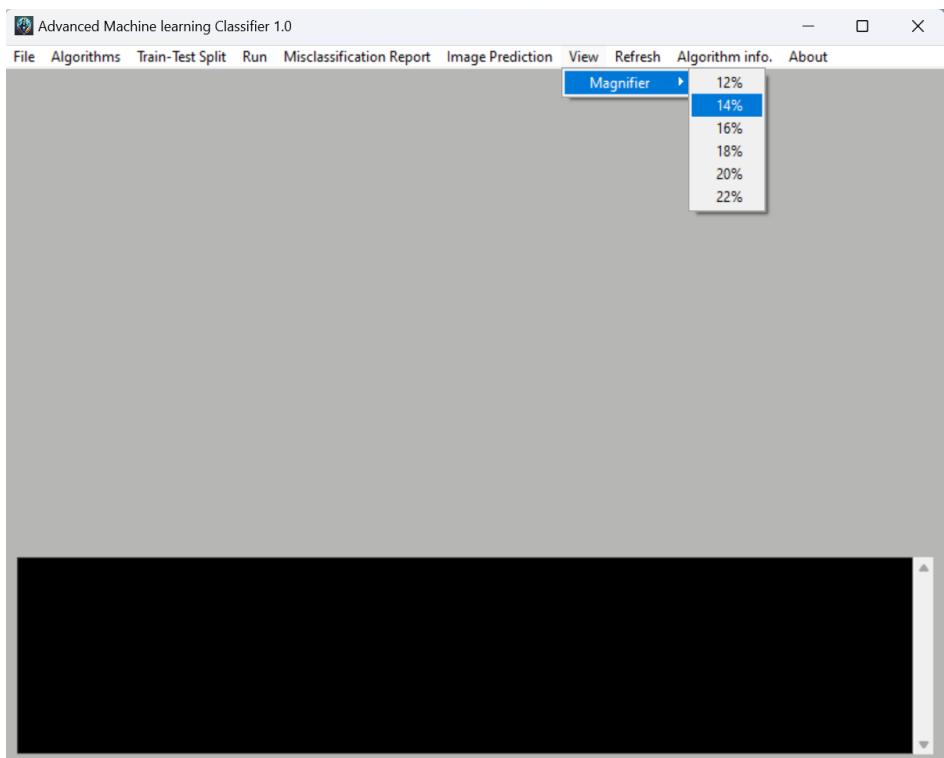


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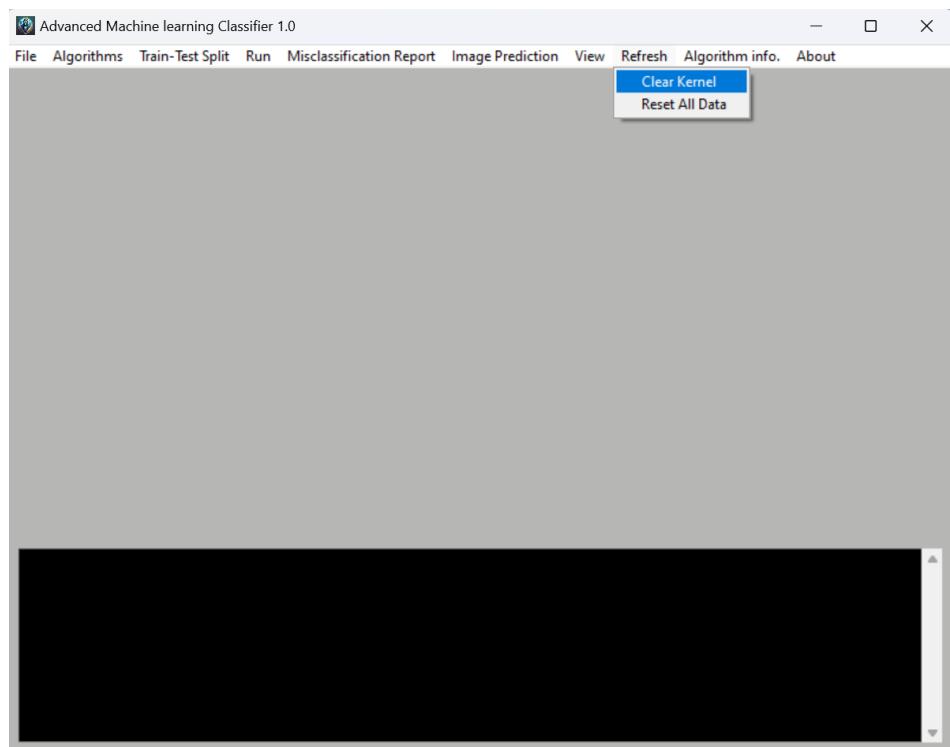
7

MAGNIFIER & REFRESH

To enlarge the application command prompt area for better visibility, kindly access the 'View' menu and click on 'Magnifier' sub-menu select the desired font size.



The 'Refresh' menu offers valuable options for managing loaded results. Clicking on the 'Clear Kernel' sub-menu will effectively clear the kernel and refresh the command prompt area in the application. Alternatively, selecting the 'Reset All Data' sub-menu will erase all information stored in the main arrays, including the confusion matrix and other relevant data.

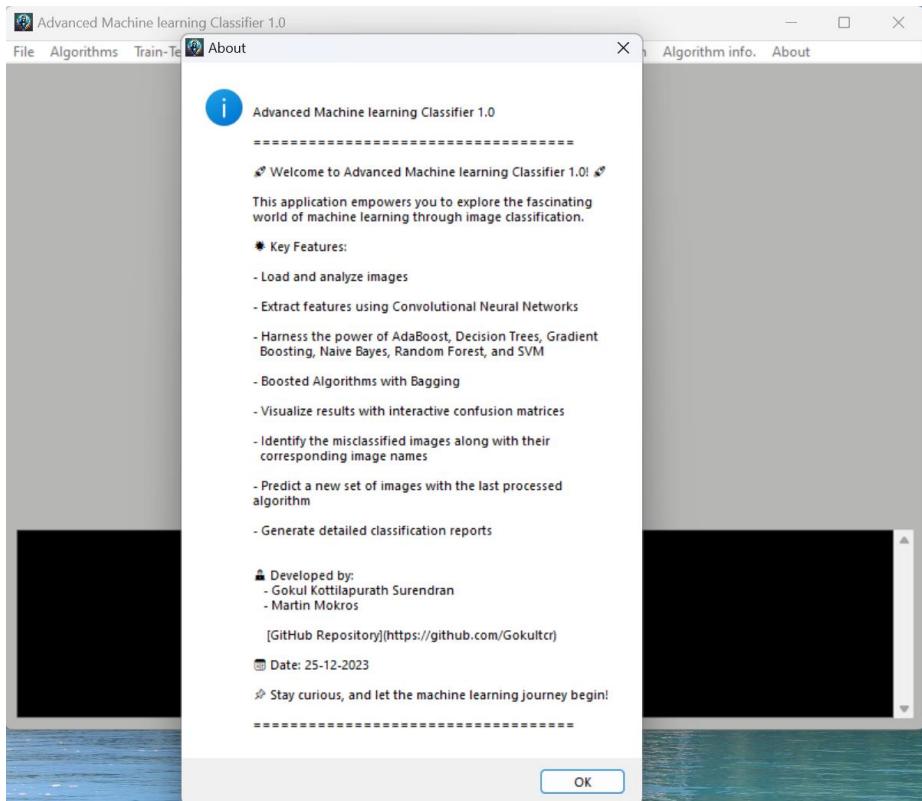


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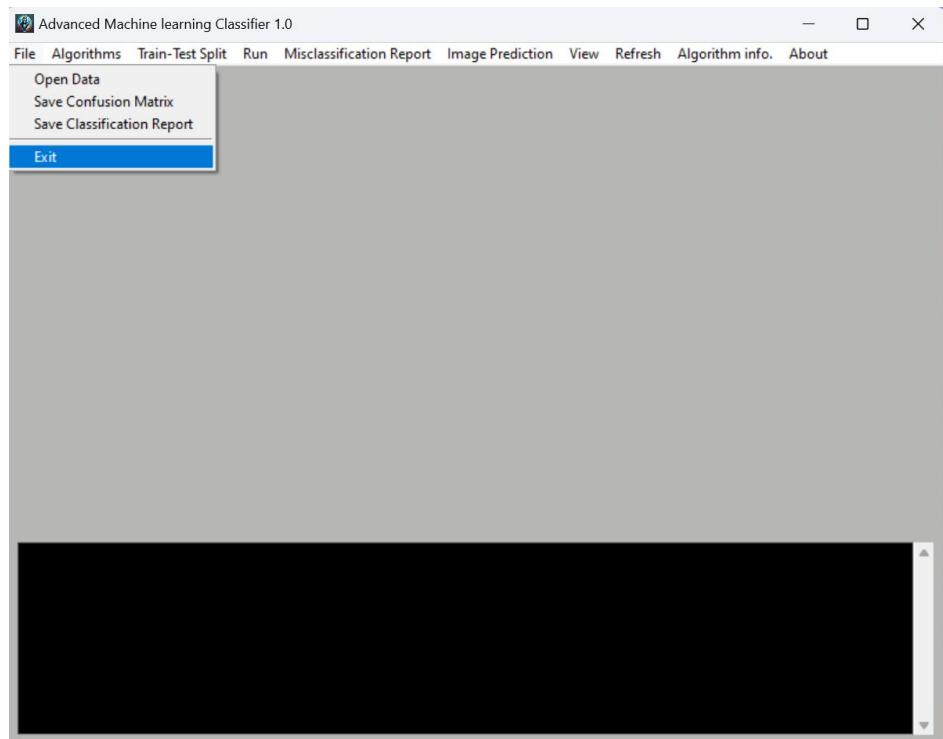
8

ABOUT & EXIT

The 'About' menu serves as a valuable resource, providing information about the application.



To gracefully exit the application, kindly navigate to the 'File' menu and select the option 'Exit.' Alternatively, you can close both the main application window and the console window.



Thank you 😊