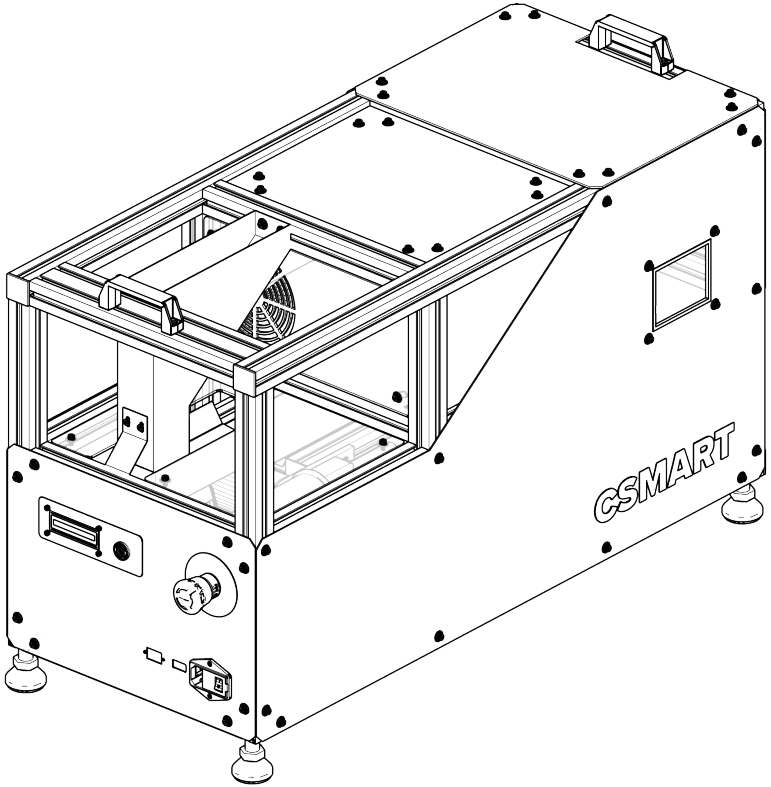


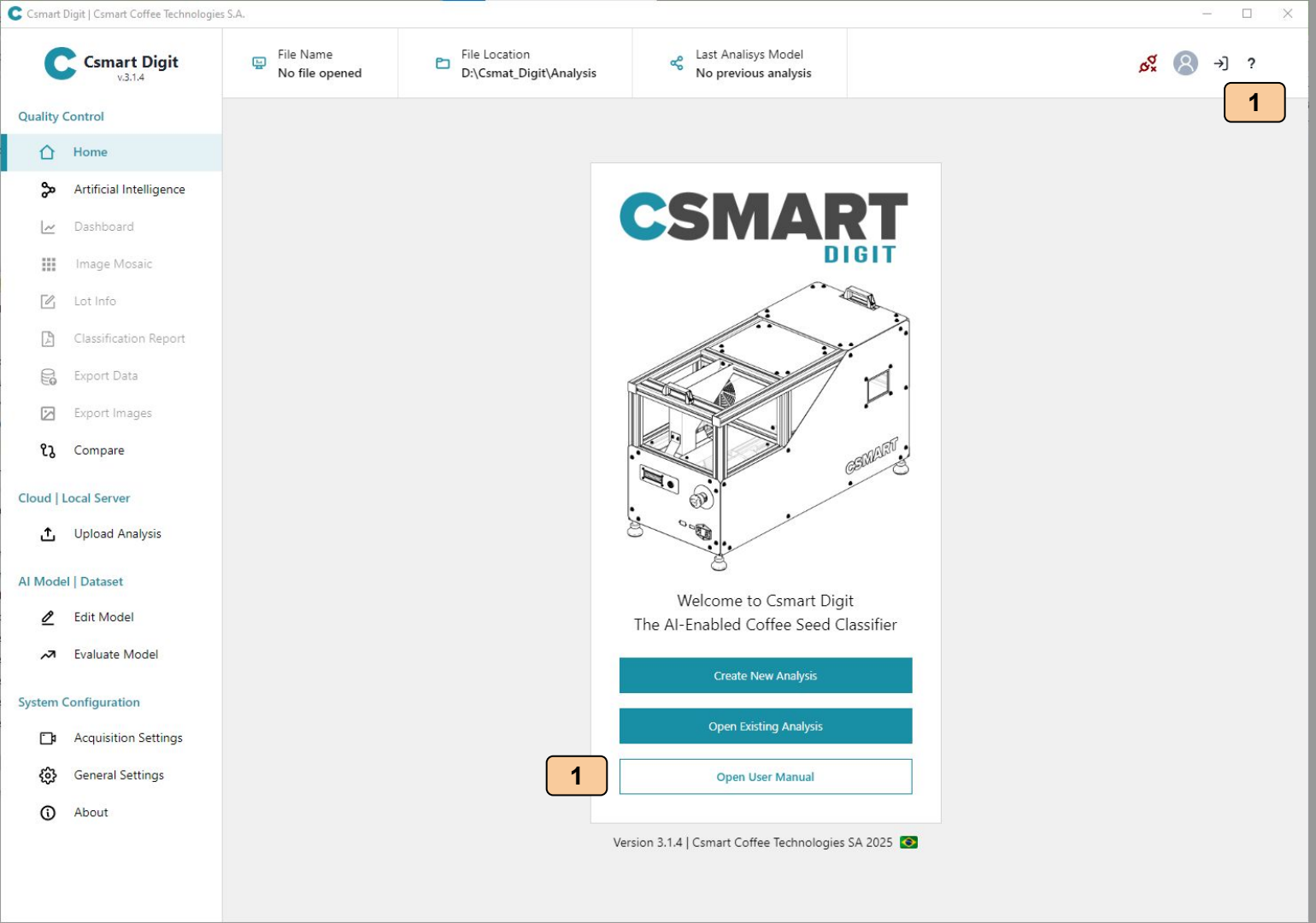
New Release

Device Control Desktop App

Minor version - V3.1.4

2025/01/17

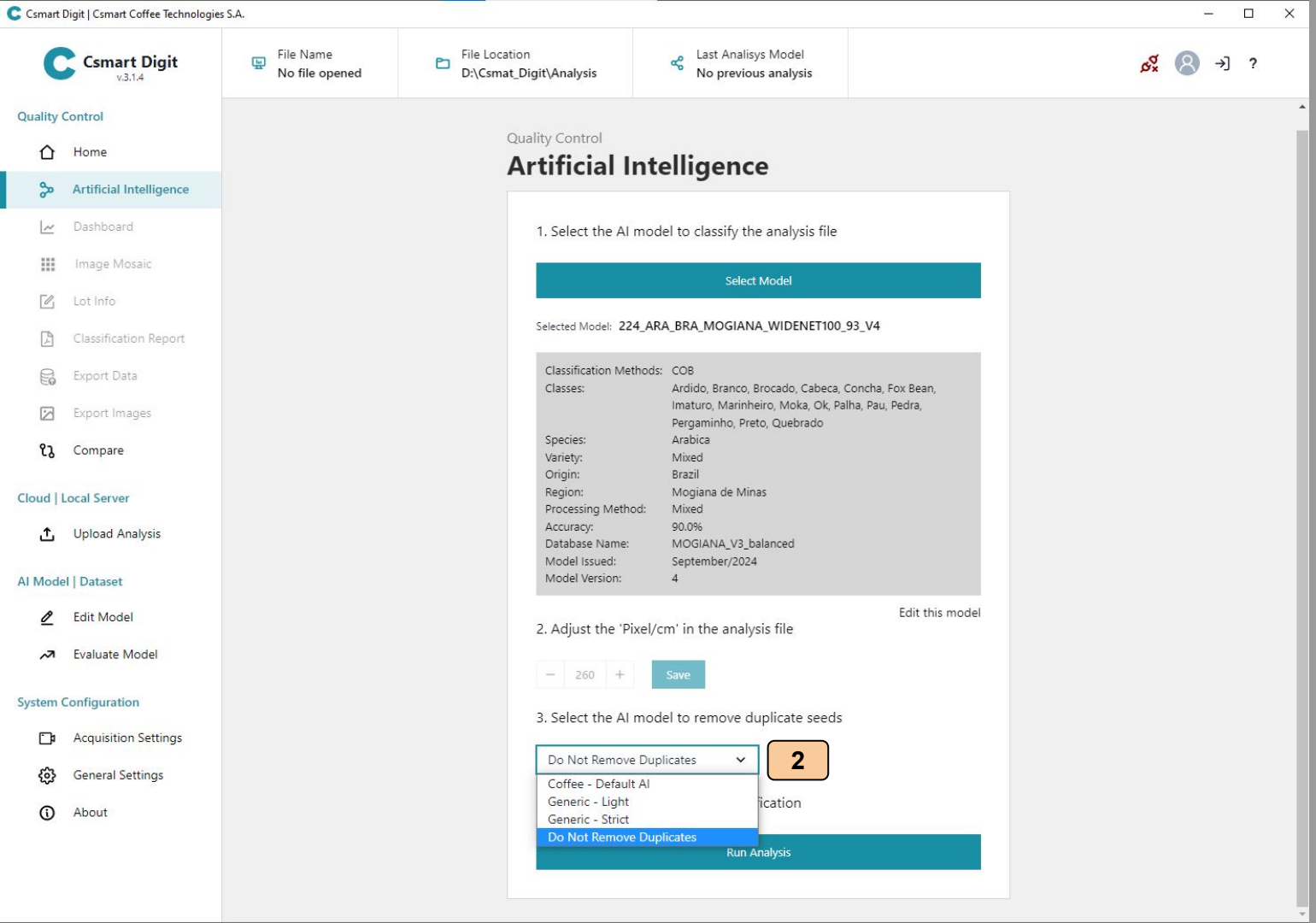
CSMART DIGIT



Knowledge Base

1. It is now possible to access the **User Manual or Knowledge Base** directly from within the application. This can be done by clicking on various locations within the software, which will open an external web browser.

The KB address is: https://csmart.gitbook.io/csmart-digit-kb



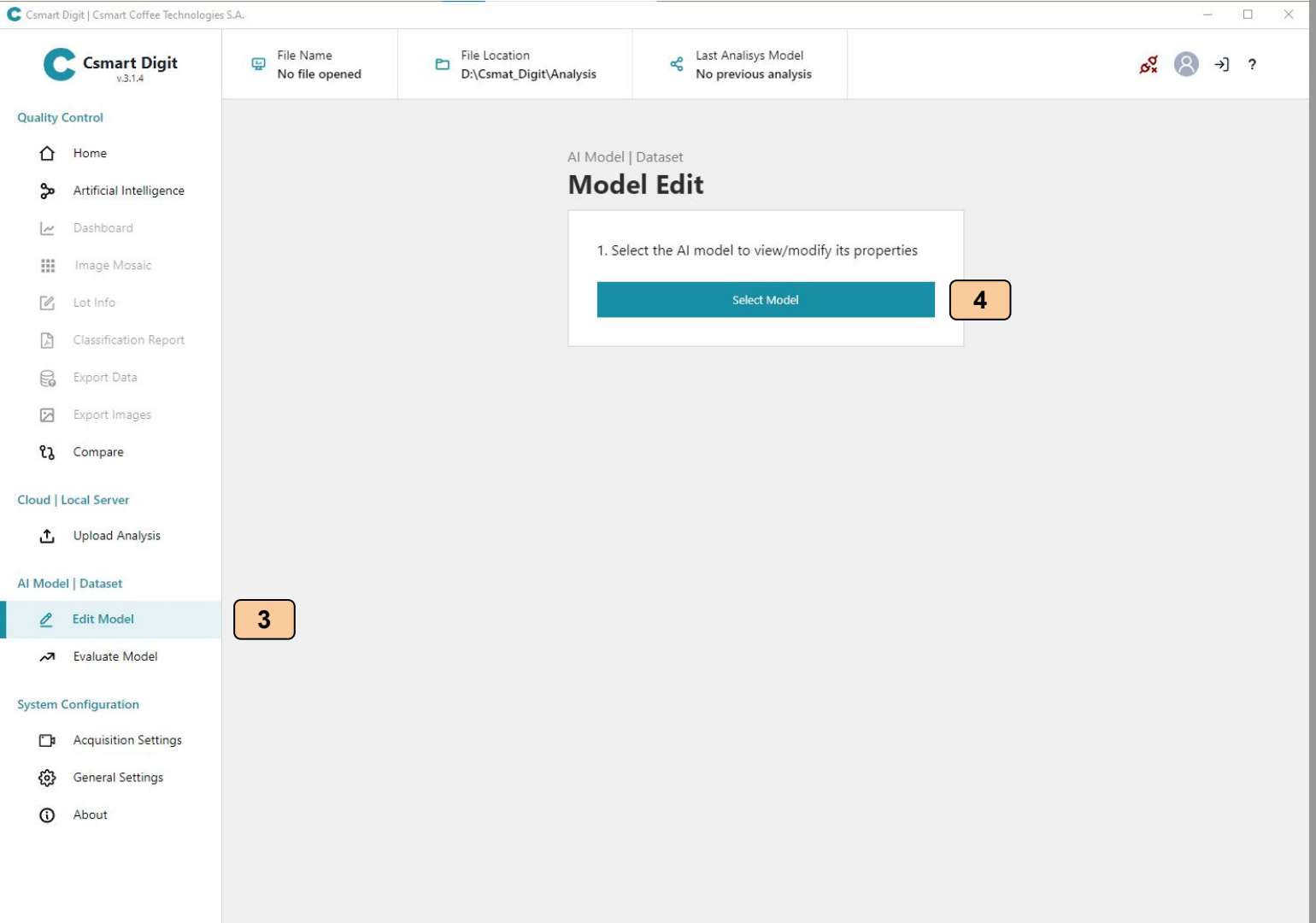
Duplicate Seeds

2. New methods for removing duplicate seeds have been added. *Duplicate seeds* refer to pictures that contain more than one seed within a single frame.

An AI model, named **Coffee-Default AI**, has been introduced. The previous method, designed for use with other crops, is still available and can be found under two sensitivity levels: Generic - Light and Generic - Severe.

There is also an option to skip the removal of duplicate images, allowing users to review and clean the duplicates later.

It is highly recommended to use the **Coffee-Default AI** option as the standard protocol.

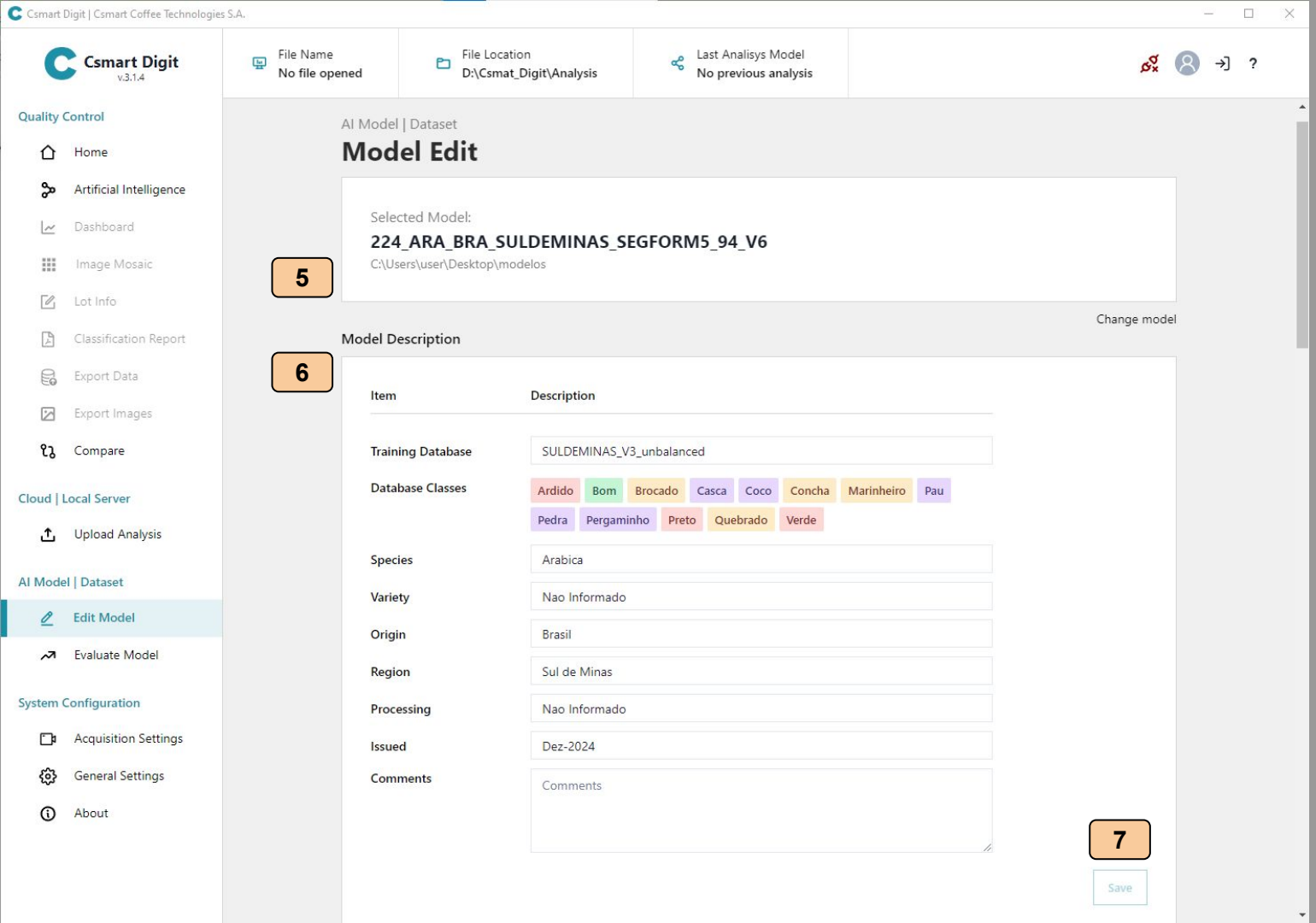


Edit Model

3. A new side menu button, named **Edit Model**, has been added under the **AI Model | Dataset** group.

It is intended to support continuous efforts to enable users to better visualize and customize AI models, datasets, and all aspects related to the AI component of the software.

4. To visualize and customize an AI model, click on the **Select Model** button and locate the desired model to open it.

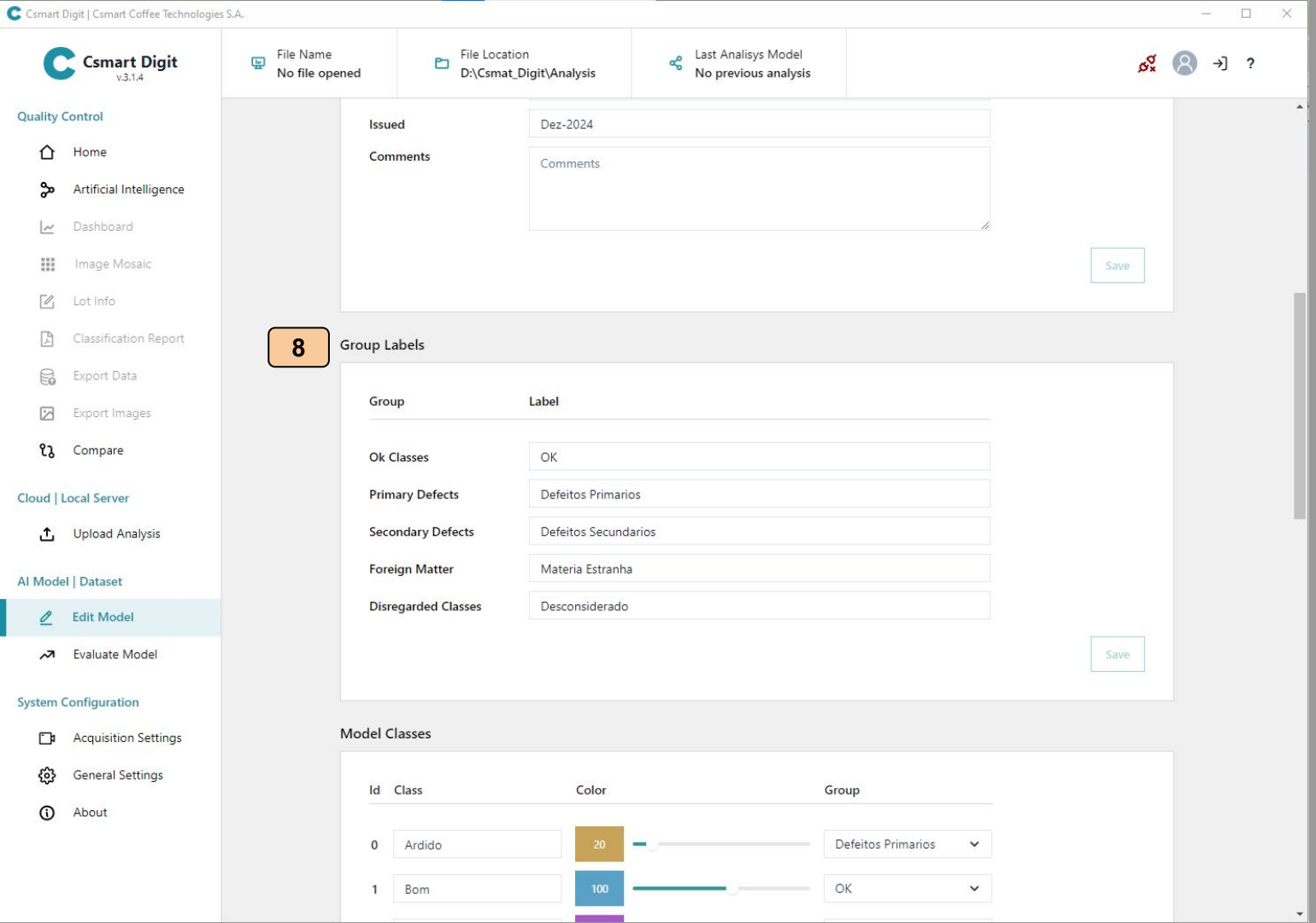


Edit Model

5. The first panel indicates the **model name and its location**.

6. The **Model Description** panel contains information that describes the characteristics of the coffee intended to be classified.

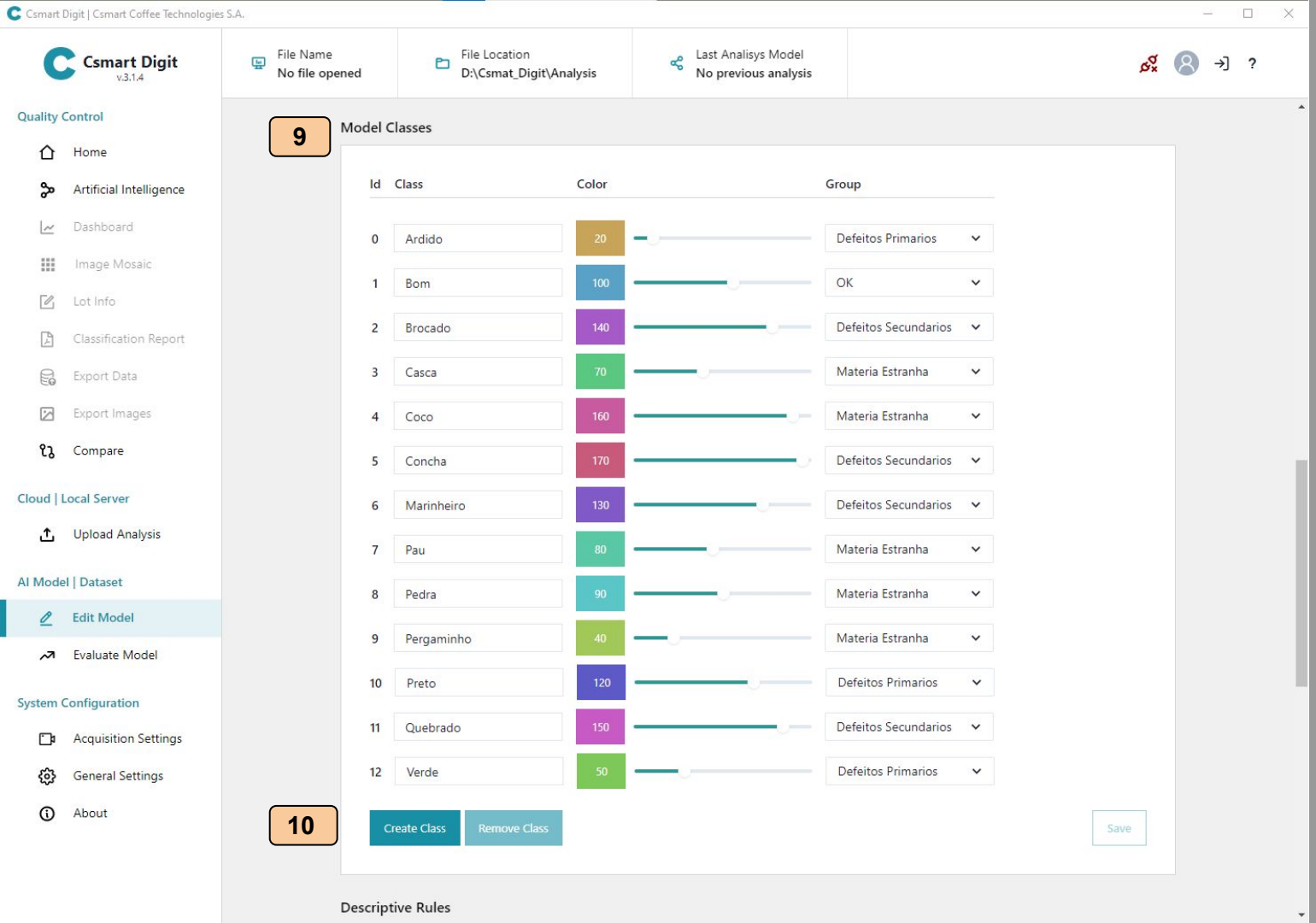
7. It is possible to modify these fields by typing in the selected field and then clicking the **Save** button at the bottom of the panel.



Edit Model

8. Every model is divided into five groups of classes: **Ok Classes, Primary Defects, Secondary Defects, Foreign Matter, and Disregarded Classes.** Even though a grading method doesn't use this terminology, Csmart-Digit divides classes into these five groups, which can have customized names in this panel.

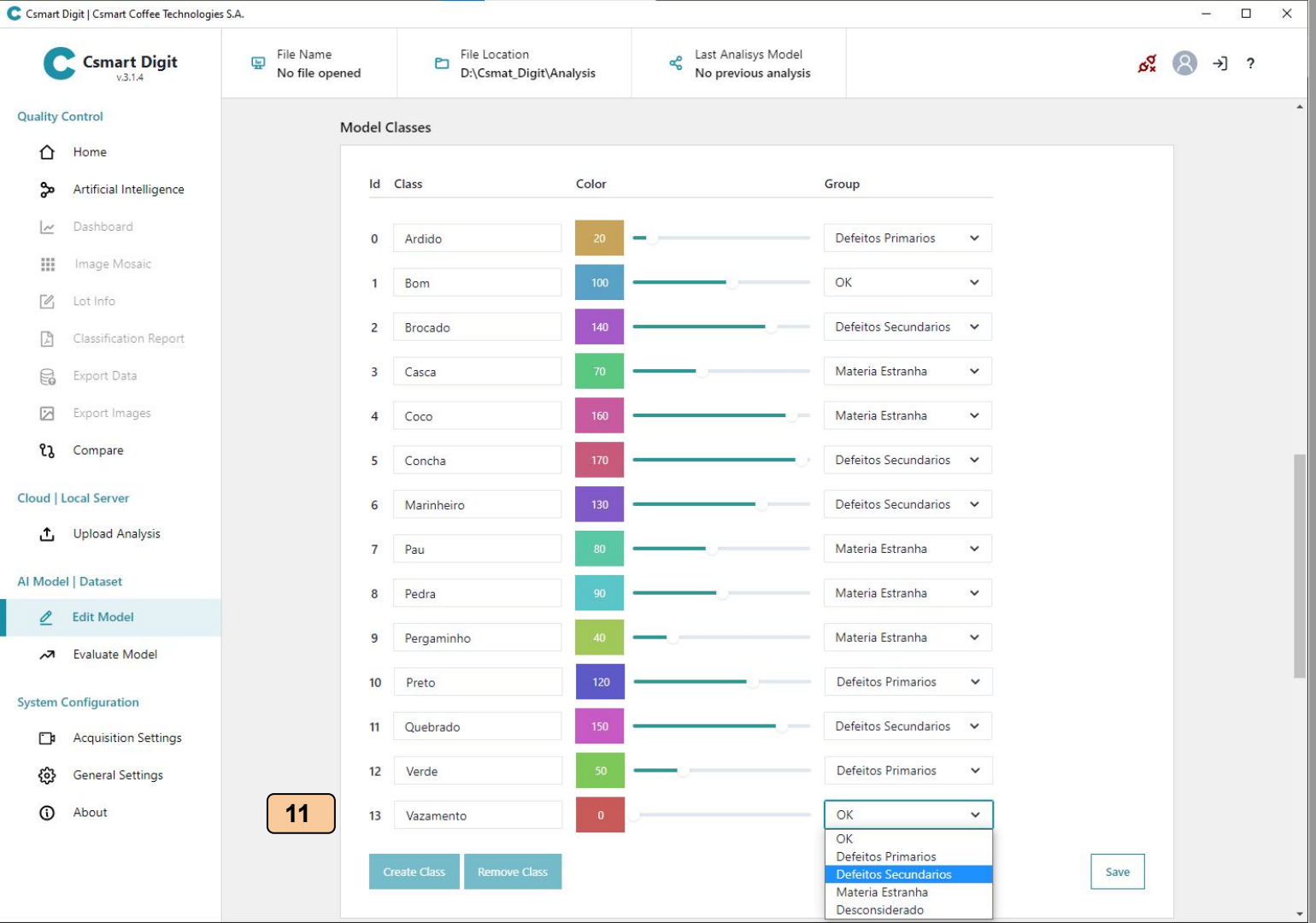
Disregarded Classes have a special characteristic: they are not accounted for in any percentage calculation and are therefore disregarded. This is intended to replicate a condition that might occur in the sample but will certainly not occur in the production lot.



Edit Model

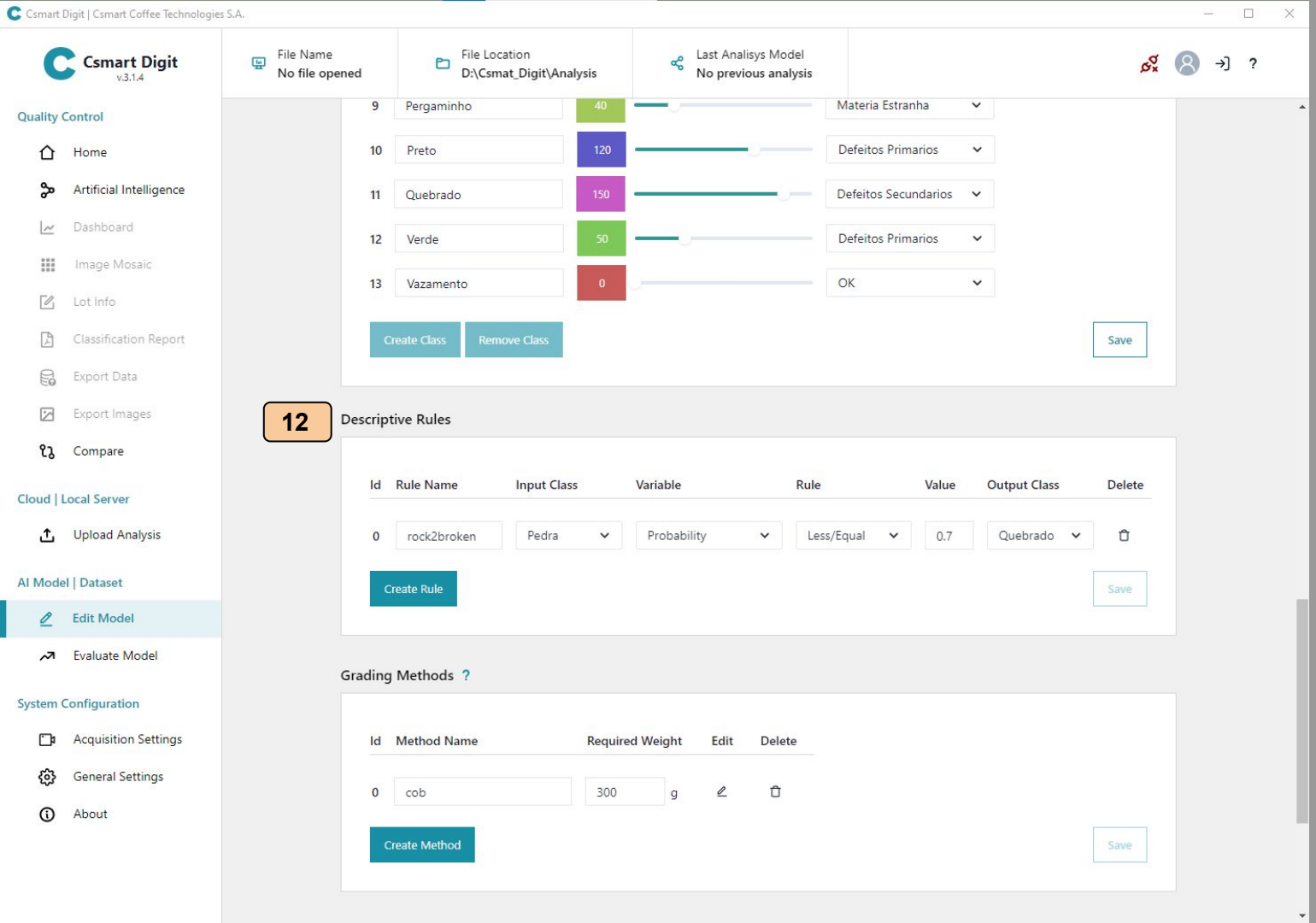
9. In the Model Classes panel, it is possible to edit the class name, the color linked to each class (to be displayed in reports and plots), and the group. After editing any information here, it is necessary to click the save button to save the changes to the AI model file.

10. It is also possible to create extra classes that were not initially present in the training dataset classes. This is intended to create descriptive rules (covered in the next section) and modify the model classification. Although it is possible to create and remove extra classes, it is forbidden to exclude original classes, as this would create errors during classification.



Edit Model

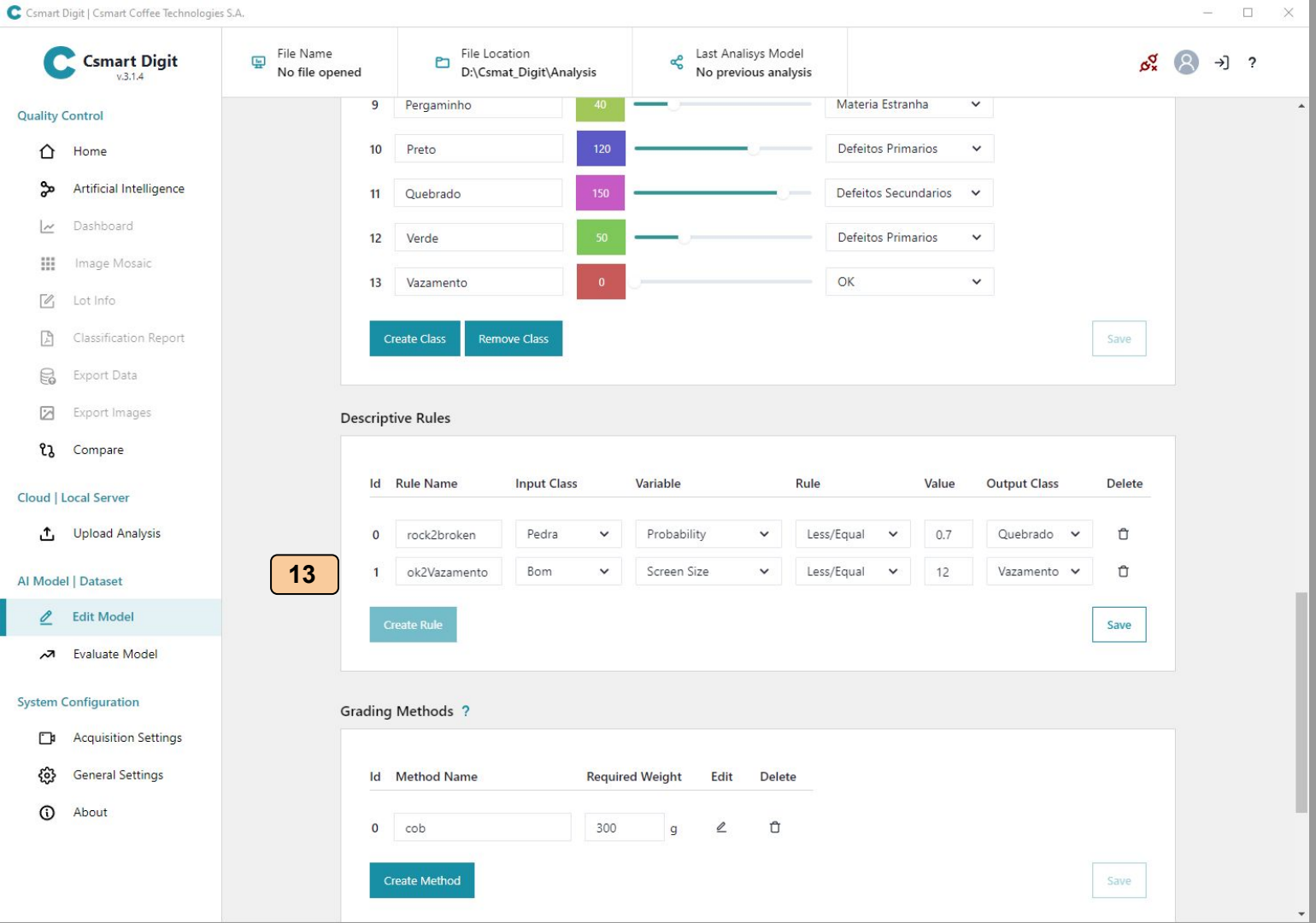
11. In this example, a new class named **Vazamento** is created and set as part of the **Defeitos Secundários** group, with its color set to red (0).



Descriptive Rules

12. The Descriptive Rule panel is designed to create rules that override the AI classification, changing the class classification based on a linear descriptive rule.

The panel contains the following fields per rule: **Rule Name**, the **Input Class** (the original class from classification), the **Variable** (where the user can select the variable to be checked), the **Rule** (which contains the condition to be checked), the **Value** (which is related to the Rule), and the **Output Class** (the class to be assigned if the condition created by the user is met).

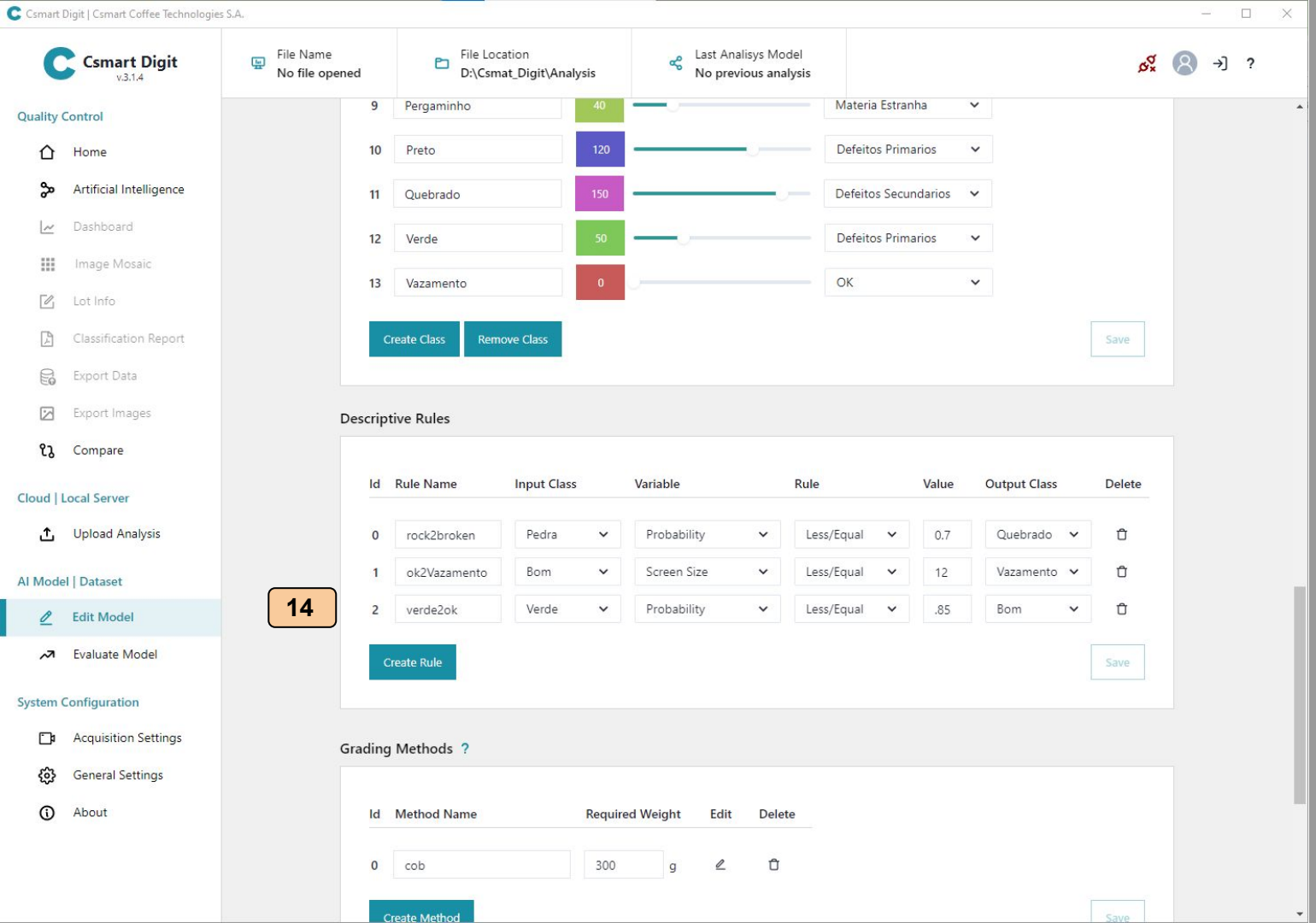


Descriptive Rules

13. As an example, a new rule that includes the newly created class is demonstrated:

The rule is named **ok2Vazamento**. The input class is **Bom** (a class without defects), the variable is **Screen Size**, and the Rule, or condition, is **Less/Equal** with a value of **12**. Finally, the output class is **Vazamento**. This rule will classify any coffee that initially has no defects (class Bom) into the new class Vazamento if the screen size is equal to or less than 12.

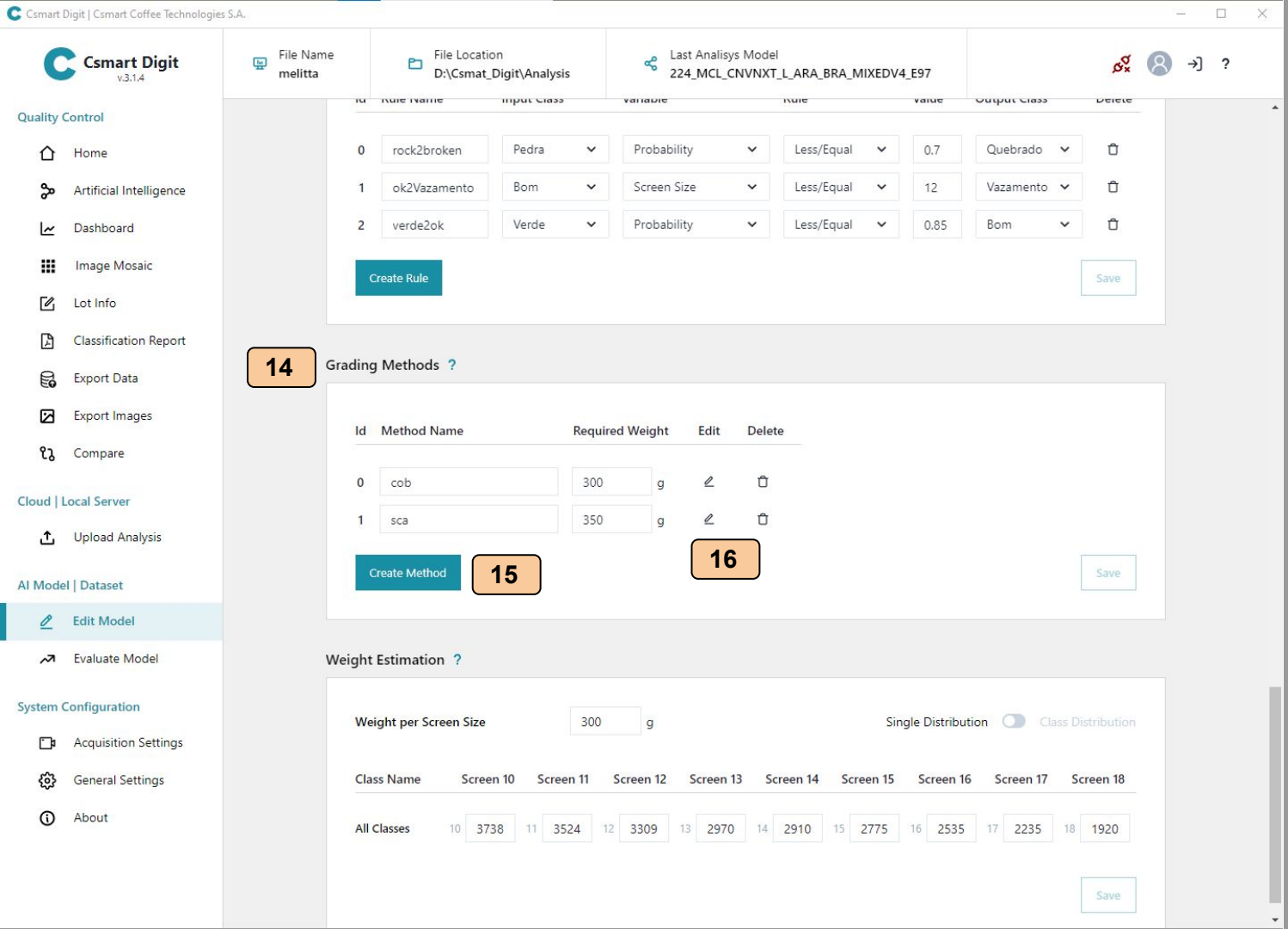
This can be used as a way to consider as defective seeds that have very small sizes, even though there are no apparent defects in the seeds.



Descriptive Rules

14. Another useful example of how to use a descriptive rule is to change a class classification based on a probability threshold.

For instance, if a model is too sensitive when classifying immatures, it is possible to create a rule that changes the Immature class to Ok based on the probability of the classification. In this case, every seed initially classified as **Verde** (immature) that does not reach **85% probability**—indicating the model is not confident it is immature—will be reclassified as **Bom** (Ok).

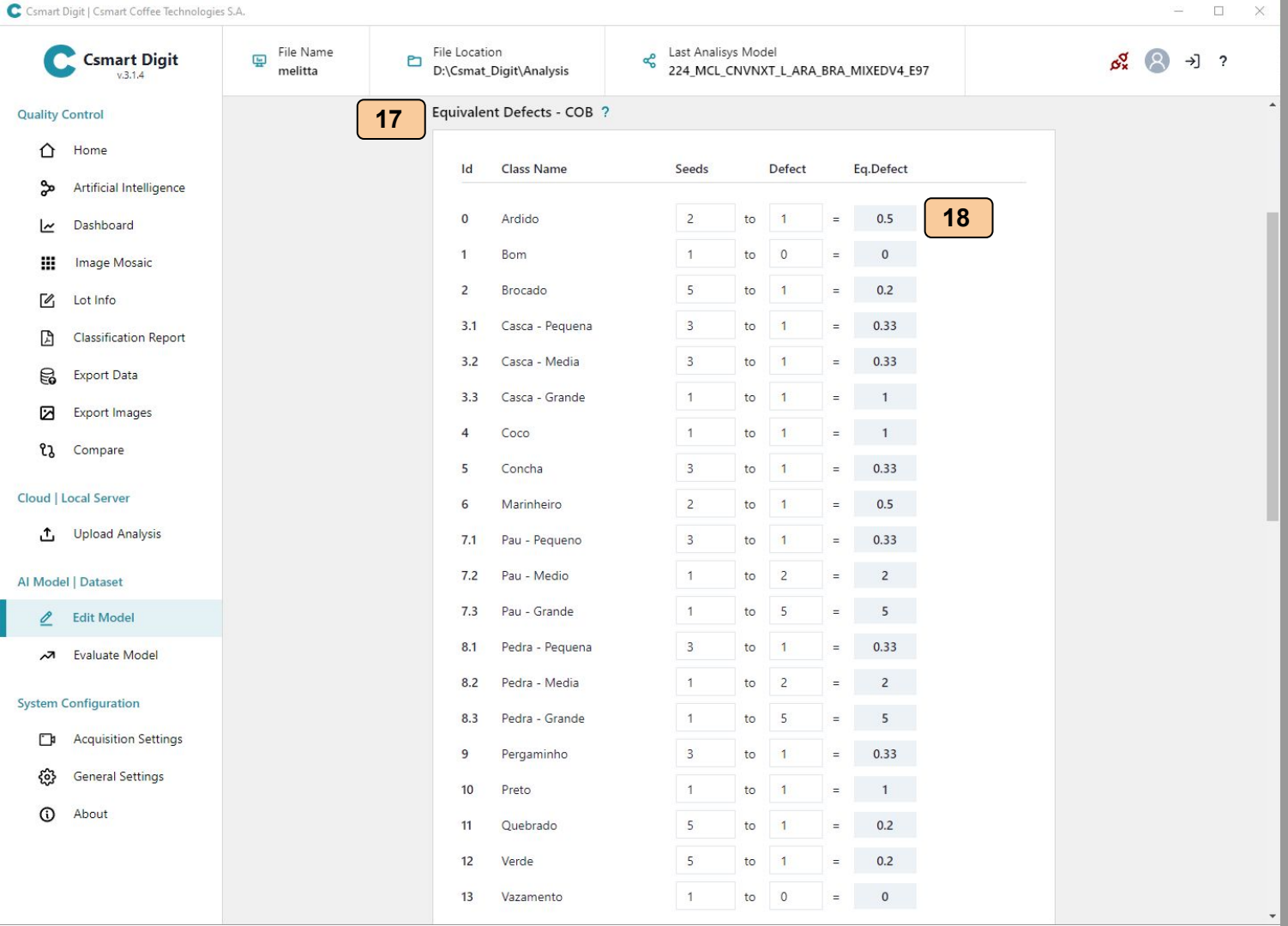


Grading Methods

14. The next panel is the **Grading Method** panel, which presents all the grading methods attached to the AI model. In this panel, users can only change the name of the method and adjust the required weight for each protocol within the method.

15. Users can create as many grading methods as necessary and later visualize the results in the dashboard. To create a new grading method, simply click the **Create Method** button.

16. To modify an existing method, click the edit icon to access its properties. It is also possible to completely remove a method by clicking the delete icon.



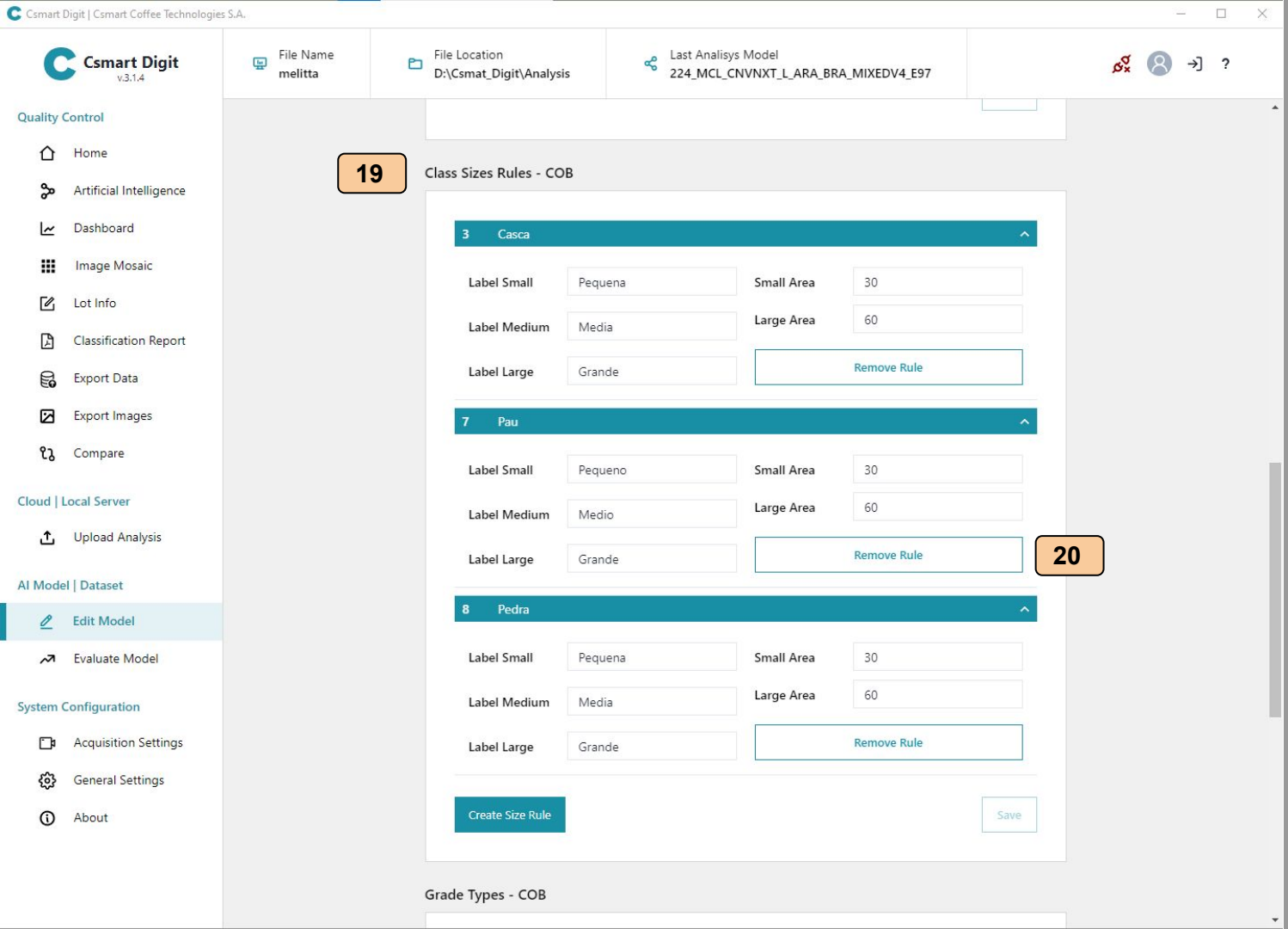
Grading Methods

17. The first panel indicates the equivalent defects present in the selected method.

The ? icon serves as a button that opens the user manual, specifically in the "Equivalent Defect" section.

18. Users can change every defect equivalence for each class. Keep in mind that all equivalences are calculated based on the number of seeds required to produce a specific number of defects. Both the seed and defect values must be equal to or greater than 0.

The equivalent defect result is automatically calculated and displayed in the last column.

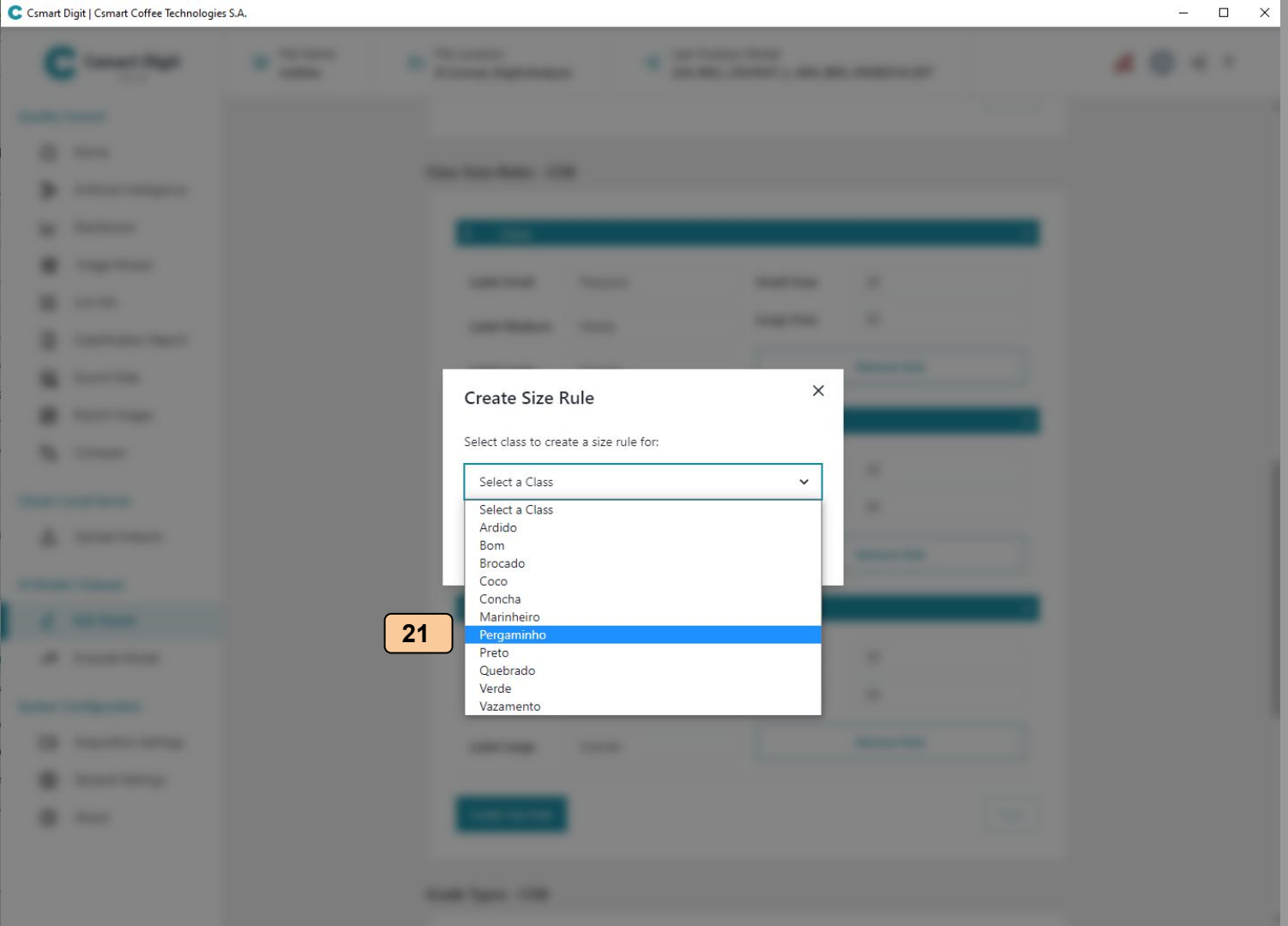


Grading Methods

19. Some grading methods specify distinct defect equivalences within a single class based on size. The **Class Size Rules** panel is designed to indicate the classes that comply with this requirement.

Users can modify the labels for small, medium, and large groups, as well as define the area of the bins to divide the class into three groups.

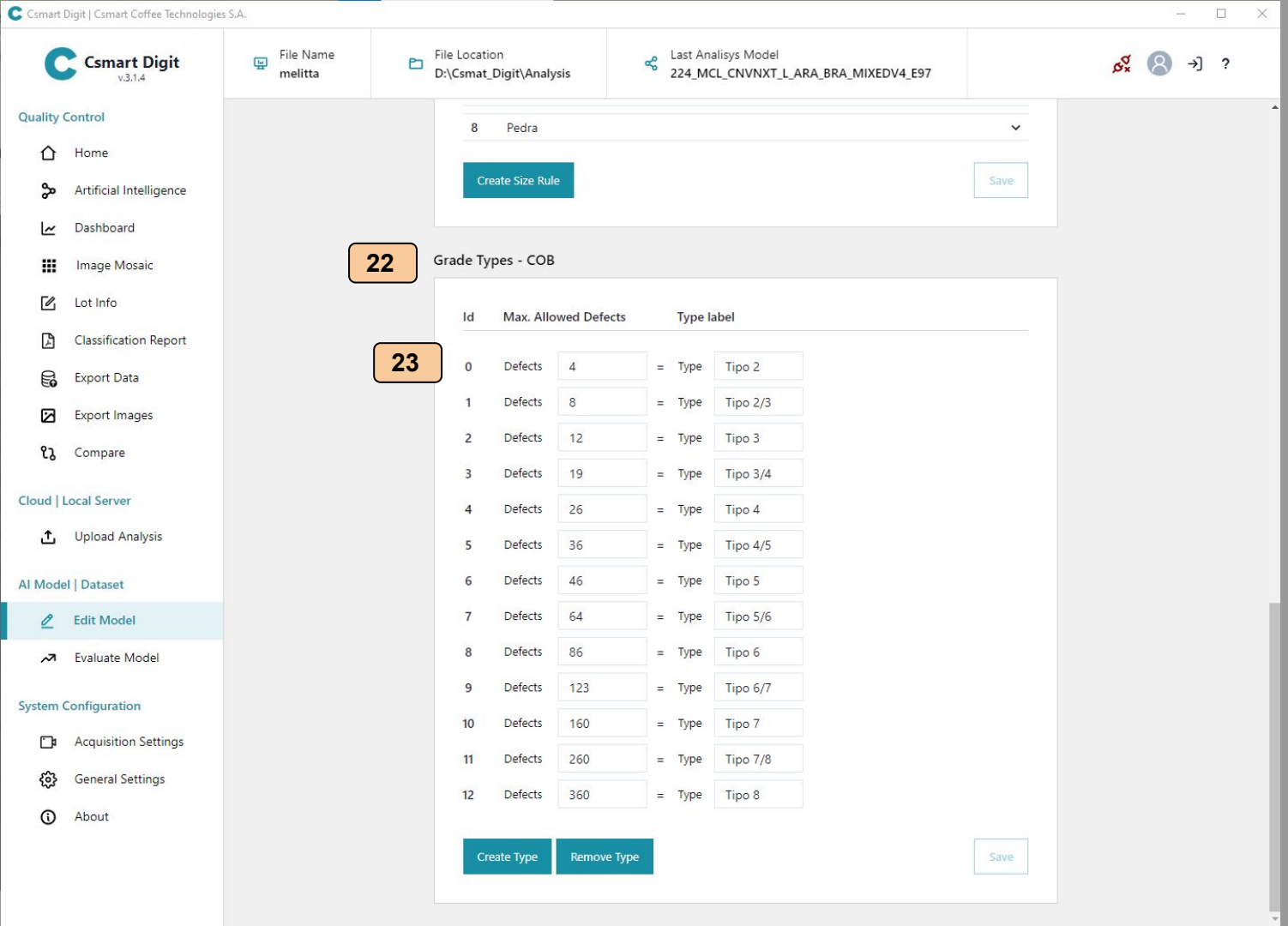
20. To remove a rule for a class, click the **Remove Rule** button. The equivalent defects form will automatically update to reflect this change, now providing a single defect equivalence.



Grading Methods

21. To create a new size rule, click the **Create Size Rule** button and select the desired class to create the size-specific division.

After saving the changes, the **Equivalent Defects** panel will display the division, allowing users to define three defect equivalences based on size.

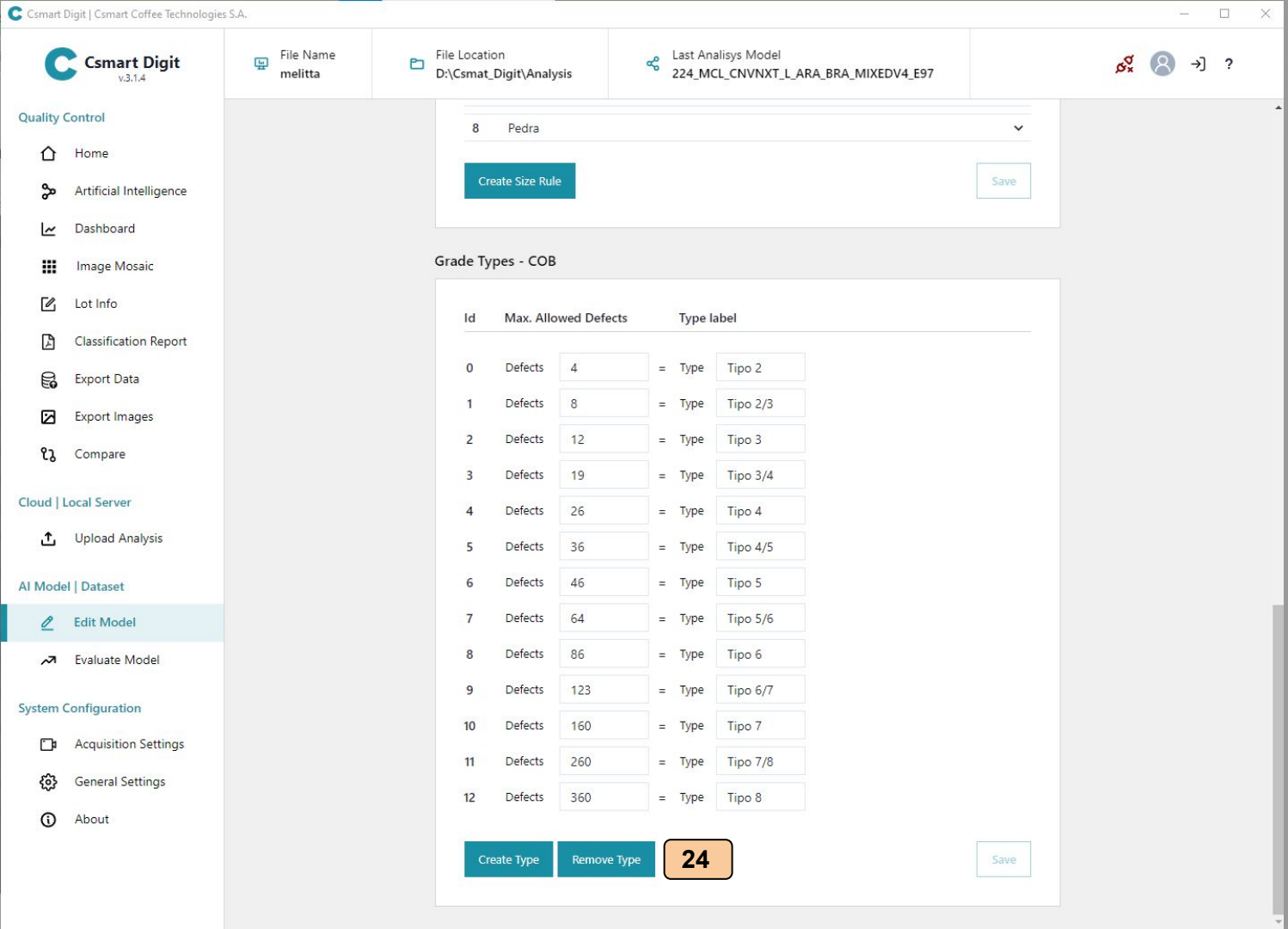


Grade Types

22. In the **Grade Types** panel, users can specify type labels based on the sum of equivalent defects in the sample.

This approach relies on defect occurrences, such as determined by methods like SCA, GCA, and COB (Brazil). However, the software currently does not account for methods based on the percentage of weight to specify a grade. Future updates will include this functionality.

23. A type is defined as the maximum allowed occurrence of equivalent defects, except for the last type, which has no upper limit. For example, a sample with 6 total equivalent defects is classified as **Tipo 2/3** in the COB methodology.



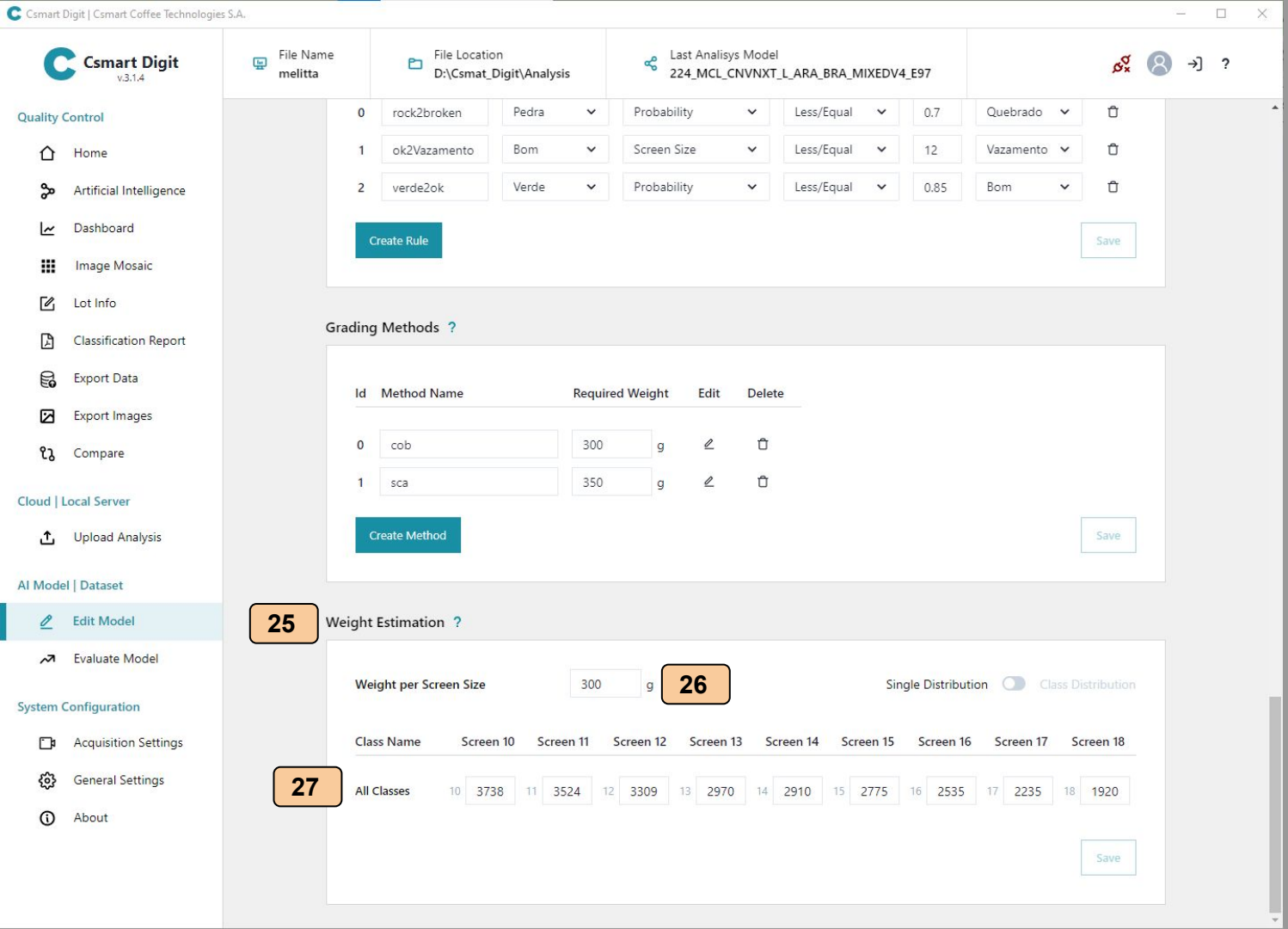
Grade Types

24. Users can create and remove grade types by clicking the **Create Type** and **Remove Type** buttons, respectively.

The final type descriptions must be arranged in ascending order, meaning a subsequent defect value cannot be smaller than the previous defect value.

For further reading on the topic of weight estimation, please open the following link of Csmart-Digit KB:

https://csmart.gitbook.io/csmart-digit-kb/csmart-fundamentals/csmart-methodology-for-weight-estimation

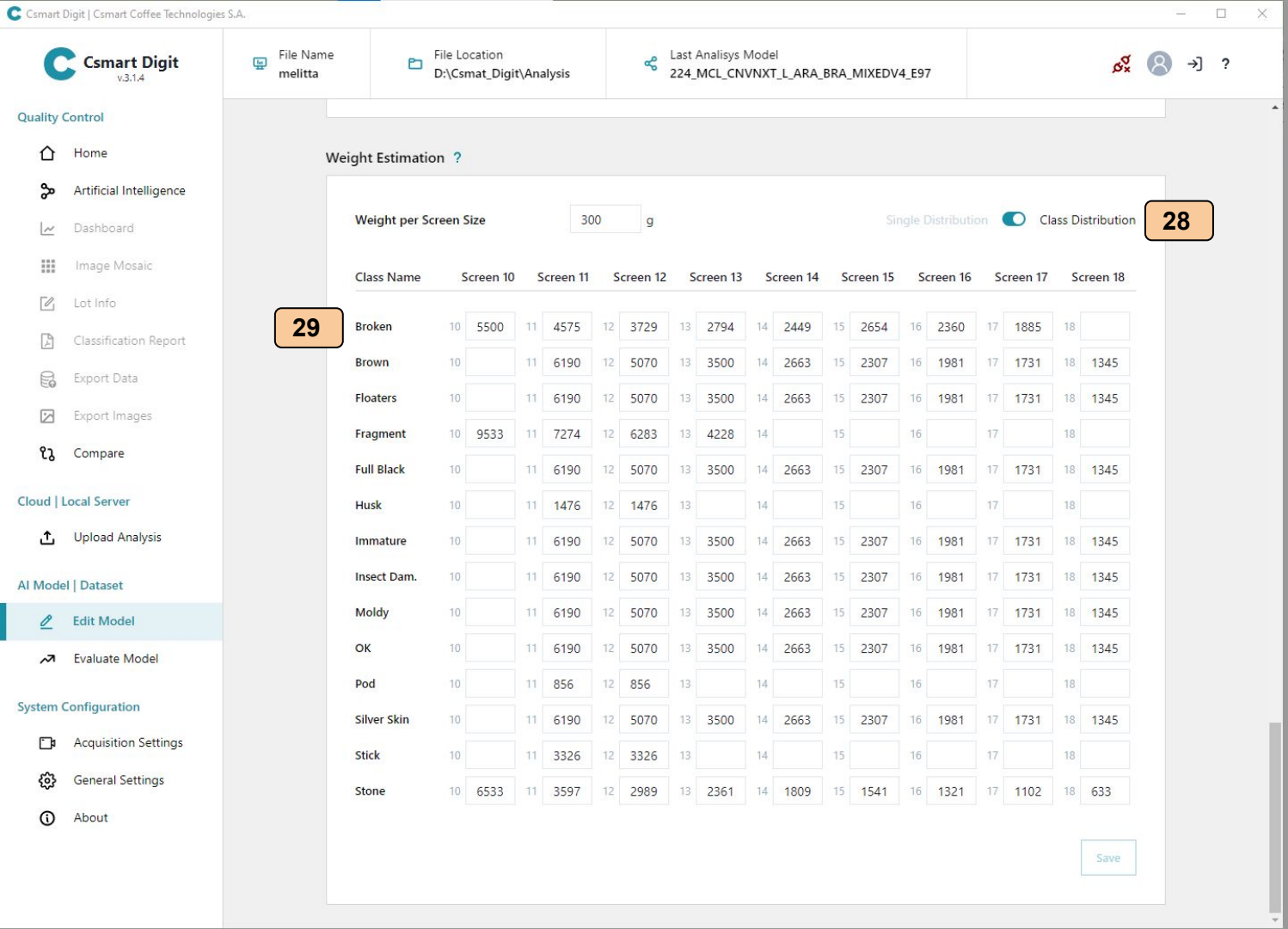


Weight Estimation

25. The **Weight Estimation** panel is designed to describe the occurrence of seeds per screen size required to obtain a specific weight value.

26. The **Weight per Screen Size** input represents the total weight to be used in the subsequent distribution.

27. Users must specify the seed occurrence for each screen size to achieve the previously specified weight. For example, to reach 300g of this coffee, it is necessary to have 3,738 seeds of screen size 14 or 3,524 seeds of screen size 11, and so on, **with each occurrence resulting in exactly 300g.**



Weight Estimation

28. It is also possible to switch from a single distribution to a class-specific distribution by clicking the designated switch button. Please note that switching between distribution methodologies will result in the loss of previously entered data.

29. In the class-specific distribution, users can include specific values for each class. All classes must have at least one entry, but if more than one entry is provided, the entries must be consecutive (e.g., 14, 15, 16). Non-filled values (e.g., empty, zero, or null) are ignored during validation and will receive min and max values of that row.

CSMART

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