

New Release

# Device Control Desktop App

Minor version - V3.0.10

2024/07/19

# Dashboard

C Csmat Digit | Csmat Coffee Technologies S.A.

**CSMART DIGIT**

File Name: AMOSTRA\_GRANO | File Location: D:\Csmat\_Digit\Analysis | Last Analysis Model: 224\_MCL\_RNXT50\_SOFT4\_ARA\_BRA\_MIXEDV4\_B94

Quality Control

- Home
- Artificial Intelligence
- Dashboard**
- Image Mosaic
- Lot Info
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**Quality Control Dashboard**

**1.** Relative to Weight

Total Defects	14.49%	Primary Defects	0.87%	Secondary Defects	13.38%	Foreign Matter	0.24%	Inspected Seeds	758	COB protocol	<b>Tipo 6/7</b>	Dominant Color
Area: 4543		Area: 273		Area: 4196		Area: 74		Est. Weight: 85g		Eq. Defects: 125		RGB(158, 153, 127)

**Screen Size Distribution**

**1.**

Screen Size	Area	Percentage	Cumulative %
Screen 10-	114	0.36%	100.00%
Screen 11	85	0.27%	99.64%
Screen 12	194	0.62%	99.37%
Screen 13	773	2.46%	98.75%
Screen 14	3759	11.98%	96.29%
Screen 15	9634	30.71%	84.31%
Screen 16	13694	43.66%	53.60%
Screen 17	2756	8.79%	9.94%
Screen 18	151	0.48%	1.15%
Screen 19+	202	0.64%	0.67%

Aggregate Area

Screen Size

OK: 85.5% | NOK: 14.5% | Cumulative %

Min and Max Screen: 10 - 19

Good Defects Both

Save Image Generate Plot

**Classes Distribution**

Class	Area	Percentage	Subset
Black	273	0.87%	Primary Defect
Broken	3032	9.67%	Secondary Defect
Floater	42	0.13%	Secondary Defect

1. A new switch labeled **Relative to Weight** and **Relative to Count** can be selected to change all calculations regarding screen size distribution. When **Relative to Count** is selected, all graphs and tables reflect the occurrence of each seed relative to the total occurrence. Conversely, when **Relative to Weight** is selected, the percentage is calculated based on the area of each seed relative to the total area of the sample, which strongly correlates to weight. This is a global variable, meaning any change here will affect all screens in the software.

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Relative to Weight

## Quality Control Dashboard

Total Defects <b>14.49%</b> Area: 4543	Primary Defects <b>0.87%</b> Area: 273	Secondary Defects <b>13.38%</b> Area: 4196	Foreign Matter <b>0.24%</b> Area: 74	Inspected Seeds <b>758</b> Est. Weight: 85g	COB protocol <b>Tipo 6/7</b> Eq. Defects: 125	Dominant Color RGB(158, 153, 127)
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### Screen Size Distribution

Aggregate Area

Screen Size	Area	Percentage	Cumulative %
Screen 10-	114	0.36%	100.00%
Screen 11	85	0.27%	99.64%
Screen 12	194	0.62%	99.37%
Screen 13	773	2.46%	98.75%
Screen 14	3759	11.98%	96.29%
Screen 15	9634	30.71%	84.31%
Screen 16	13694	43.66%	53.60%
Screen 17	2756	8.79%	9.94%
Screen 18	151	0.48%	1.15%
Screen 19+	202	0.64%	0.67%

2.

Min and Max Screen: 10 to 19

□ Good   □ Defects    Both

### Classes Distribution

Class	Area	Percentage	Subset
Black	273	0.87%	Primary Defect
Broken	3032	9.67%	Secondary Defect
Floater	42	0.13%	Secondary Defect

3.

2. The **Min and Max Screen** slider is intended to define the boundaries of the screen size distribution. Changing the values will adjust any sizes that are larger or smaller than the specified limits to the selected boundaries.

3. After selecting the min and max values, click **Generate Plot** to calculate and generate both the Screen Size plot and table

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Relative to Weight

## Quality Control Dashboard

Total Defects <b>14.49%</b> Area: 4543	Primary Defects <b>0.87%</b> Area: 273	Secondary Defects <b>13.38%</b> Area: 4196	Foreign Matter <b>0.24%</b> Area: 74	Inspected Seeds <b>758</b> Est. Weight: 85g	COB protocol <b>Tipo 6/7</b> Eq. Defects: 125	Dominant Color RGB(158, 153, 127)
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### Screen Size Distribution

Aggregate Area

Screen Size	Area	Percentage	Cumulative %
Screen 13-	1168	3.72%	100.00%
Screen 14	3759	11.98%	96.28%
Screen 15	9634	30.71%	84.30%
Screen 16	13694	43.66%	53.59%
Screen 17	2756	8.79%	9.93%
Screen 18+	354	1.13%	1.14%

Min and Max Screen: 13 - 18

Good  Defects  Both  Save Image  Generate Plot

### Classes Distribution

Class	Area	Percentage	Subset
Black	273	0.87%	Primary Defect
Broken	3032	9.67%	Secondary Defect
Floater	42	0.13%	Secondary Defect

# Dashboard

4. Example of the adjusted plot and table, limited to screens 13 and 18.

## Quality Control

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**Quality Control**  
**Dashboard**

Total Defects

**14.49%**

Area: 4543

Primary Defects

**0.87%**

Area: 273

Secondary Defects

**13.38%**

Area: 4196

Foreign Matter

**0.24%**

Area: 74

**5.**

Inspected Seeds

**758**

Est. Weight: 85g

COB protocol

**Tipo 6/7**

Eq. Defects: 125

Dominant Color

RGB(158, 153, 127)

 Relative to Weight

## Screen Size Distribution



## Expected Screen Size Distribution

Screen Size	Expected Count (300g)
Screen 10 and less	3738 seeds
Screen 11	3524 seeds
Screen 12	3309 seeds
Screen 13	2970 seeds
Screen 14	2910 seeds
Screen 15	2775 seeds
Screen 16	2535 seeds
Screen 17	2235 seeds
Screen 18 and more	1920 seeds

Close

**Dashboard**

5. Weight estimation now takes into account the expected screen size distribution over a known weight. This information is associated with the AI model file, allowing each AI model to have a different distribution. Users need to create this table for their models. Based on the expected count distribution and the total seeds inspected, it is possible to estimate the weight of the analyzed sample. Note that it is not possible to assume that every seed that passes through the conveyor will be recorded, so the expected distribution serves as the baseline variable for accurate classification methods

6. File Name: AMOSTRA\_GRANO, File Location: D:\Csmart\_Digit\Analysis, Last Analysis Model: 224\_MCL\_RNXT50\_SOFT4\_ARA\_BRA\_MIXEDV4\_B94

Classification Methods

Total Defects	Method	Equivalent Defects	Type
<b>115</b>	COB	125	Tipo 6/7
	NY	125	NY 6

Weight Factor: 3.53

7. Classification Report

Class	Original Count	Weighted Count	Factor	Equivalent Defects
Black	7	25	1 to 1	25
Broken	79	279	5 to 1	56
Floater	1	4	5 to 1	1
Fox Bean	19	68	0	0
Husk Small	0	0	3 to 1	0
Husk Medium	0	0	3 to 1	0
Husk Large	0	0	1 to 1	0
Immature	6	22	5 to 1	5
Insect Dam.	10	36	5 to 1	8
Ok	624	2203	0	0
Parchment	2	8	2 to 1	4
Pod	0	0	1 to 1	0
Rocks Small	0	0	3 to 1	0
Rocks Medium	2	8	1 to 2	16
Rocks Large	0	0	1 to 5	0
Shell	8	29	3 to 1	10
Sour	0	0	2 to 1	0

AI Parameters

Prediction Entropy	True Positives	True Negatives	False Positives	False Negatives
Average Entropy: 0.78%	<b>112</b> Ratio: 14.78%	<b>643</b> Ratio: 84.83%	<b>0</b> Ratio: 0.0%	<b>3</b> Ratio: 0.4%
Confidence Level: High Confidence				

# Dashboard

6. Based on the **Estimated Weight** and the **Required Weight** of the classification method, a **Weight Factor** is applied.

7. All occurrences of each defect will be multiplied by the **Weight Factor**, generating a **Weighted Count**. From that, the class factor, defined by the chosen method, is applied to determine the **Equivalent defects** per class and Total.

8. This procedure is applied to all methods present in the AI model and can be accessed in the tabs view.

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File Name: AMOSTRA\_GRANO

File Location: D:\Csmat\_Digit\Analysis

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**Non Defective Seeds**

OK Classes

643 Seeds | 85.51%

Dominant Color: RGB(158, 153, 127)

Color by Class

Draw Perimeter

Draw Min Axis

**Defective Seeds**

NOK Classes

115 Seeds | 14.49%

Dominant Color: RGB(158, 153, 126)

Color by Class

Draw Perimeter

Draw Min Axis

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**10.**

File Name: AMOSTRA\_GRANO

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**Non Defective Seeds**

OK Classes

643 Seeds | 85.51%

Dominant Color: RGB(158, 153, 127)

Color by Class

Draw Perimeter

Draw Min Axis

**Defective Seeds**

NOK Classes

115 Seeds | 14.49%

Dominant Color: RGB(158, 153, 126)

Color by Class

Draw Perimeter

Draw Min Axis

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**11.**

**Image Mosaic**

9. By pressing **CTRL** and clicking on the grid cells, it is possible to select multiple images at once. A green check mark is shown on each selected seed.

10. By pressing **Edit Selection**, a side menu will open, allowing the user to change the class of all selected images at once.

11. To reset the selection, the user can click the **Clear Selection** button.

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Non Defective Seeds

OK Classes

643 Seeds | 85.51%

Dominant Color: RGB(158, 153, 127)

Color by Class   Draw Perimeter   Draw Min Axis

Page 1 / 6    Edit Selection

Seed Features

Classification

Select class

12.

# Image Mosaic

12. Use the select menu to assign a new class to the selected images

# Classification Report

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Quality Control

## Classification Report

1. Select the report language: English

2. Specify if the percentage refers to count or weight: Relative to Weight

3. Specify the 'Screen Distribution' mode: Both

4. Specify the minimum and maximum screen sizes: 13 - 18

5. Select detailed classification methods to include: COB, NY

6. Select extra features: Screen Sizes Plot and Classes Distribution Plot, Sample images of Good and Defective Coffees

7. Click 'Generate PDF' to export the report: **Generate PDF**

Open Pdf after Export:

**13.**

**14.**

**15.**

**16.**

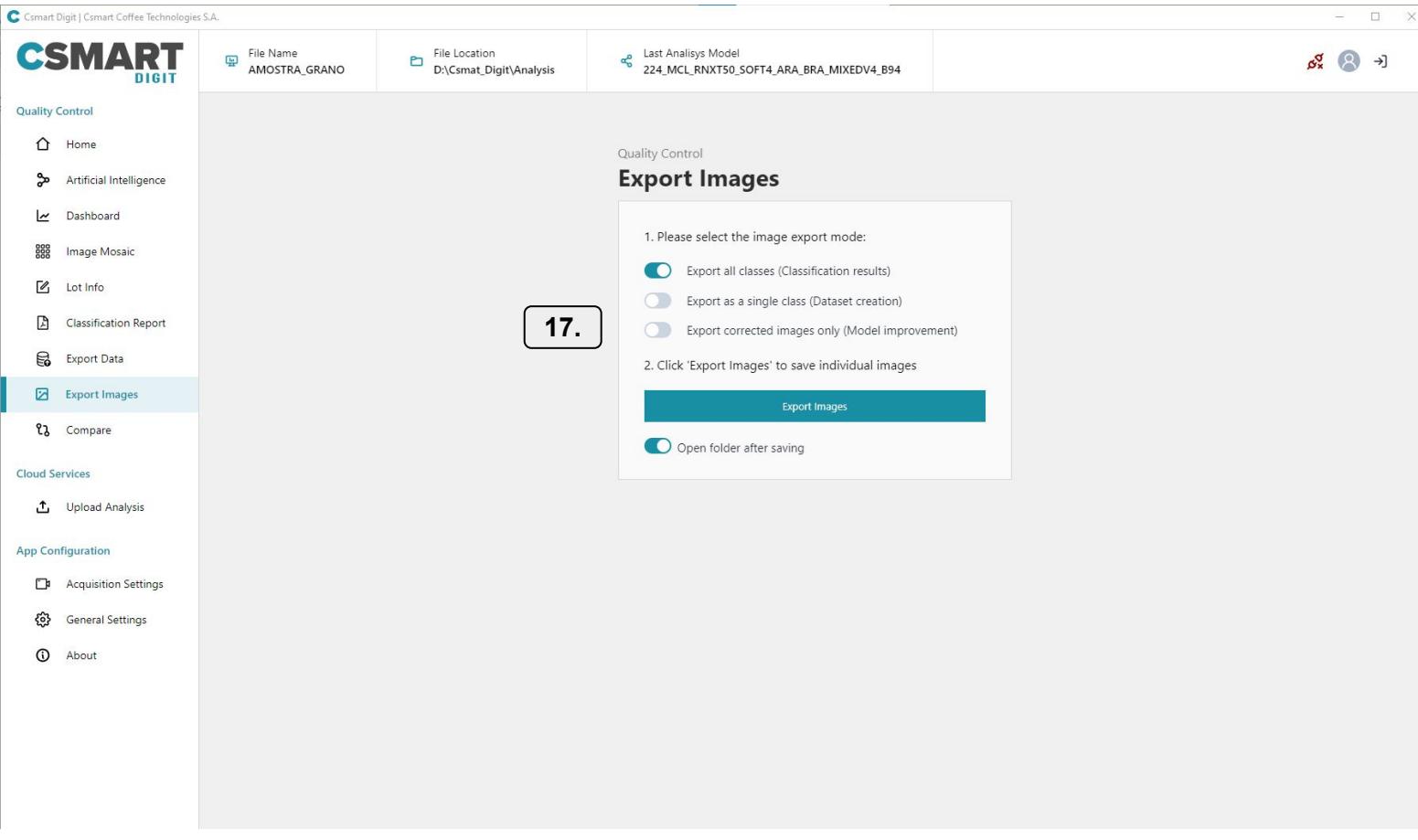
13. The classification report incorporates changes in screen distribution, allowing it to be represented as relative to weight or relative to count.

14. The Screen Distribution mode can be selected to include only good coffee, only defective coffee, or both, in regards to tables and plots.

15. The user can specify limits for screen size, adapting the data accordingly.

16. A new selection allows specifying the method to be included in the report

# Classification Report



The screenshot shows the CSMART DIGIT Quality Control interface. The left sidebar contains a navigation menu with the following items: Quality Control (selected), Home, Artificial Intelligence, Dashboard, Image Mosaic, Lot Info, Classification Report, Export Data, Export Images (selected), Compare, Cloud Services, Upload Analysis, App Configuration (Acquisition Settings, General Settings), and About. The main content area displays the 'Export Images' dialog box. The dialog box has the following steps:

1. Please select the image export mode:
  - Export all classes (Classification results)
  - Export as a single class (Dataset creation)
  - Export corrected images only (Model improvement)
2. Click 'Export Images' to save individual images

Below the second step is a large teal button labeled 'Export Images'. At the bottom of the dialog box is another teal button labeled 'Open folder after saving' with a checked radio button next to it. The number '17.' is displayed in a box on the left side of the dialog box.

13 Export Images is now divided into three different modes:

## Export All Classes:

Saves a new folder for each class, containing the respective images inside.

## Export as a Single Class:

Saves all images into a single folder and is intended to create training datasets, particularly in cases where the input sample is previously known to be a single class, regardless of the actual classification.

## Export Corrected Images:

Only exports images that were changed in class by the user.



CSMART COFFEE TECHNOLOGIES SA

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