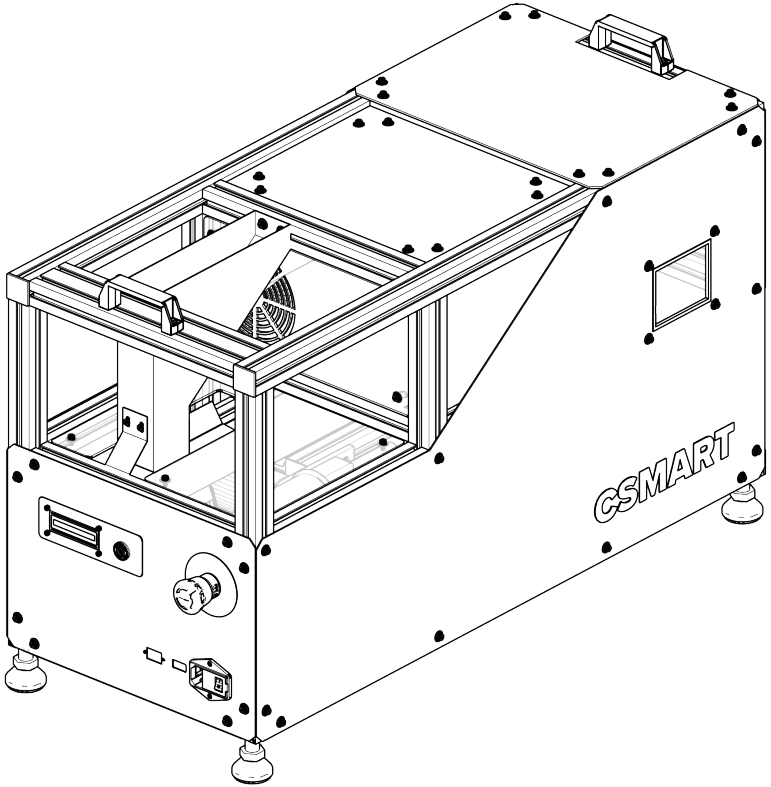


Quick User Manual

Device Control Desktop App

Major version - V3.0.0

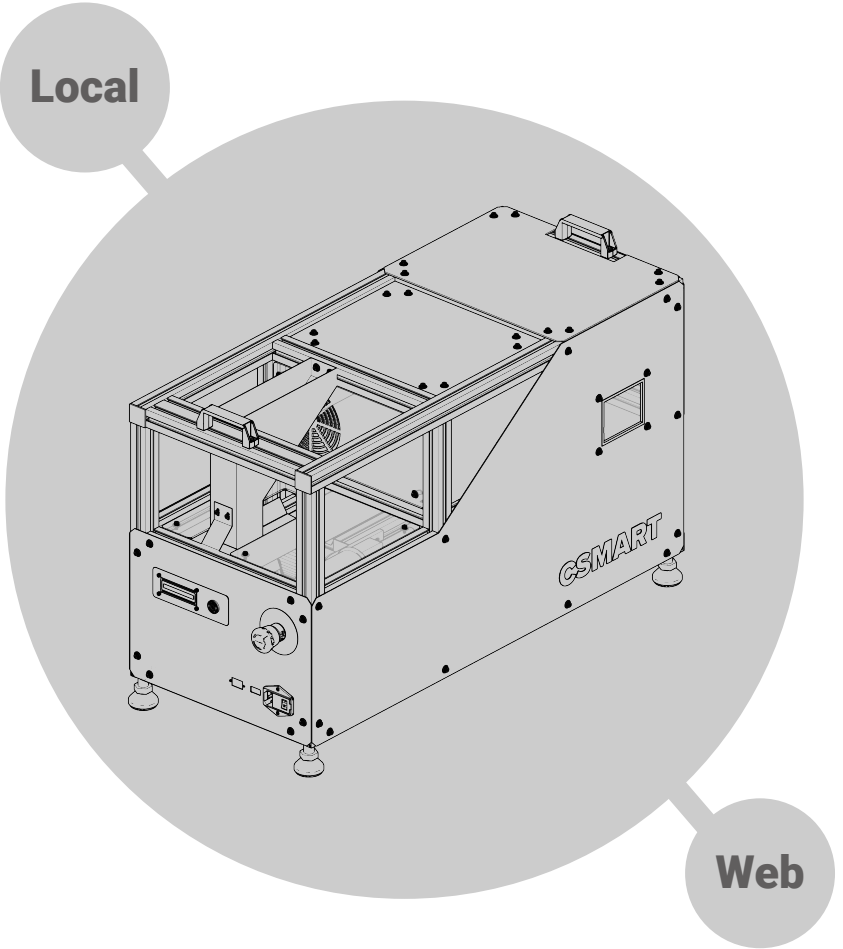
2023/02/08

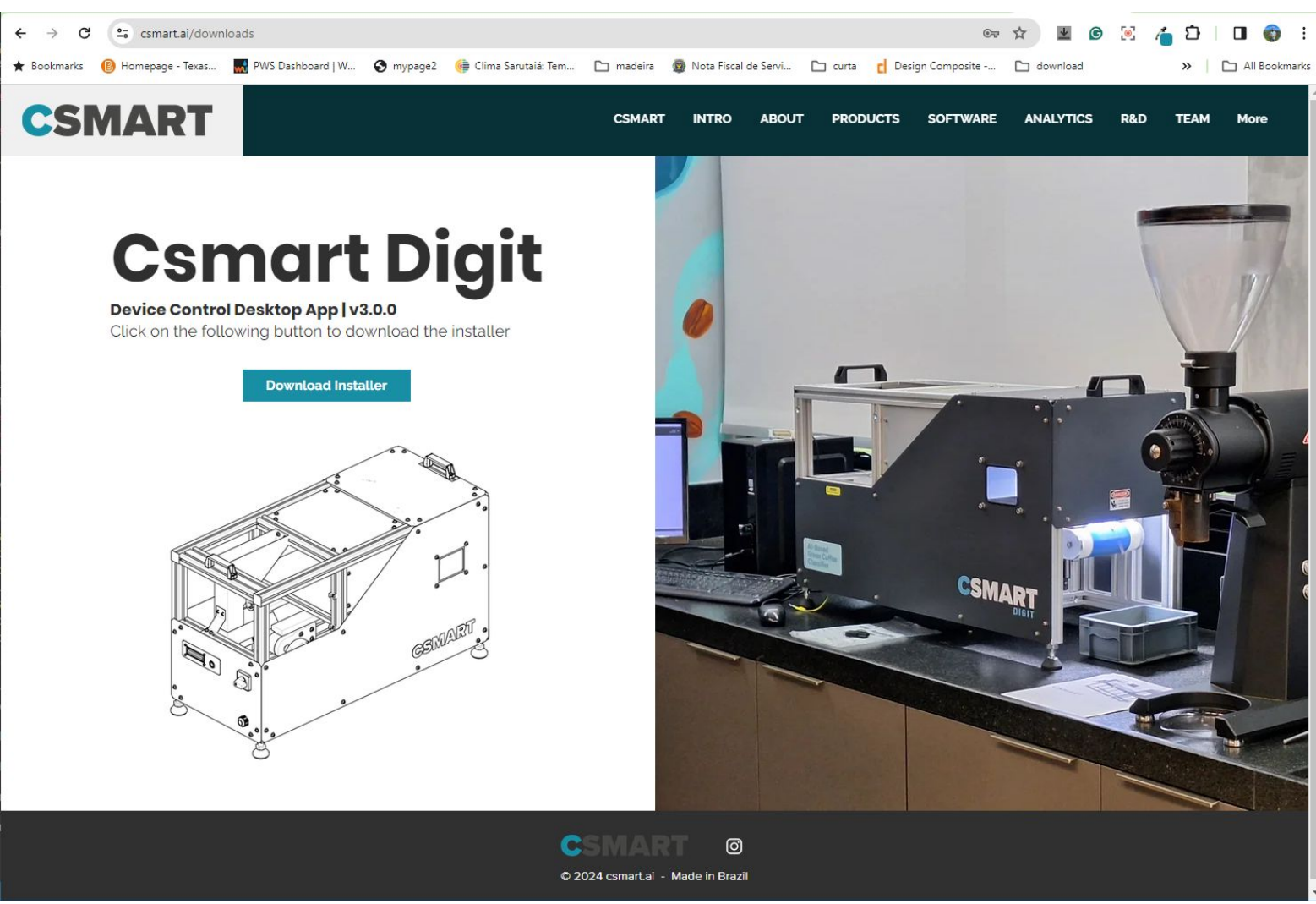
CSMART DIGIT

Csmart Digit
v3.0.0

We are excited to announce the release of version 3.0.0, a significant milestone in the evolution of Csmart Digit. This major update marks a pivotal transformation in software architecture, enabling a more versatile and seamless user experience across multiple operating systems. Version 3.0.0 not only represents a leap forward in terms of technology but also introduces a suite of enhancements and new features designed to improve performance, usability, and integration capabilities.

A key feature of this release is the integration of the desktop application with a proprietary web app that centralizes all analysis in a single repository. By consolidating data in one place, our solution now offers an unprecedented level of convenience and accessibility, allowing users to collaborate more effectively and streamline their workflows.





Download Installer

Go to csmart.ai/downloads

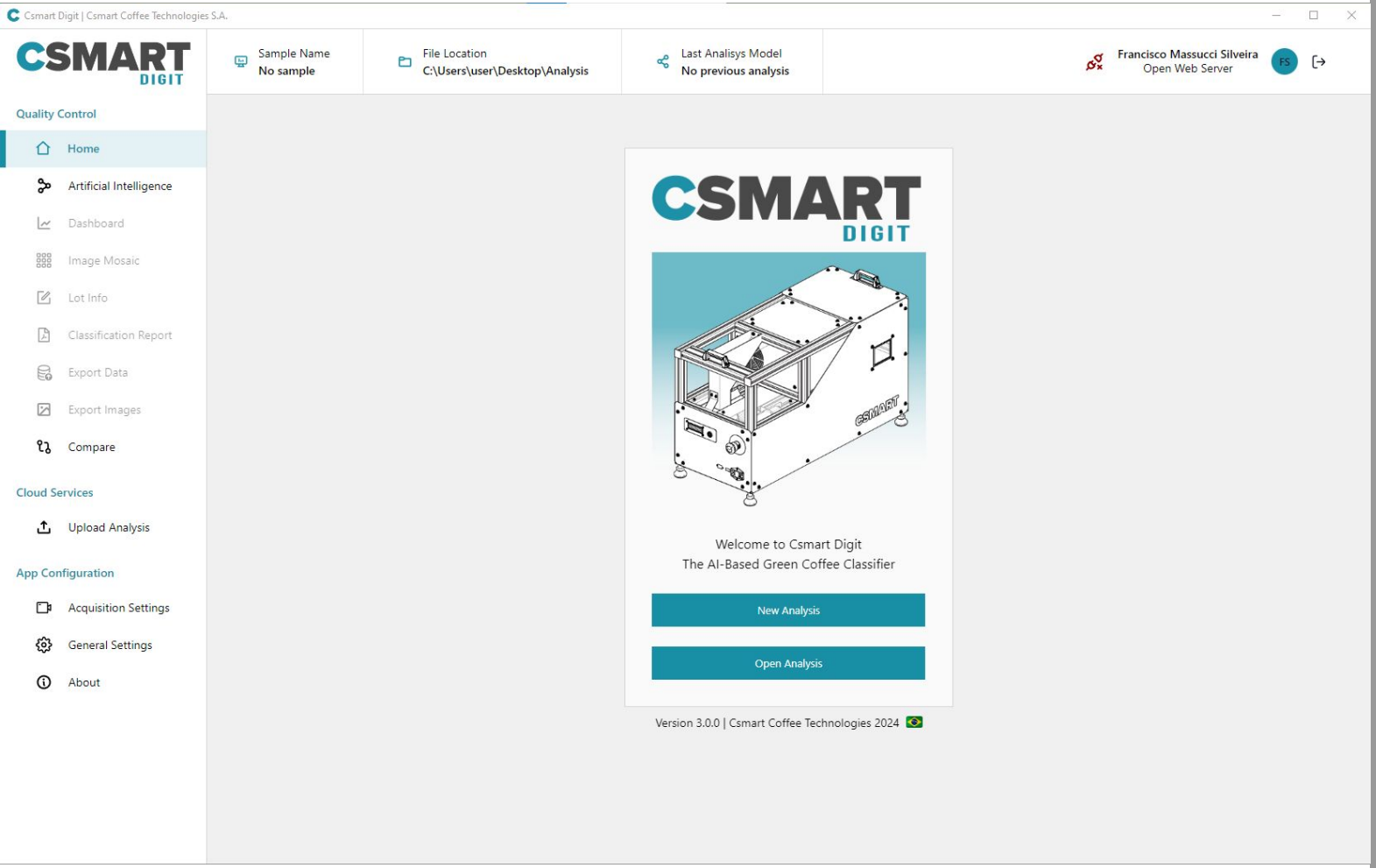
The password to download the app is: **digit_users**

Find the file named "csmart-digit Setup 3.0.0.exe" and double-click to install.

Ignore any Windows or antivirus messages and proceed with the installation.

Important: Choose a location for installation that doesn't require admin privileges.

A desktop window will appear once the installation is finished.



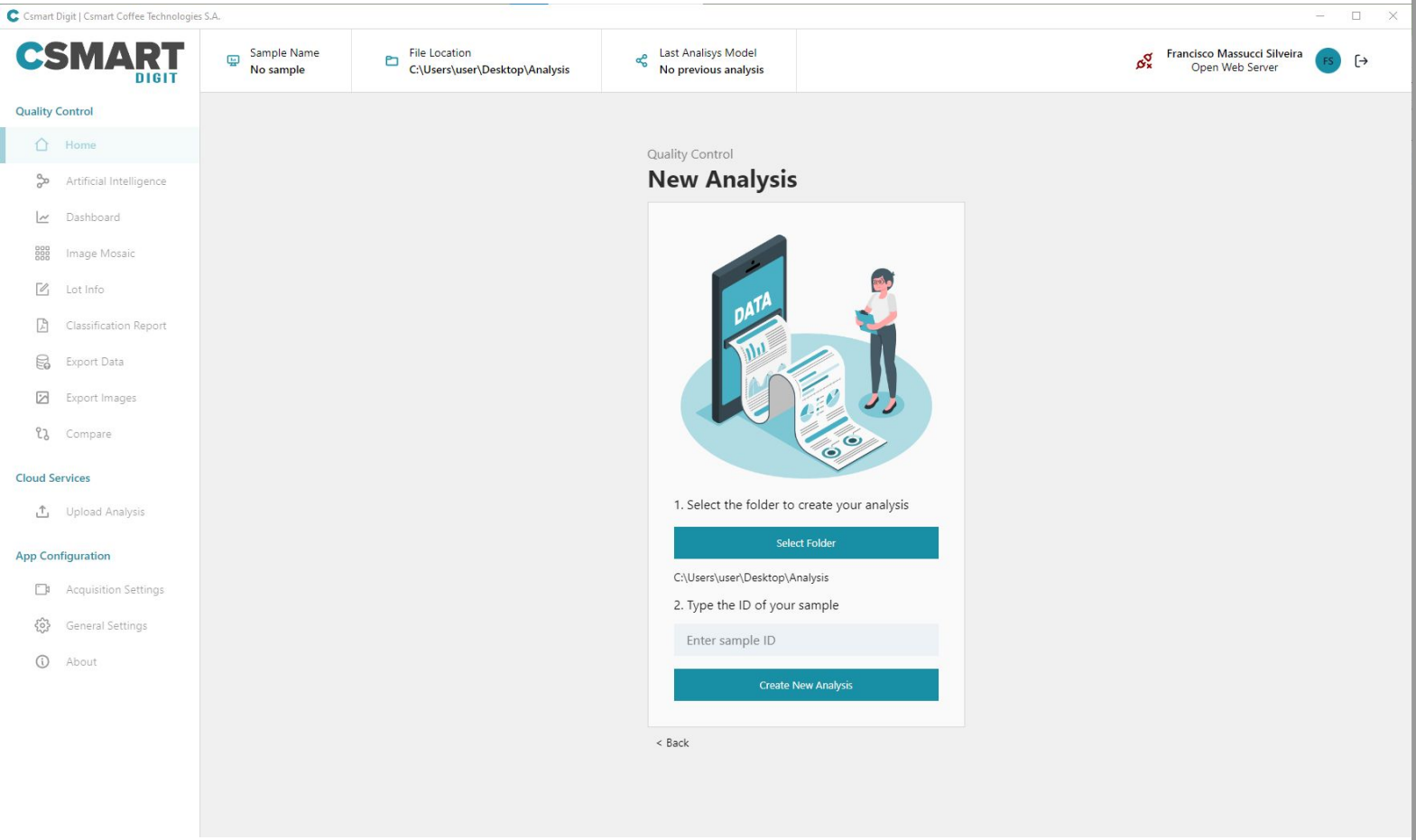
Home

Upon first opening the app, you will be directed to the home screen.

In this page you have the option to create a new analysis or open an existing one.

The sidebar menu contains all the existing routes of the software, which will be discussed in detail in the subsequent slides.

The top bar consists of information about the opened analysis on the left and information about the user on the right

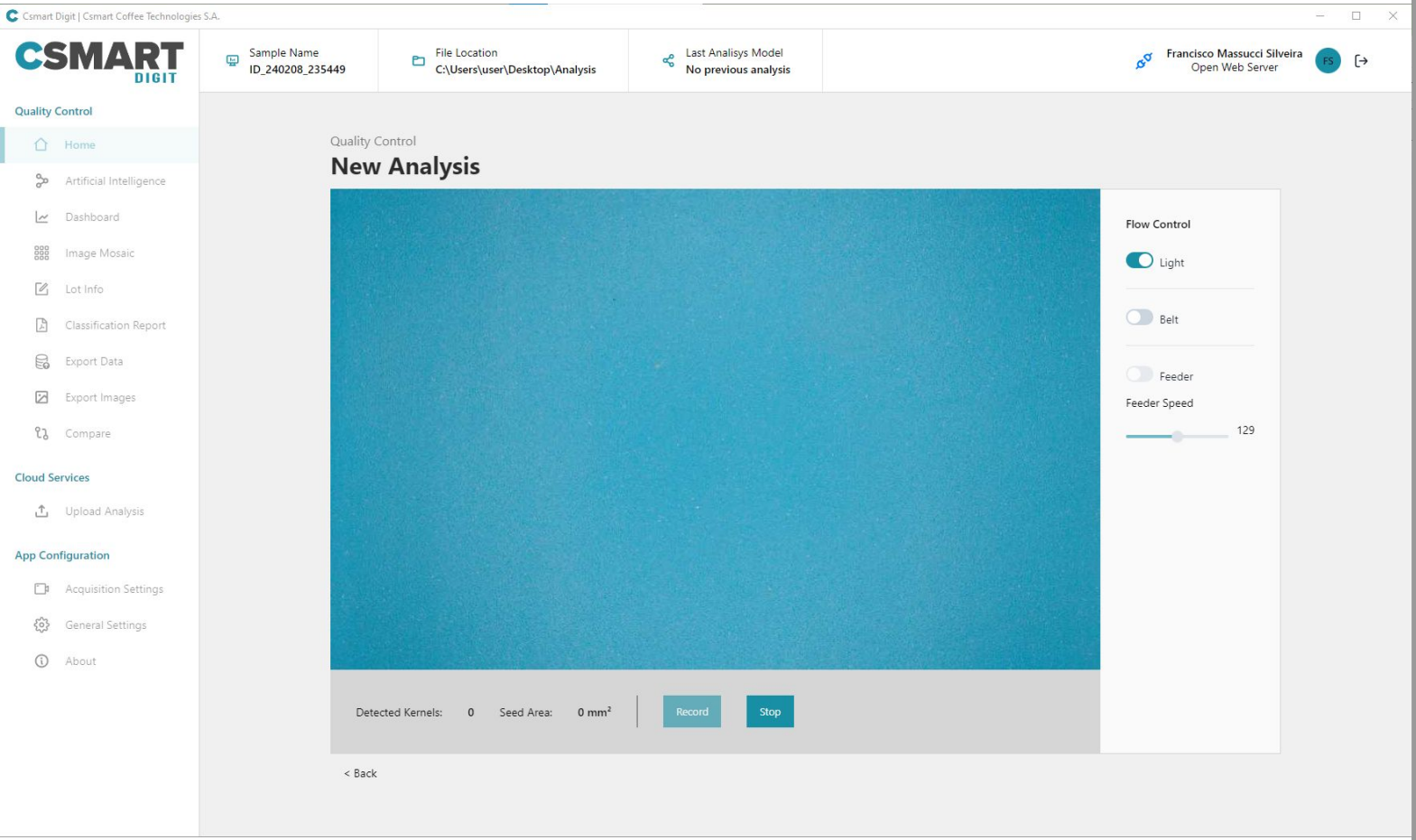


New Analysis

By clicking on "New Analysis," you can now choose the folder where the .hdf5 file will be saved.

Each analysis will be saved within a single .hdf5 file. This file is a self-contained data structure capable of holding all images and data related to the sample.

Enter the sample ID or simply click "Create New Analysis" to start recording the images with a random sample name.



New Analysis

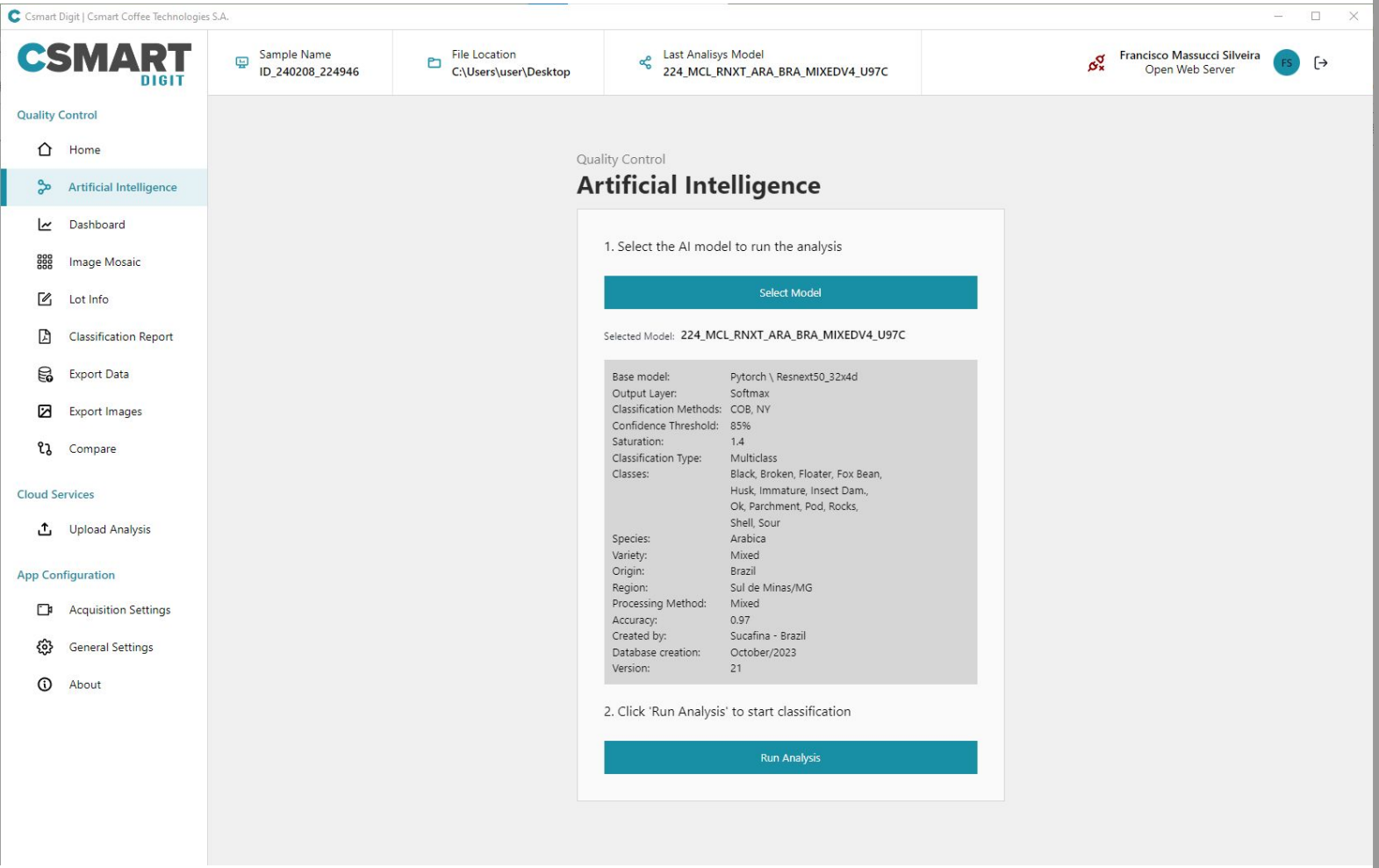
Click on "Record," to start the camera.

The connection logo in the upper right corner will change from red to blue, indicating that a connection has been successfully established.

If the connection fails to establish, please verify the USB cable connection to the Wi-Fi device.

Once the camera is on, you can proceed to turn on the light, belt, and feeder, adjusting the feeder speed as needed.

To finish, simply click "Stop" once all sample have been processed.

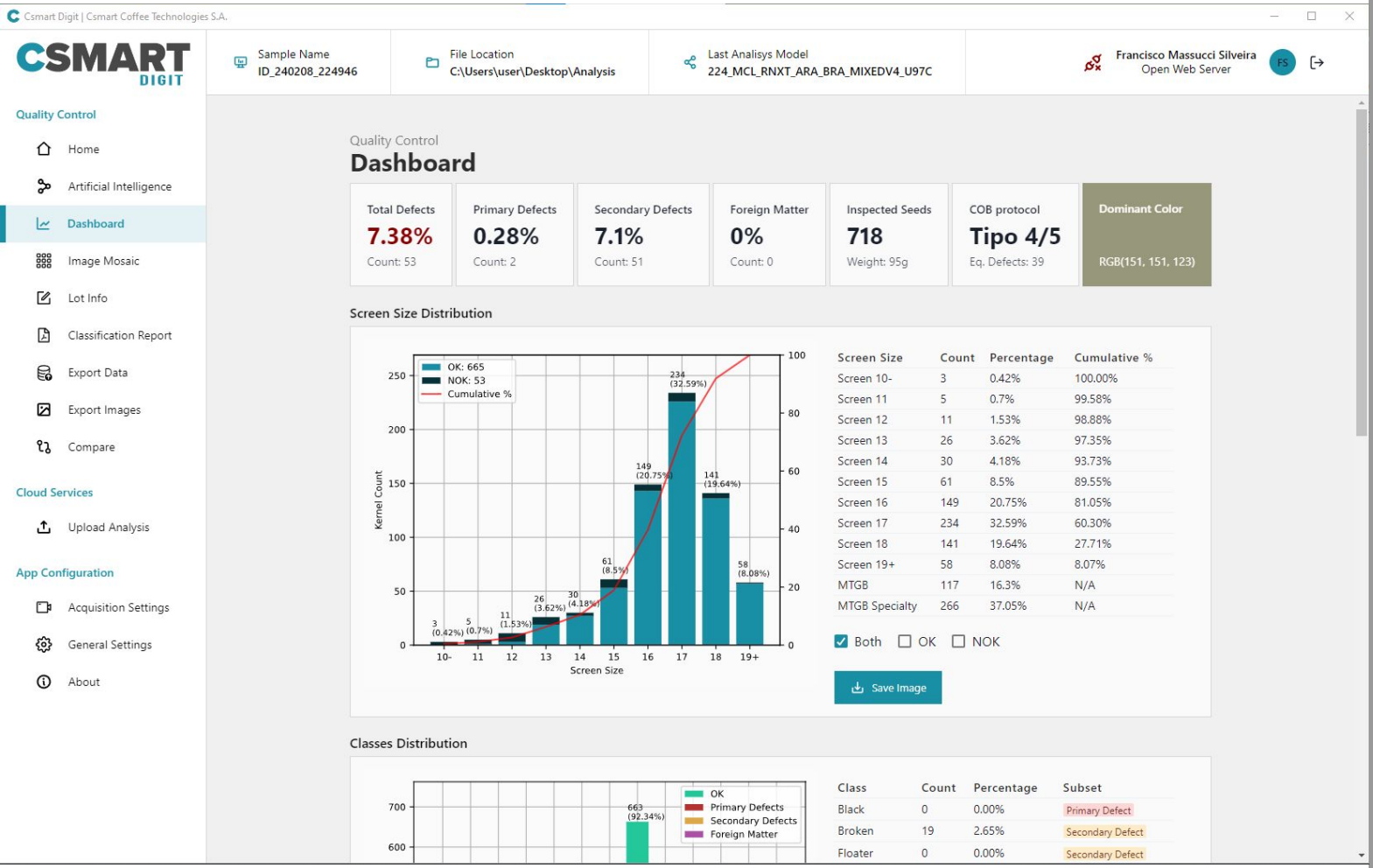


Artificial Intelligence

After clicking the "Stop" button, the software will redirect you to the Artificial Intelligence page.

Click on "Select Model" to choose the appropriate classification model that matches the newly recorded sample.

Double-check the model information, then click "Run Analysis" to perform the classification analysis.



Dashboard

Upon completion of the analysis, the dashboard will automatically update to display all the information related to the sample.

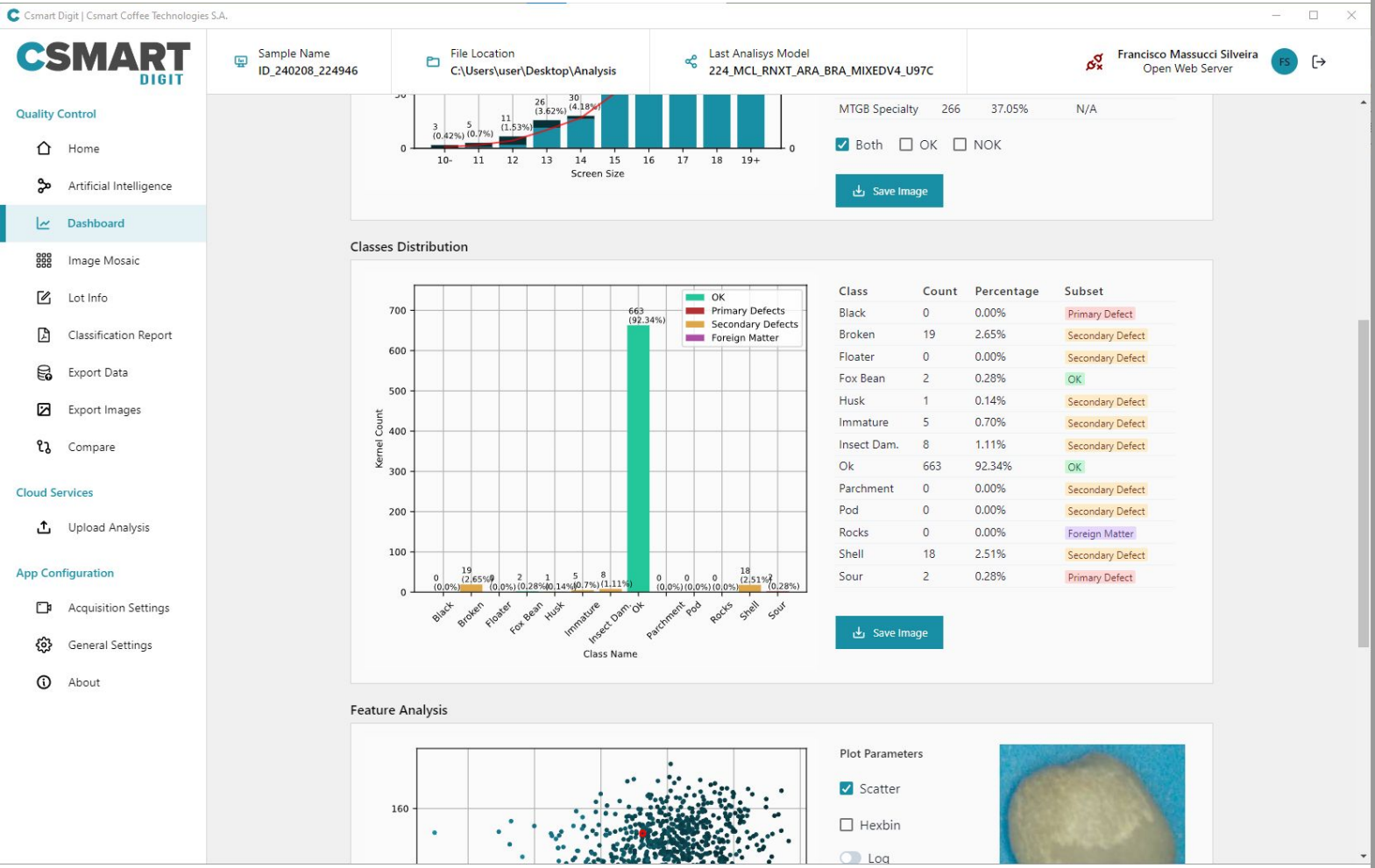
The upper section of the page features:
- Total Defects
- Primary Defects
- Secondary Defects
- Foreign Matter
- Number of Seeds
- Grading Method
- Dominant Color

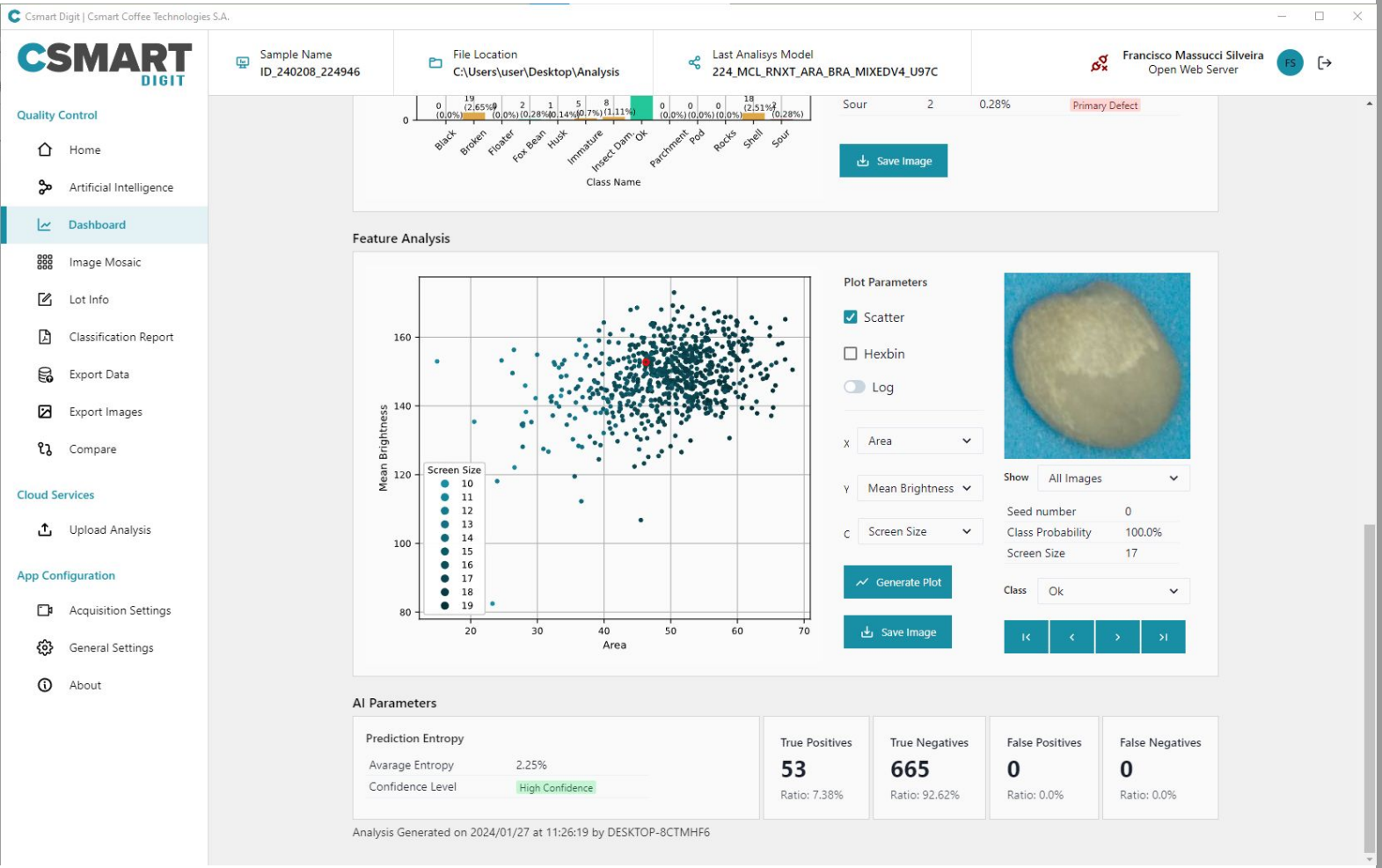
Following this, you will find the graph showing screen size distribution, accompanied by information in a table format

Dashboard

Scrolling down the page, one will find the Classes Distribution graphic along with a table detailing the defect classes, defects count, and their percentages relative to the total number of seeds.

Additionally, it categorizes each finding into subsets of classification, indicating Primary Defect, Secondary Defect, Foreign Matter, and Ok status.





Dashboard

At the bottom of the dashboard, the Feature Analysis chart is presented with variables that have been extracted from each seed.

Furthermore, the interface allows for the individual visualization of seeds, navigation through the entire collection, and modifying the classification through the "Class" selection menu.

In the footer, cards display information pertaining to Artificial Intelligence metrics, offering insights into the performance and outcomes of the classification process.

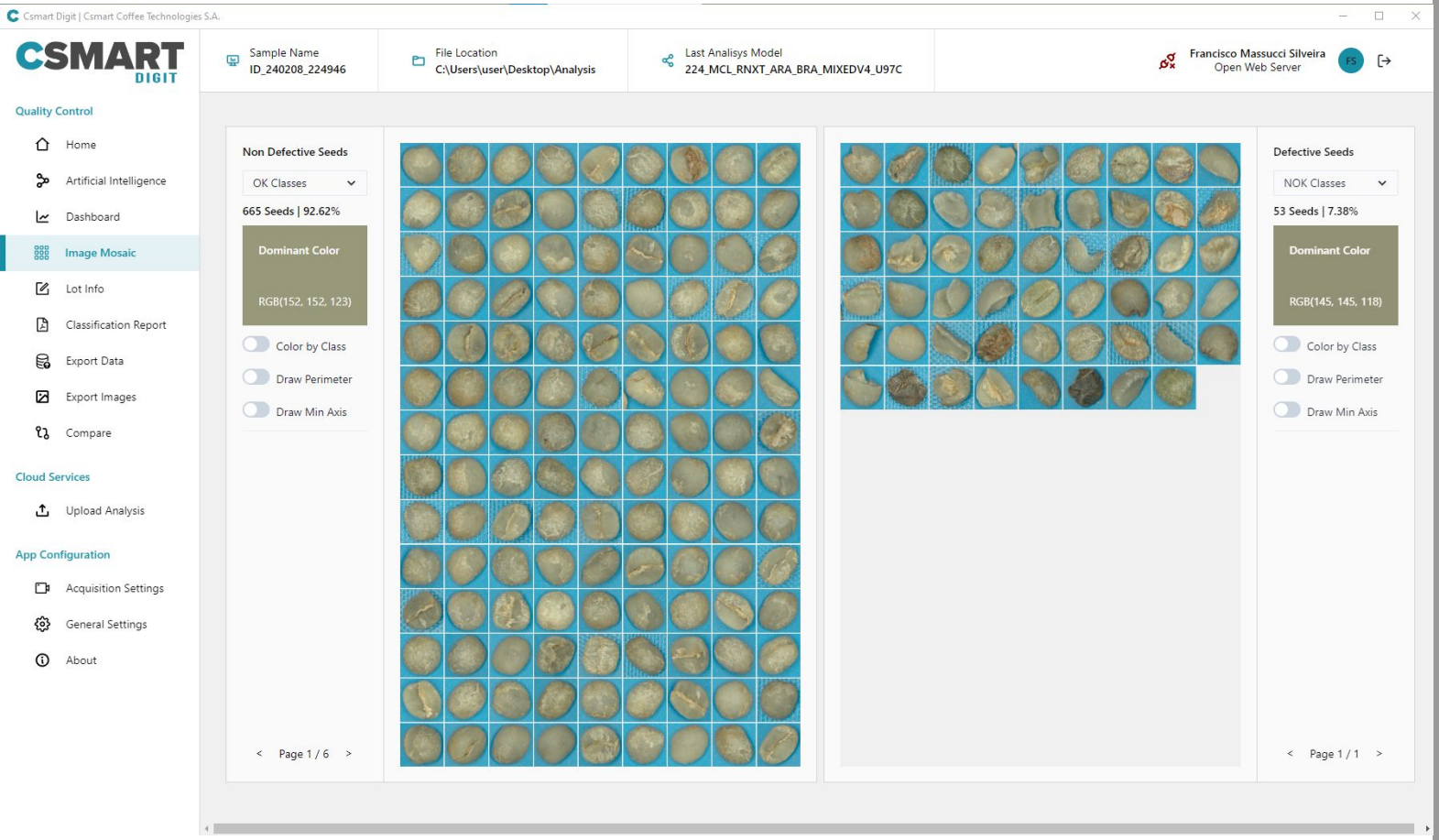


Image Mosaic

Click on "Image Mosaic" to view a sample of both non-defective and defective seeds, along with the dominant color for each subgroup.

Use the drop-down menu to select and visualize a specific class within either the defective or non-defective seed groups.

The definitions of classes, as well as the categorization into defective and non-defective groups, are determined by the model file and can be modified upon request.

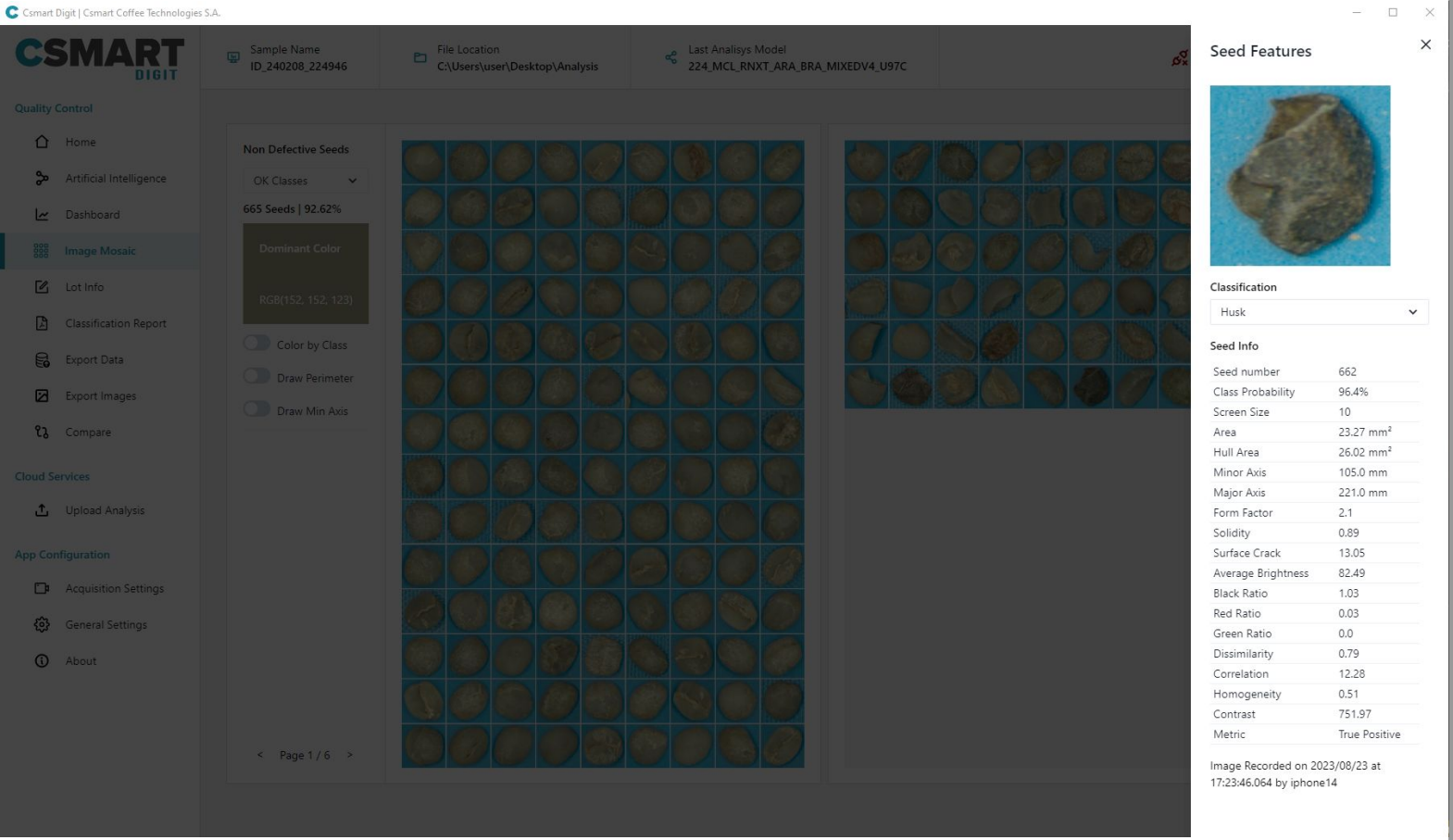


Image Mosaic

Click on any image to open a side drawer menu displaying comprehensive information about a specific seed.

Correct the classification by simply selecting a new class name from the classification drop-down menu.

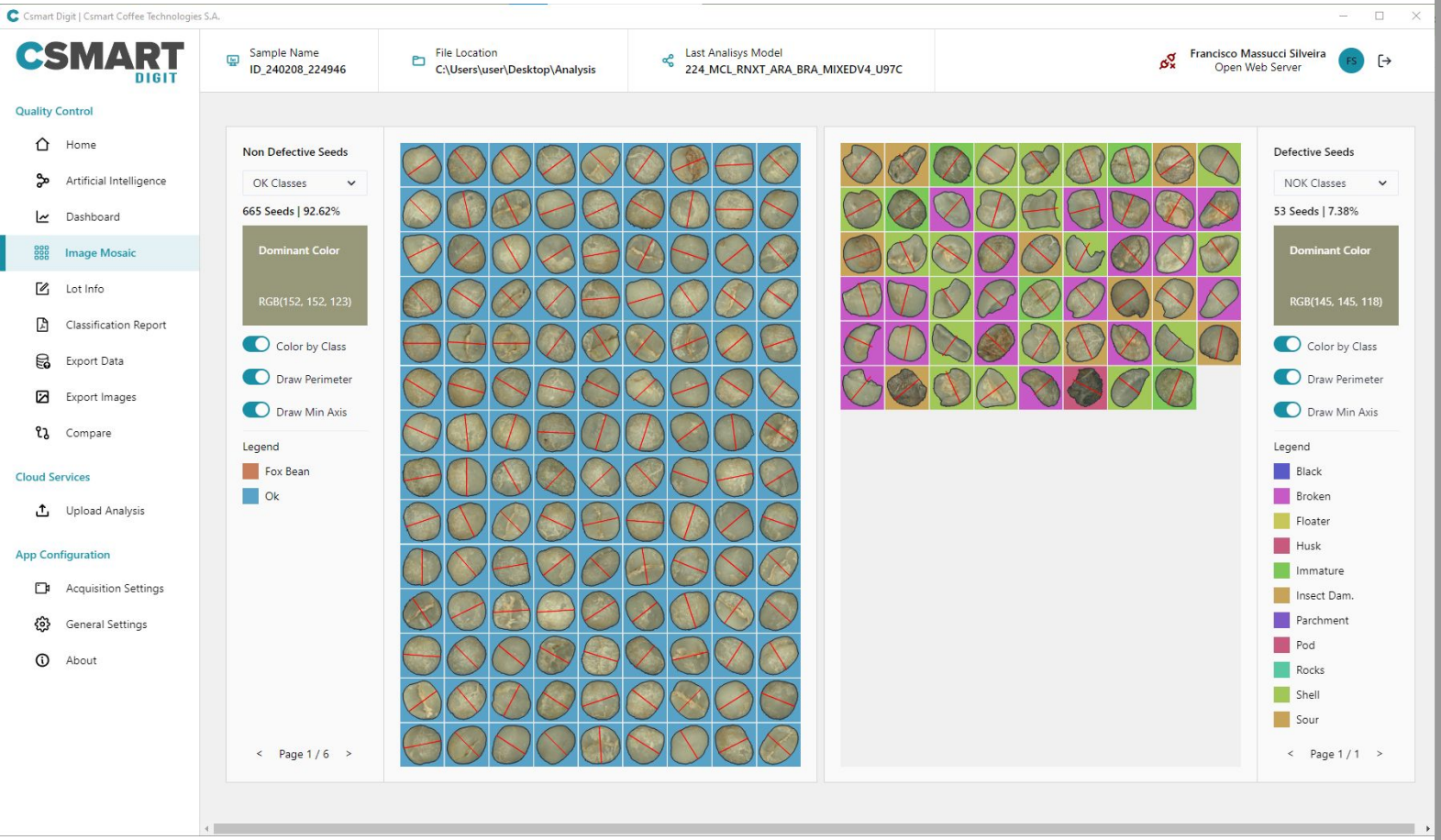
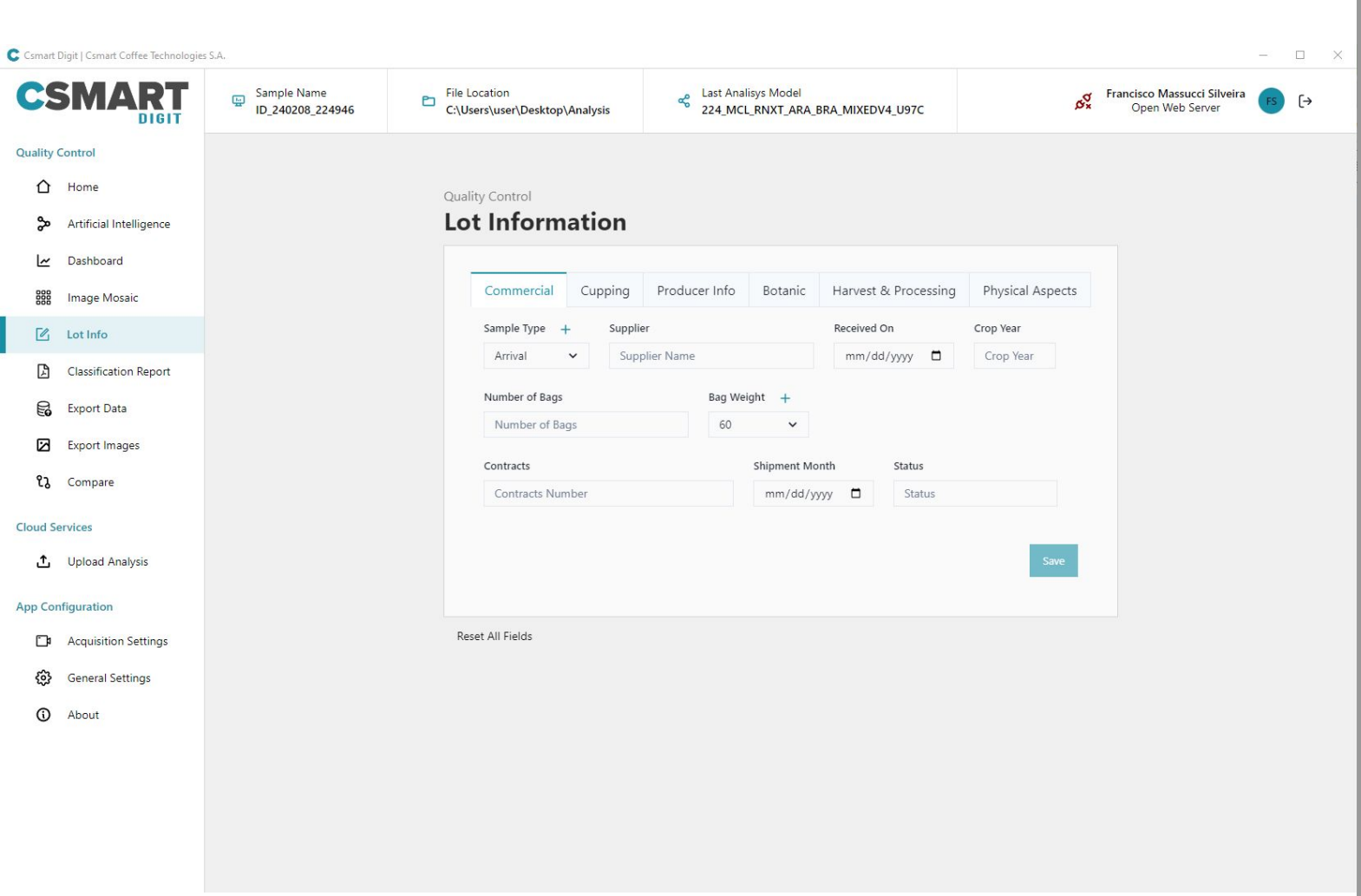


Image Mosaic

Incorporate visual artifacts, such as perimeter and minimum axis length, to improve the visualization.

Additionally, visualize each defect class using the corresponding color indicated in the legend to facilitate easy identification.

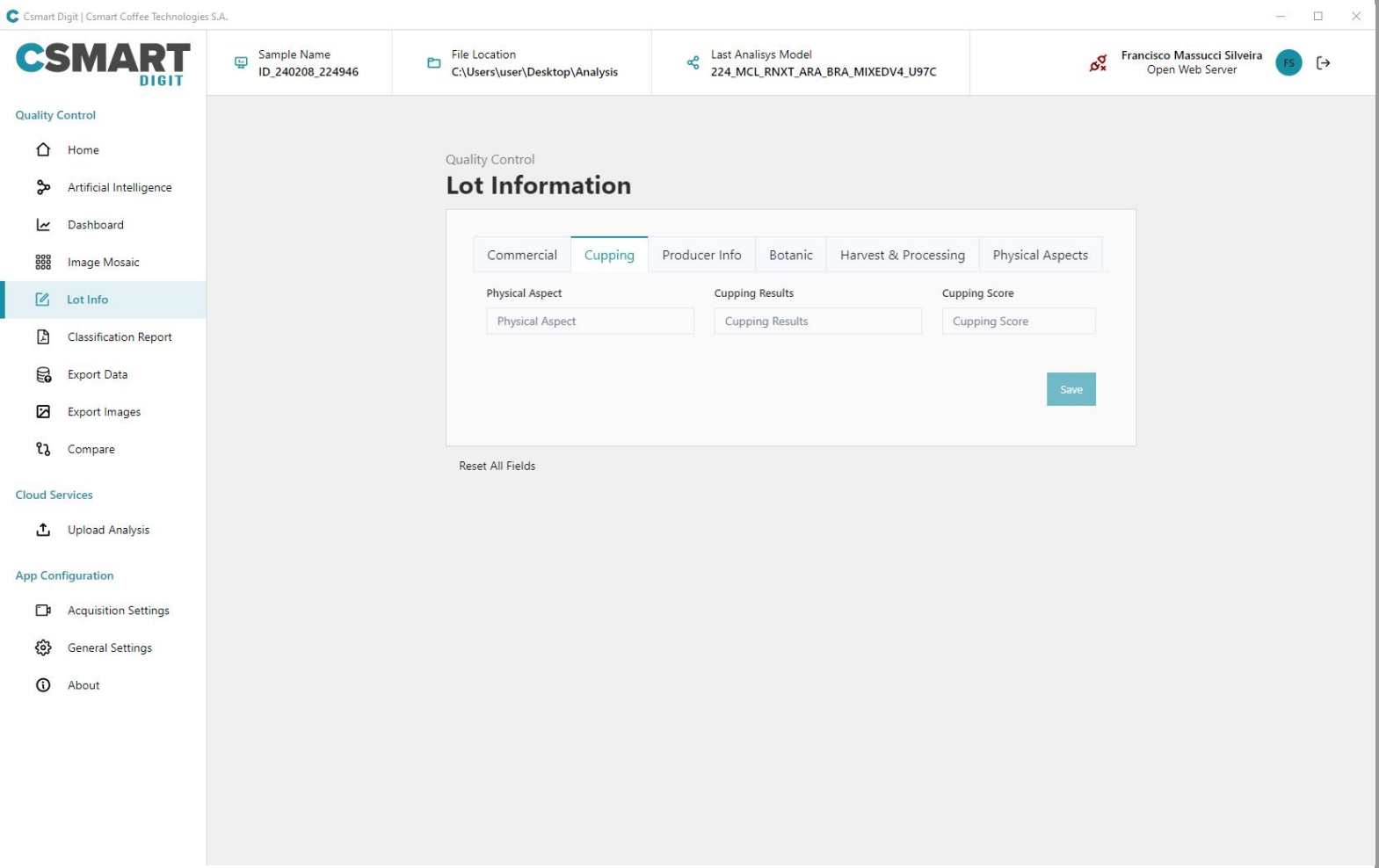


Lot Information

The "Lot Information" menu consolidates all the details about the sample that cannot be directly discerned from its image, thereby enriching the sample information.

The first tab displays commercial information, which will be utilized in the PDF report. This includes:

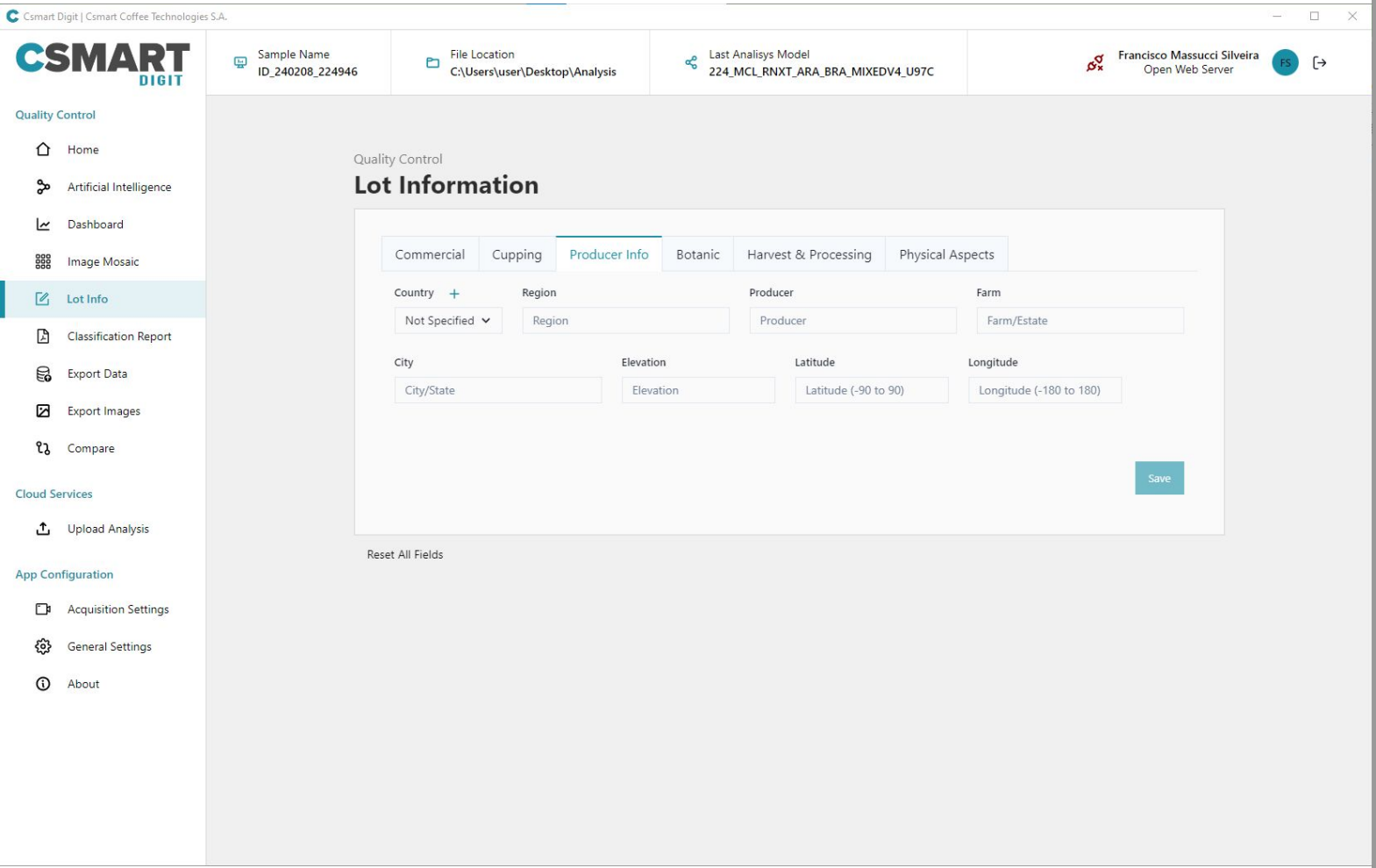
- Sample Type
- Supplier
- Date Received
- Crop Year
- Number of Bags
- Bag Weight
- Contracts
- Shipment Month
- Status



Lot Information

The "Cupping" tab displays detailed information concerning the grading attributes derived from cupping evaluations. This includes fields such as:

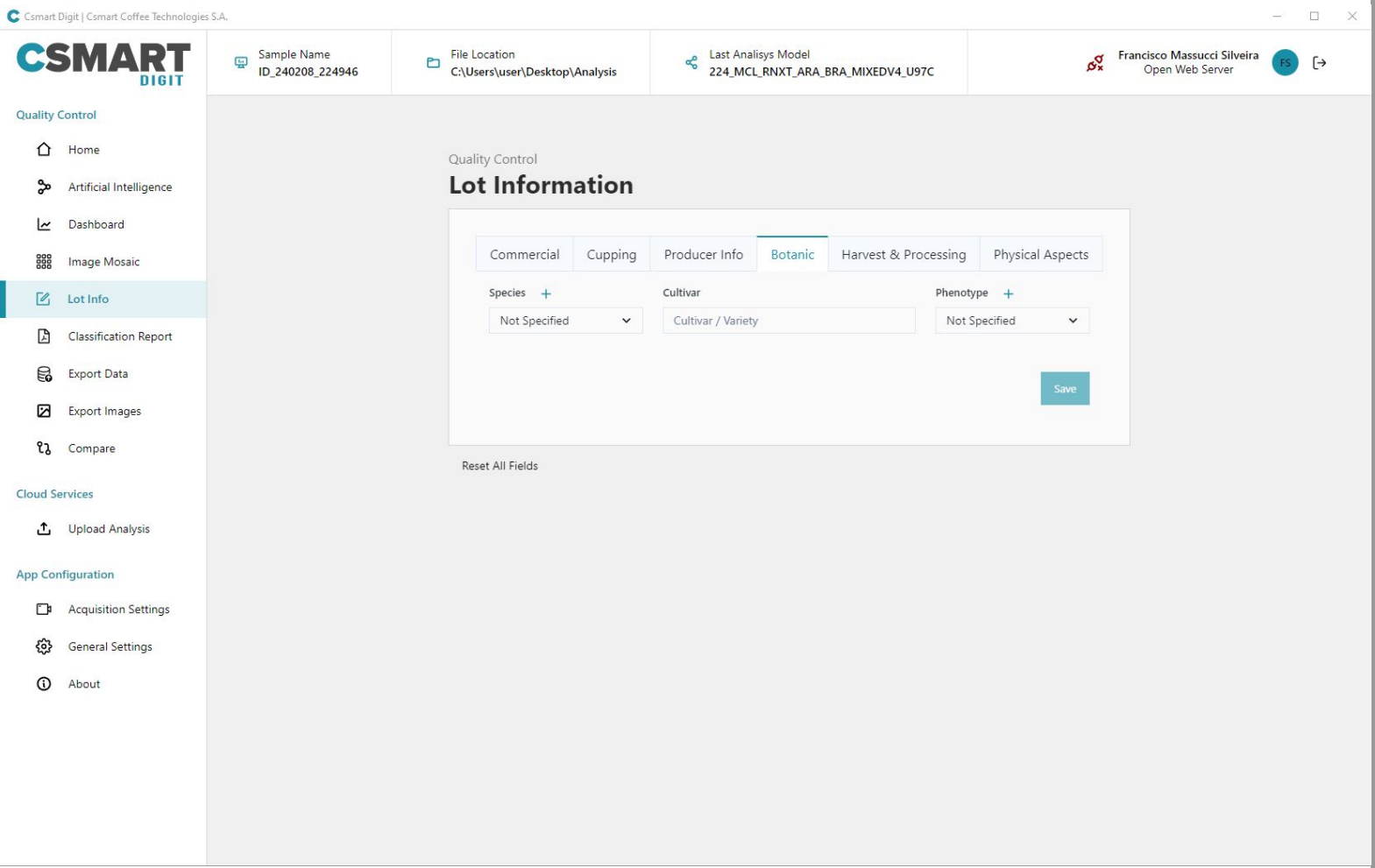
- Physical Aspects
- Cupping Results
- Cupping Scores



Lot Information

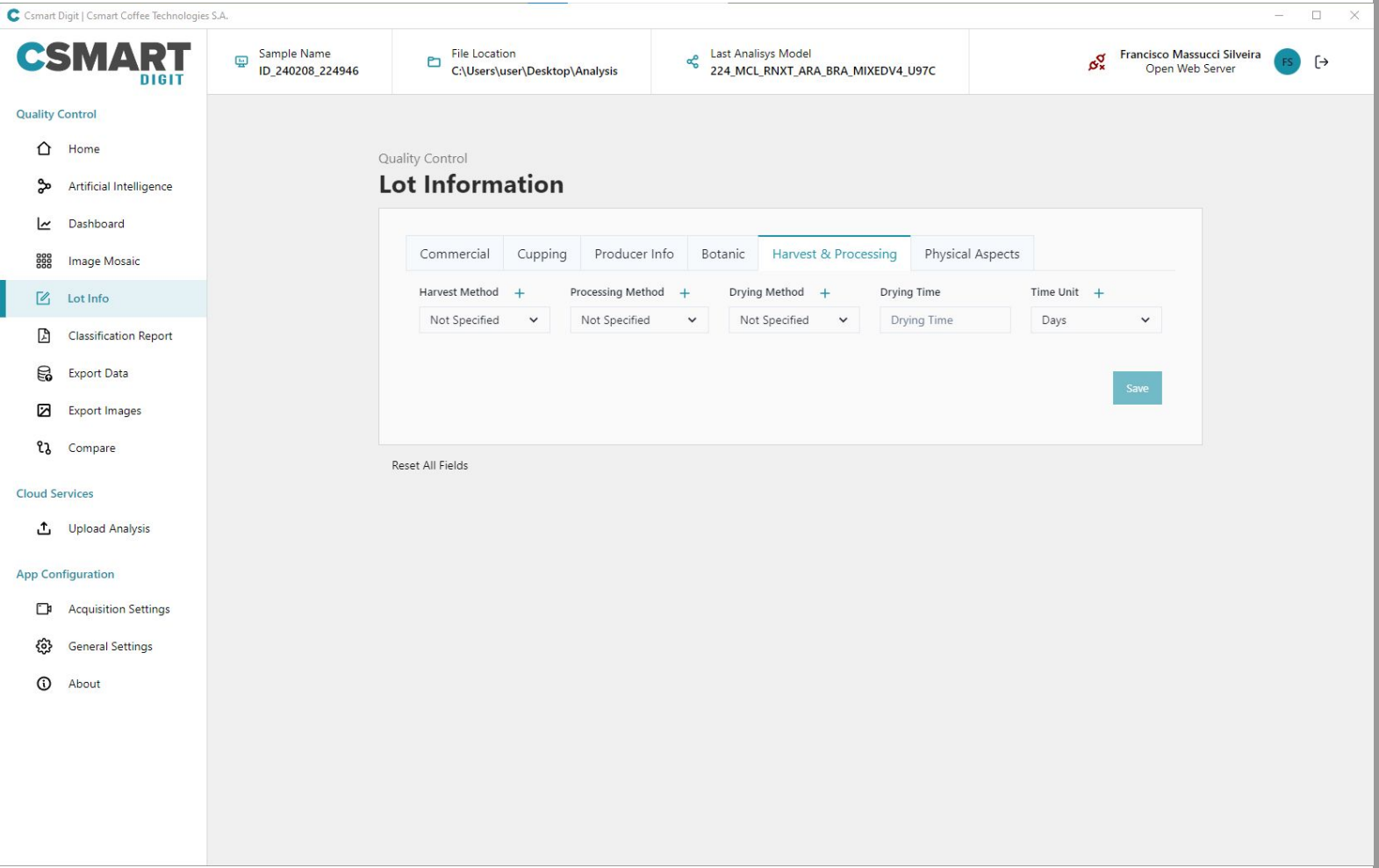
The "Producer Info" tab displays detailed information regarding the origin of the coffee and the farm where it was processed. Included fields are:

- Country
- Region
- Producer
- Farm
- City
- Elevation
- Latitude
- Longitude



Lot Information

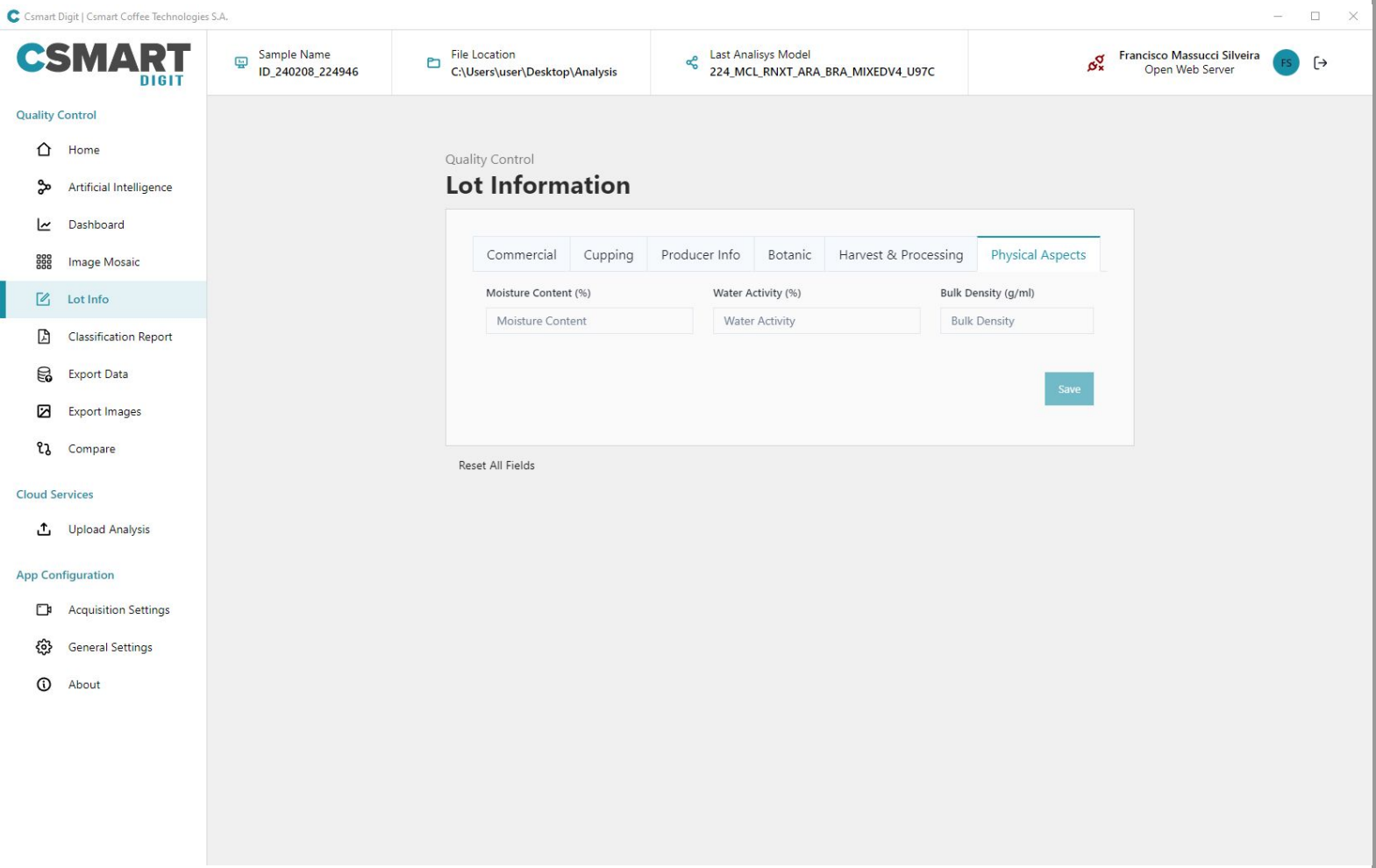
The "Botanic" tab displays information regarding the Species, Cultivar and Phenotype.



Lot Information

The “Harvest” tab displays detailed information regarding its production, including fields such as:

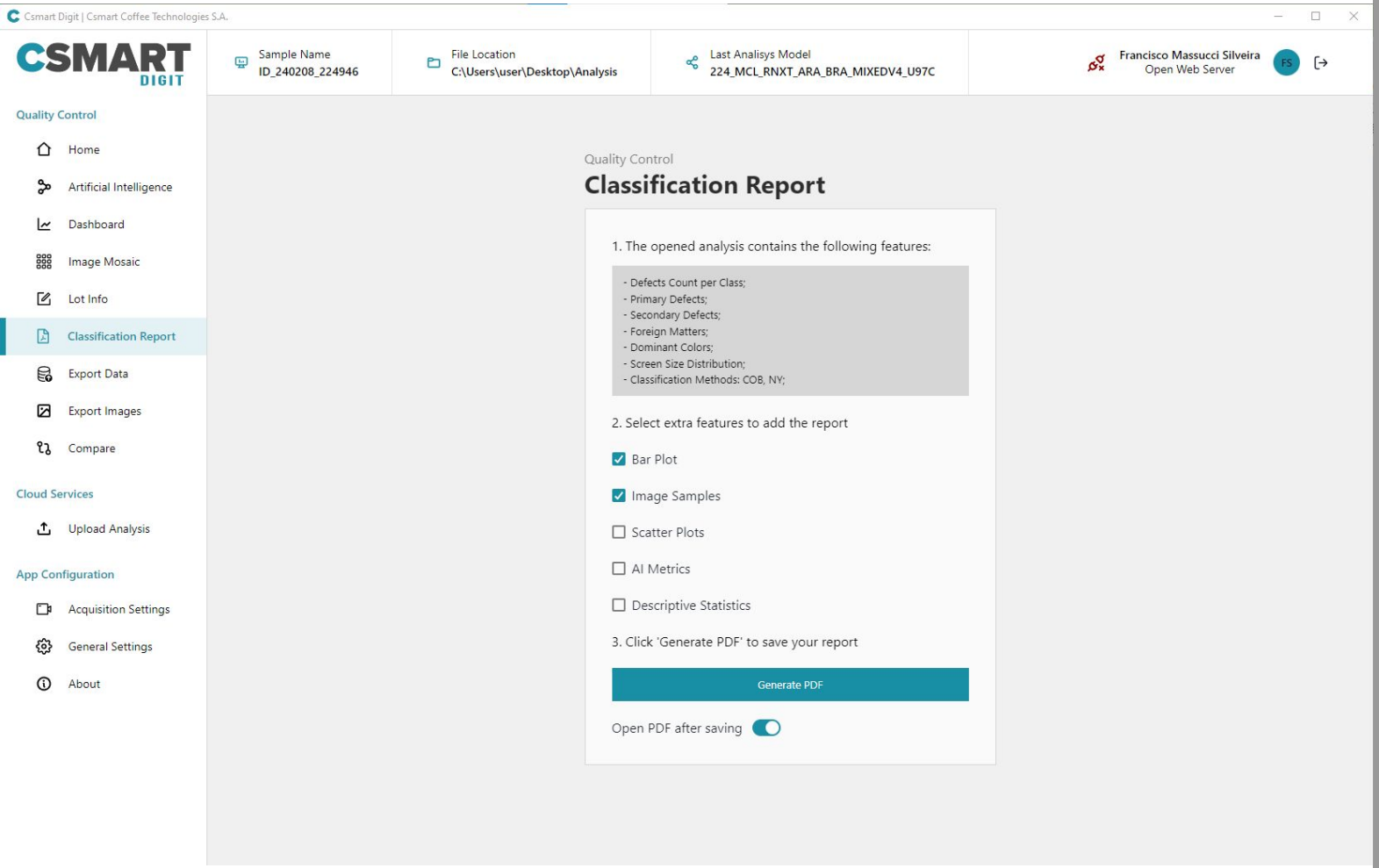
- Harvest Method
- Processing Method
- Drying Method
- Drying Time
- Time Unit



Classification Report

Finally, “Physical Aspects” present fields related to the sample’ physical state, including:

- Moisture Content
- Water Activity
- Bulk Density

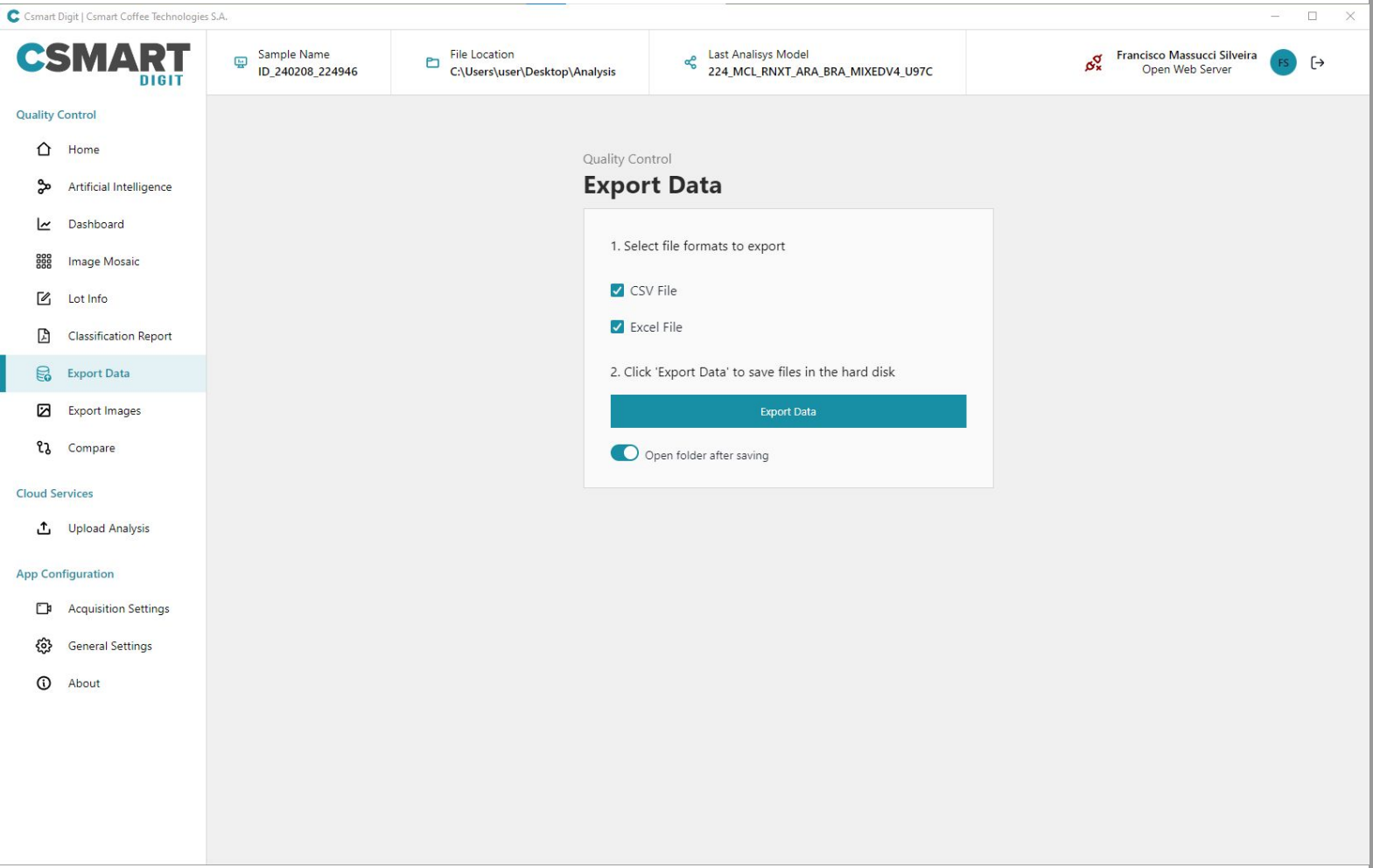


Classification Report

The “Classification Report” Menu is designed to generate a comprehensive PDF file containing all the information presented on the dashboard.

Users can select the types of data to be included. By default, Bar Plot and Image Samples are selected.

The default logo for the report is the Csmart logo. However, if the user is connected to the web server and the company has uploaded a logo into the system, the report will automatically use the company’s logo instead.

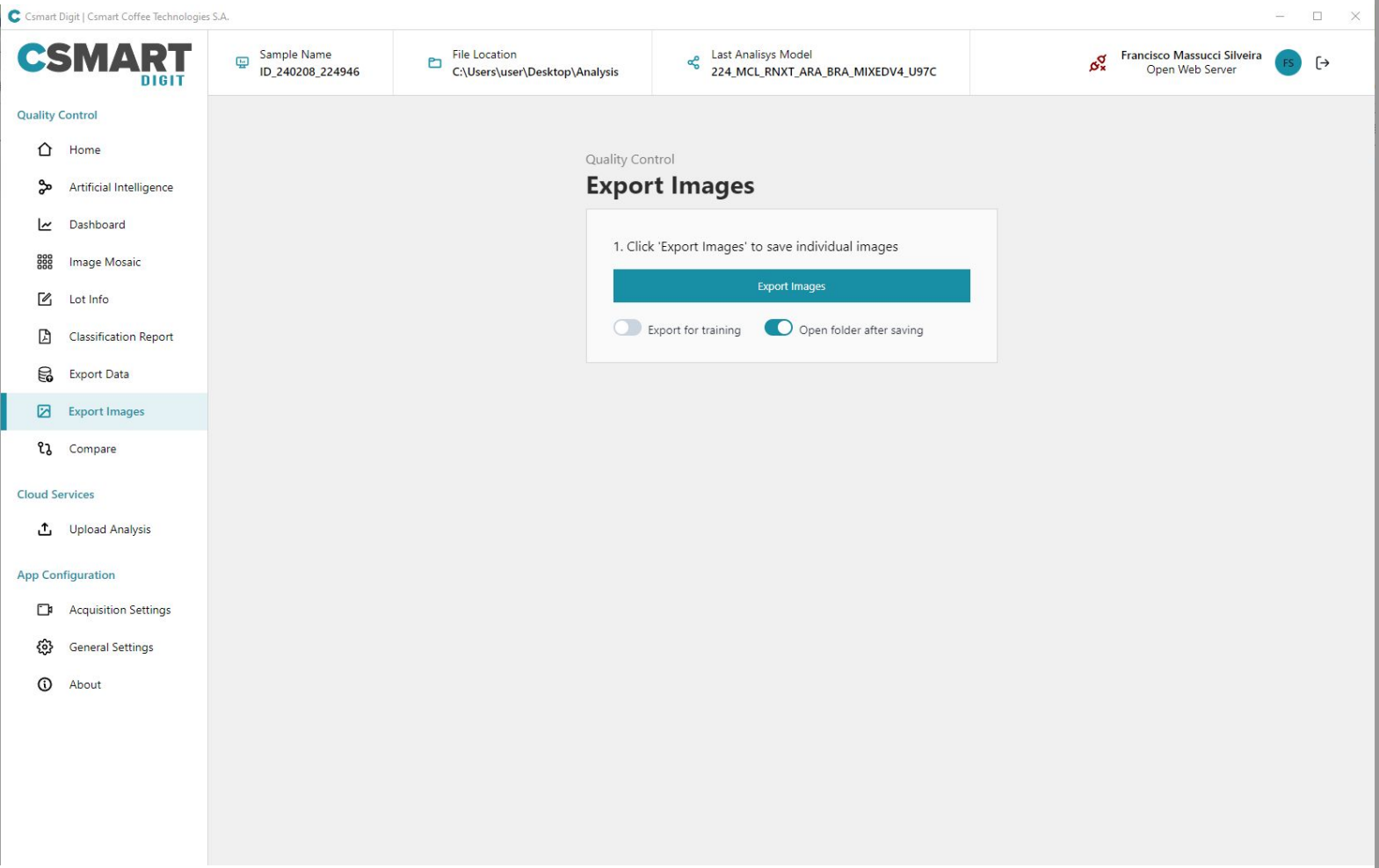


Export Data

The 'Export Data' menu is designed to export data from the .hdf5 file into standard data formats, such as .csv and Excel files.

The exported data includes the summary report of the sample and all the extracted features of each individual seed of the sample.

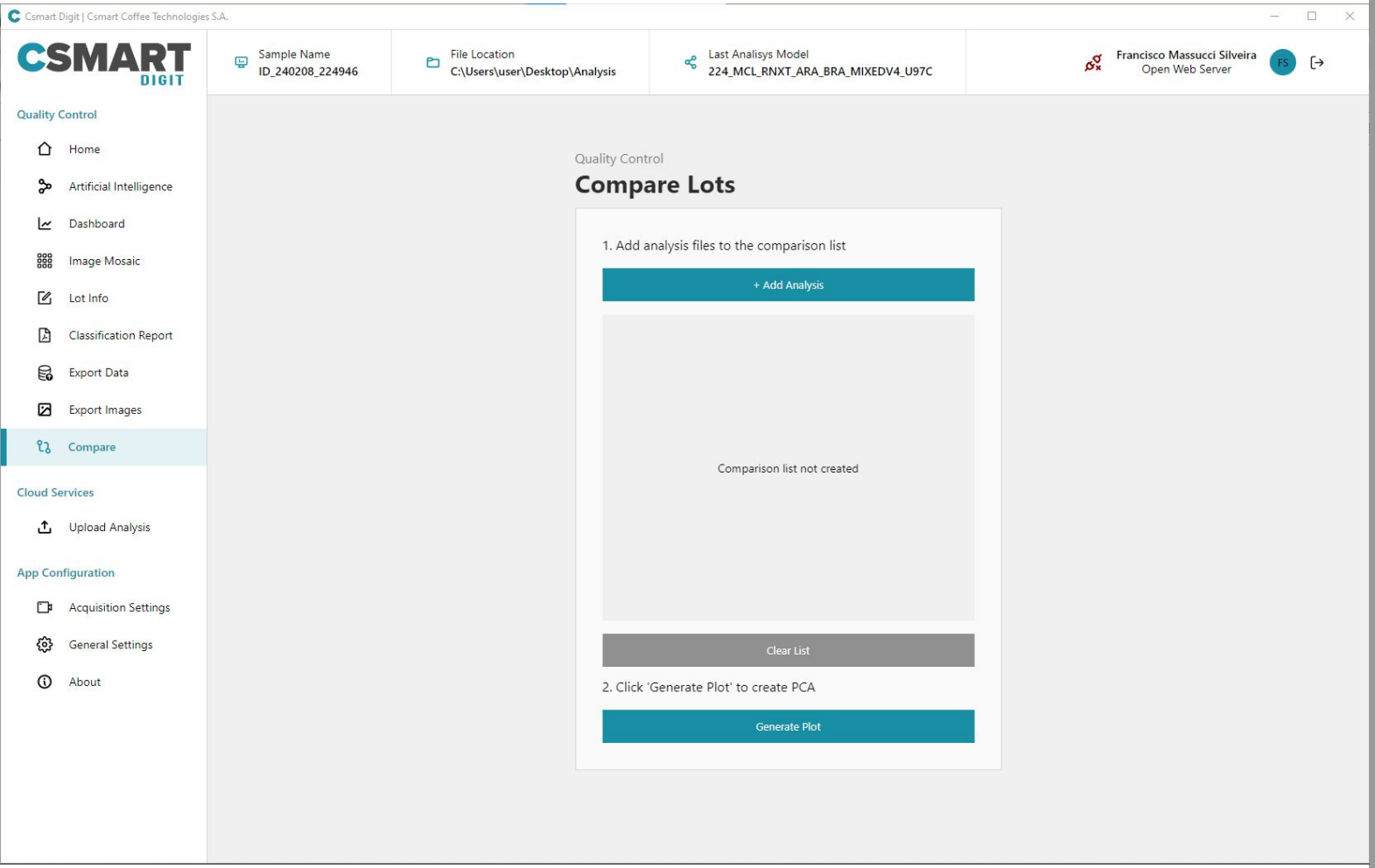
Exported files will be saved in the same folder where the .hdf5 file is saved.



Export Images

Similar to the previous feature, the 'Export Images' function allows for the export of all individual images stored in the .hdf5 file into JPG format.

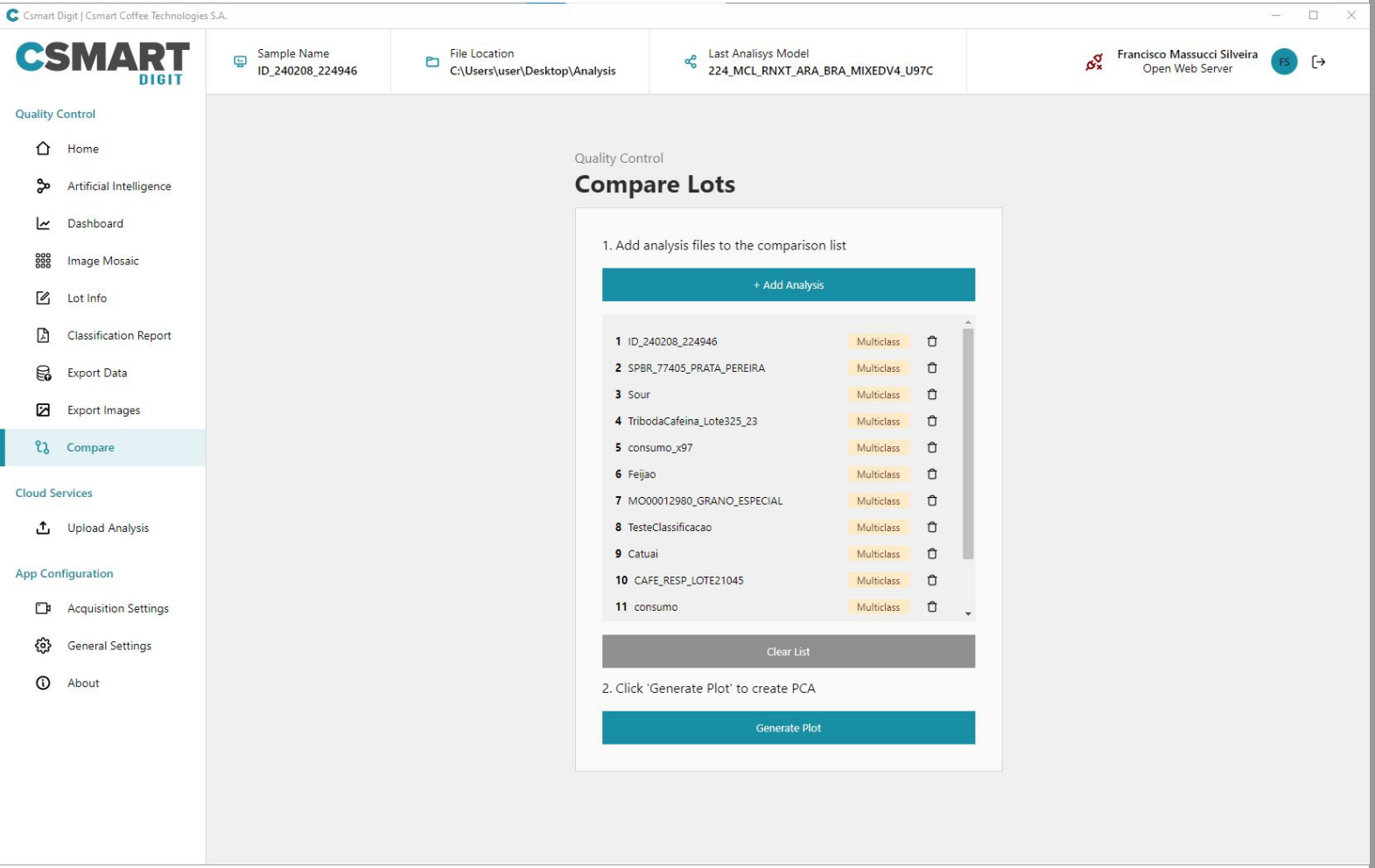
Files can be organized into classes based on model classification (the default setting), or by selecting the 'Export for training' option, they will be exported into a single folder. This functionality is particularly useful for creating new datasets, especially when the classification has been previously done by hand and all images of the sample are, in fact, of a single class.



Compare Lots

Unlike the functionalities focused on individual sample analysis, the 'Compare Lots' menu offers a suite of features designed for analyzing a sample in comparison to others, thereby generating insights from these comparisons.

By clicking on '+Add Analysis', users can select multiple files for comparison.



Compare Lots

After selecting the files, a list is generated, indicating whether each file's classification is multiclass or binary.

To proceed with the comparison, all files must have been analyzed using the same classification type—either all binary or all multiclass, though not necessarily with the same AI model.

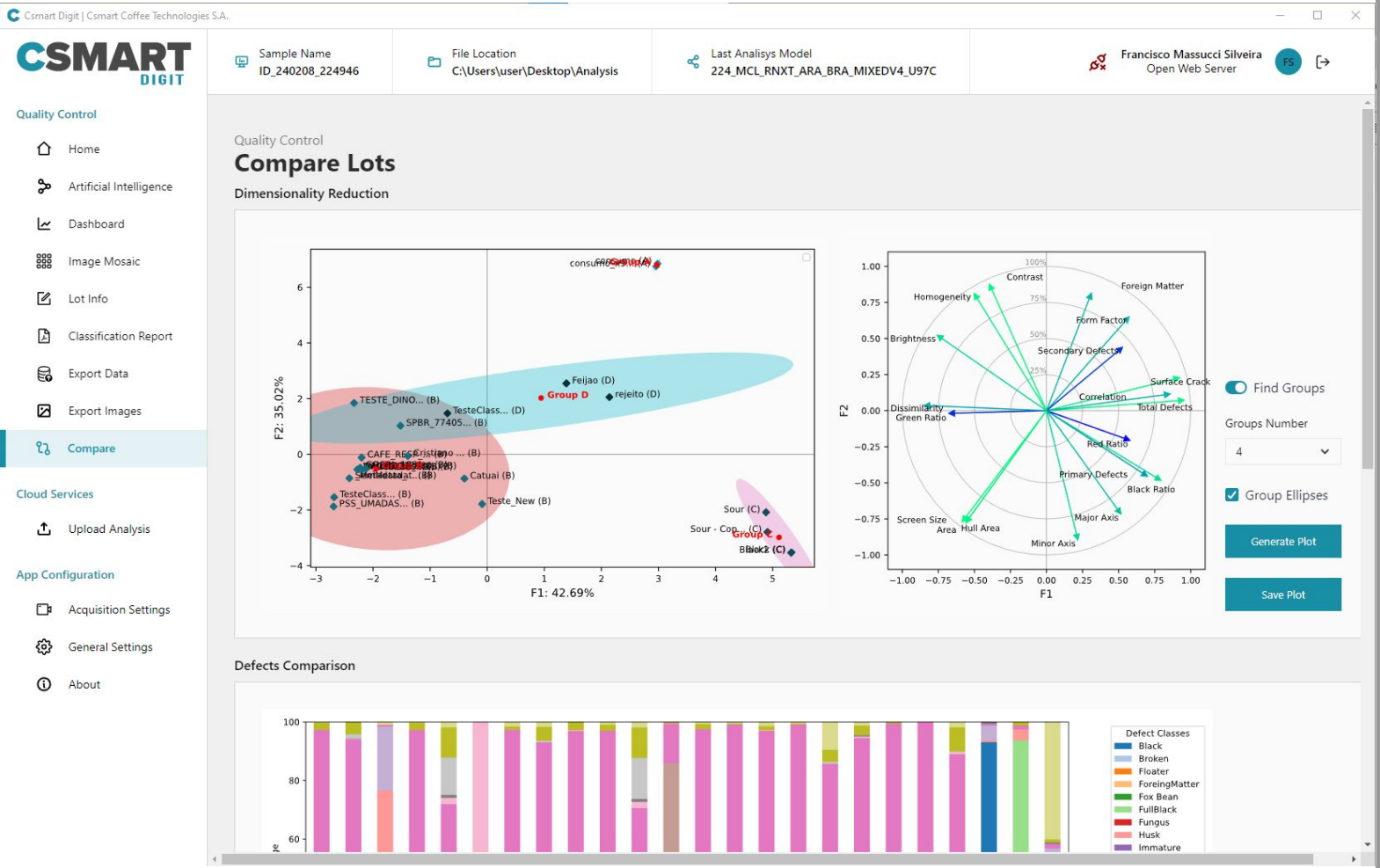
After meeting these requirements, simply click on 'Generate Plot' to proceed with the comparison analysis.

Compare Lots

The initial analyses include dimensionality reduction, featuring a Principal Component Analysis Plot on the left and Pearson's Correlation Plot on the right.

Samples exhibiting similarity will be plotted in close proximity to each other, whereas dissimilar samples will be positioned further apart.

The right chart displays the spatial arrangement of features, clarifying the patterns observed in the left chart and emphasizing contributions through the color and size of arrows.



Compare Lots

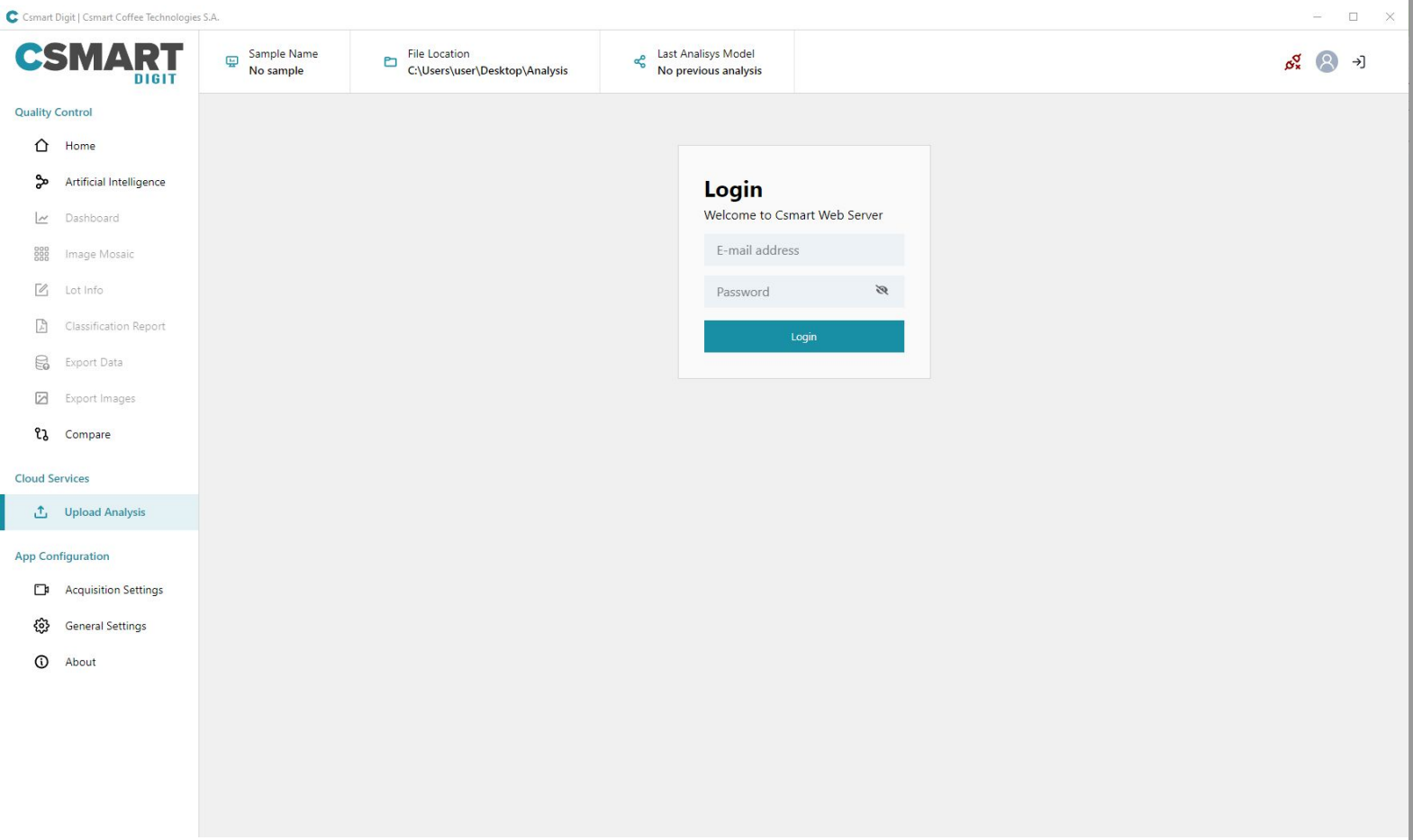
The comparison of defects is shown immediately below, depicted as a bar plot that outlines each sample's class distribution.

This feature facilitates the easy visualization of differences in class occurrences among the selected samples.

Compare Lots

Similar to the previous plot, the Screen Size comparison is depicted using a Cumulative Distribution Plot that includes all the chosen samples.

This type of visualization enables an efficient comparison of size distributions among the samples, highlighting both differences and similarities with clarity.



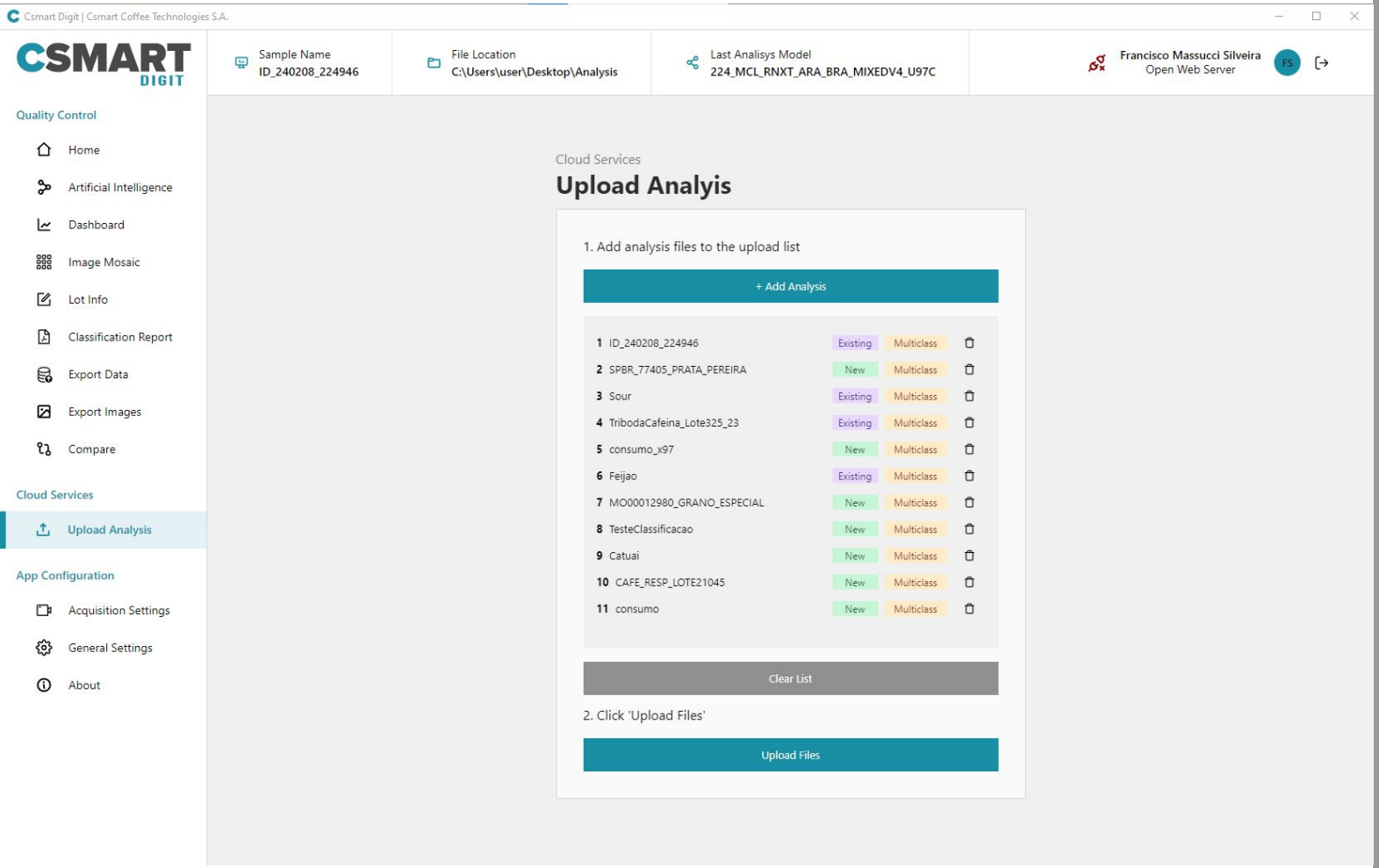
Login to Cloud Services

The Cloud Service Menu features an "Upload Analysis" button designed to upload all collected data to a centralized repository.

This functionality facilitates the efficient storage and sharing of information. Upon initial selection, users are directed to a login screen, where they must enter their email address and password.

For information on obtaining these credentials, please contact:

grading@csmart.ai



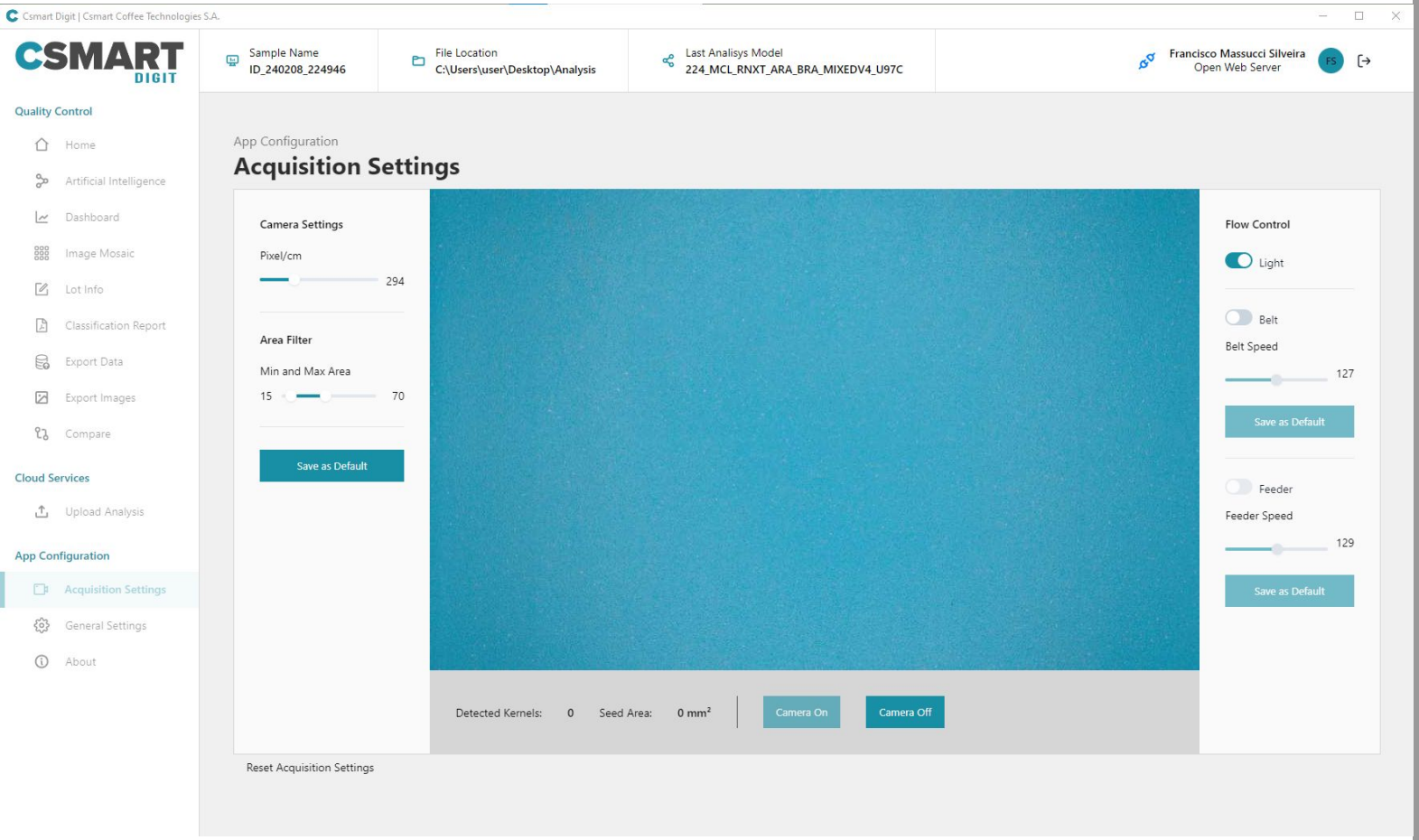
Upload Files to Cloud Services

After logging in, users can choose files for upload by clicking "+Add Analysis."

The selected files will appear in the list component, which also indicates whether they already exist in the database and if they have been previously analyzed.

Only files that have undergone AI analysis are eligible for storage in the repository.

Existing files require confirmation for upload since they will overwrite any current data in the system.

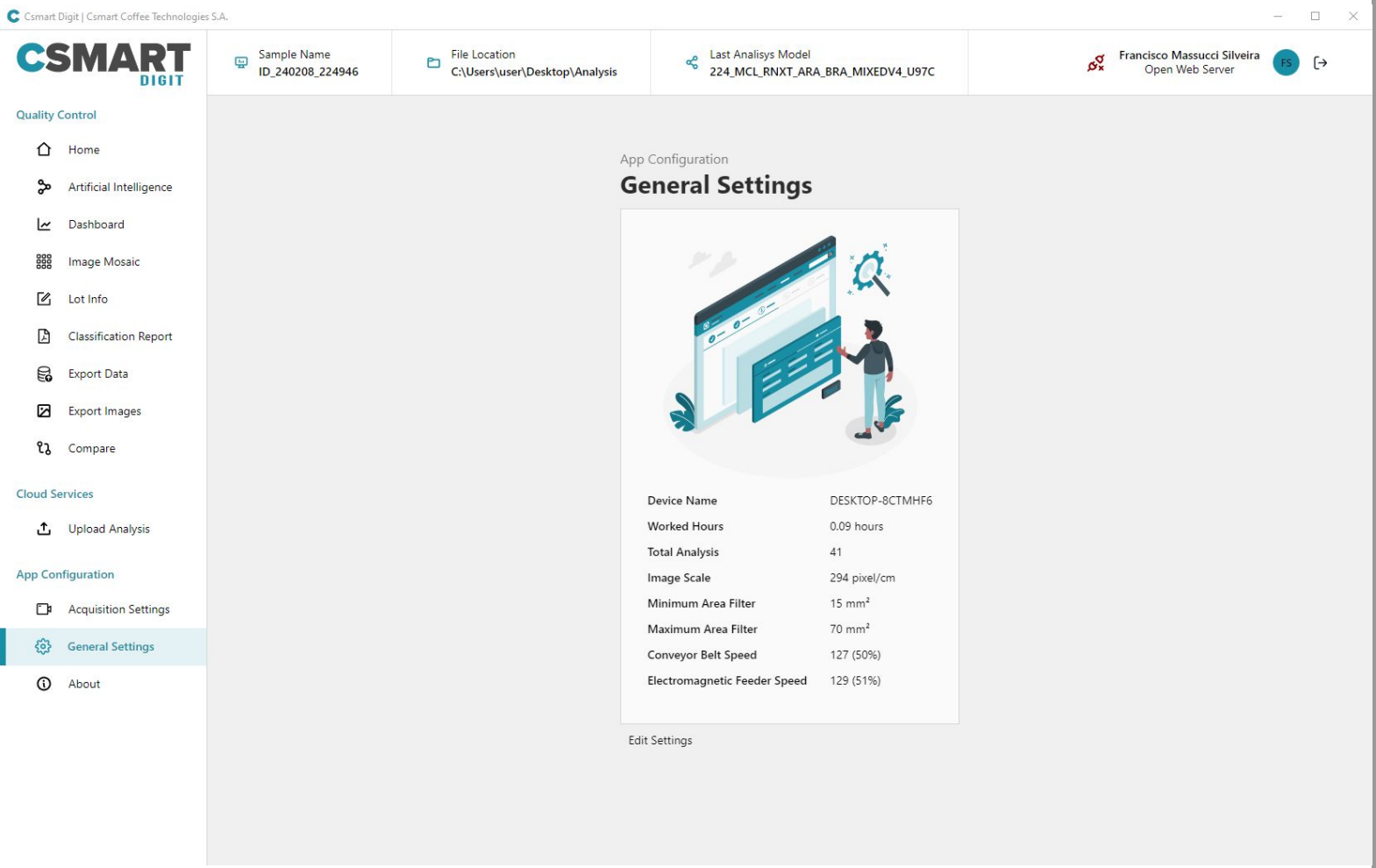


Acquisition Settings

The "Acquisition Settings" are intended for setting up variables related to controlling the camera and physical devices, such as lights, belt conveyors, and vibratory feeders.

Once adjusted, users can save these settings as default by clicking the “Save as Default” button, utilizing the new values when creating a new analysis.

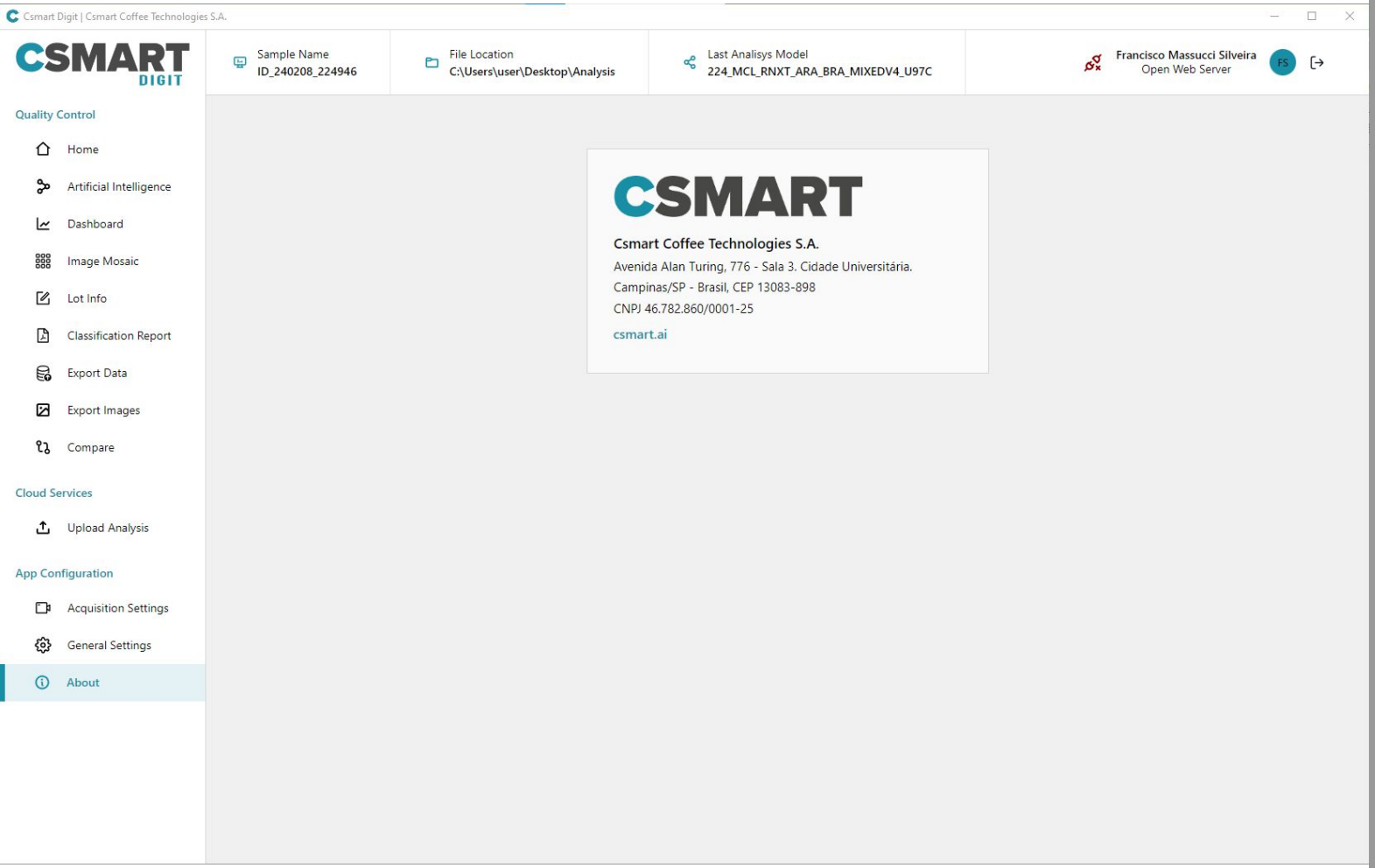
Click "Reset Acquisition Settings" to return to the factory default values.



General Settings

The "General Settings" display all of the acquisition settings values, as well as the worked hours of the machine, indicating the hours of operation, and the total number of analyses, indicating how many times the analyses have been run on this computer.

Click "Edit Settings" to adjust values as required.



About

The "About" section presents information about the company along with a hyperlink to the Csmart website.

CSMART

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