

Using Help

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Conventions

This help file uses the following conventions:

» The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.



This icon denotes a tip, which alerts you to advisory information.



This icon denotes a note, which alerts you to important information.

bold Bold text denotes items that you must select or click on in the software, such as menu items and dialog box options. Bold text also denotes parameter names, emphasis, or an introduction to a key concept.

green Underlined text in this color denotes a link to a help topic, help file, or Web address.

italic Italic text denotes variables or cross references. This font also denotes text that is a placeholder for a word or value that you must supply.

monospace Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames and extensions, and code excerpts.

Navigating Help (Windows Only)

To navigate this help file, use the **Contents**, **Index**, and **Search** tabs to the left of this window or use the following toolbar buttons located above the tabs:

- **Hide**—Hides the navigation pane from view.
- **Locate**—Locates the currently displayed topic in the **Contents** tab, allowing you to view related topics.
- **Back**—Displays the previously viewed topic.
- **Forward**—Displays the topic you viewed before clicking the **Back** button.
- **Options**—Displays a list of commands and viewing options for the help file.

Searching Help (Windows Only)

Use the **Search** tab to the left of this window to locate content in this help file. If you want to search for words in a certain order, such as "related documentation," add quotation marks around the search words as shown in the example. Searching for terms on the **Search** tab allows you to quickly locate specific information and information in topics that are not included on the **Contents** tab.

Wildcards

You also can search using asterisk (*) or question mark (?) wildcards. Use the asterisk wildcard to return topics that contain a certain string. For example, a search for "prog*" lists topics that contain the words "program," "programmatically," "progress," and so on.

Use the question mark wildcard as a substitute for a single character in a search term. For example, "?ext" lists topics that contain the words "next," "text," and so on.




Note Wildcard searching will not work on Simplified Chinese, Traditional Chinese, Japanese, and Korean systems.

Nested Expressions

Use nested expressions to combine searches to further refine a search. You can use Boolean expressions and wildcards in a nested expression. For example, "example AND (program OR VI)" lists topics that contain "example program" or "example VI." You cannot nest expressions more than five levels.

Boolean Expressions

Click the  button to add Boolean expressions to a search. The following Boolean operators are available:

- **AND** (default)—Returns topics that contain both search terms. You do not need to specify this operator unless you are using nested expressions.
- **OR**—Returns topics that contain either the first or second term.
- **NOT**—Returns topics that contain the first term without the second term.
- **NEAR**—Returns topics that contain both terms within eight words of each other.


Search Options

Use the following checkboxes on the **Search** tab to customize a search:

- **Search previous results**—Narrows the results from a search that returned too many topics. You must remove the checkmark from this checkbox to search all topics.
- **Match similar words**—Broadens a search to return topics that contain words similar to the search terms. For example, a search for "program" lists topics that include the words "programs," "programming," and so on.
- **Search titles only**—Searches only in the titles of topics.

Printing Help File Topics (Windows Only)

Complete the following steps to print an entire book from the **Contents** tab:

1. Right-click the book.
2. Select **Print** from the shortcut menu to display the **Print Topics** dialog box.
3. Select the **Print the selected heading and all subtopics** option.
 **Note** Select **Print the selected topic** if you want to print the single topic you have selected in the **Contents** tab.
4. Click the **OK** button.

Printing PDF Documents

This help file may contain links to PDF documents. To print PDF documents, click the print button located on the Adobe Acrobat Viewer toolbar.

NI Classification Training Interface Tutorial

This tutorial guides you through the steps for classifying samples with the classification engine using a specific set of images. This tutorial illustrates the various steps required to classify varying representations of the same class.

This tutorial includes the following sections:

- [Classifying Samples with the Classification Engine](#)
- [Editing the Classifier File](#)
- [Saving the Classifier File](#)

Classifying Samples with the Classification Engine

Complete the following steps to classify samples with the classification engine:

1. Complete one of the following steps to launch the NI Classification Training Interface:
 - a. If you are using Vision Builder for Automated Inspection (Vision Builder AI) or Vision Assistant, click **New/Edit Classifier File**.
 - b. If you are not using Vision Builder AI or Vision Assistant, click **Start»Programs»National Instruments»Vision»Classification Training**.
2. Save the Classifier File as Tutorial.clf and Click **OK**.
3. Complete one of the following sets of steps to select the tutorial images:
 - **NI Vision and Vision Assistant**
 - a. Click **File»Open Images**.
 - b. Navigate to <Vision>\Images\Classification Tutorial, where <Vision> is the location to which you installed the NI Vision Development Module.
 - c. Select the following images:
 - [Parts00.png](#)
 - [Parts01.png](#)
 - [Bolt00.png](#)
 - [Bolt01.png](#)
 - [Motor00.png](#)
 - [Motor01.png](#)
 - Tip** You can select multiple image files by pressing the <Ctrl> key and clicking each file. Enable the **Select all files** checkbox to open all images in the directory you specified.
 - d. Click **Open**.
 - **Vision Builder AI**
 - a. Navigate to <Vision Builder AI>\DemoImg\Classification, where <Vision Builder

AI> is the location to which you installed Vision Builder AI.

b. Select the following images:

- [Parts00.png](#)
- [Parts01.png](#)
- [Bolt00.png](#)
- [Bolt01.png](#)
- [Motor00.png](#)
- [Motor01.png](#)

Tip You can select multiple image files by pressing the <Ctrl> key and clicking each file. Enable the **Select all files** checkbox to open all images in the directory you specified.

c. Click **Open**.


Tip Click each of the image file names above to view the tutorial steps associated with the image. Click each image to return to the list above.

4. Click **Open**.

5. Use the [navigation buttons](#) to locate Parts00.png.

6. Make sure your Preprocessing options are set properly. Select **Clustering** for the **Method** of thresholding, and select **Dark Objects** from the **Look For** drop-down menu.

7. Draw an ROI around the bolt in the image.

 **Tip** It may be necessary to include parts of other objects in the ROI you draw around the bolt to successfully contain the entire bolt in the ROI. To configure the classification engine to classify the sample of the bolt correctly even though the ROI contains part of another object, enable **Reject Objects Touching ROI** on the **Preprocessing** tab.



The NI Classification Training Interface displays the objects in the ROI according to the preprocessing settings. When the preprocessing settings are configured to use a clustering method of thresholding and to look for dark objects, the objects in the ROI

are blue.

8. Select **Add New Label** from the **Class Label** list. Enter Bolt for the **New Label**.
9. Click **OK**.
10. Navigate to the Parts01.png file.
11. Draw an ROI around a bolt in the image.
12. Check that the **Class Label** control reads Bolt and click **Add Sample**.
13. Select the **Classify** tab, and click **Train Classifier**.
14. Navigate to the Bolt00.png file.
15. Draw an ROI around the bolt in the image.
16. Verify that the object in the ROI is classified correctly by checking that the **Assigned Class Label** indicator reads Bolt. The **Classification Score** is 1000 because you have only defined one class.
17. Navigate to the Bolt01.png file.
18. Draw an ROI around the bolt in the image.
19. Verify that the sample in the ROI is classified correctly by checking that the **Assigned Class Label** indicator reads Bolt.

Complete the following steps to train and classify motors.

19. Use the [navigation buttons](#) to locate Parts00.png.
20. Make sure your Preprocessing options are set properly. Select **Clustering** for the **Method** of thresholding and select **Dark Objects** from the **Look For** drop-down menu.
21. Draw an ROI around a motor in the image.



Tip It may be necessary to include parts of other objects in the ROI you draw around the motor to successfully contain the entire motor in the ROI. To configure the classification engine to classify the sample of the motor correctly even though the ROI contains part of another object, enable **Reject Objects Touching ROI** on the **Preprocessing** tab.



The NI Classification Training Interface displays the objects in the ROI according to the preprocessing settings. When the preprocessing settings are configured to use a clustering method of thresholding and to look for dark objects, the objects in the ROI are blue.

22. Select **Add New Label** from the **Class Label** list. Enter Motor for the **New Label**.
23. Click **OK**.
24. Navigate to the Parts01.png file.
25. Draw an ROI around the motor in the image.



26. Check that the **Class Label** control reads Motor and click **Add Sample**.
27. Select the **Classify** tab, and click **Train Classifier**.
28. Navigate to the Motor00.png file.
29. Draw an ROI around a motor in the image.



30. Verify that the sample in the ROI is classified correctly by checking that the **Assigned Class Label** indicator reads Motor.
31. Navigate to the Motor01.png file.
32. Draw an ROI around the motor in the image.



33. Verify that the sample in the ROI is classified correctly by checking that the **Assigned Class Label** indicator reads Motor.

Editing the Classifier File

Use the **Edit Classifier** tab to view the thumbnail images and descriptive information about the samples classified.

The following list includes descriptions of each of the items on the **Edit Classifier** tab.

- Use the **Classifier File Description** text box to input descriptive characteristics about the classifier file.
- Use the **Relabel** button to change the class to which a sample belongs.
- Use the **Delete** button to delete a sample from the browser.
- Use **Browser Display** to display either all of the trained samples or only the samples of a certain class. If you select to display **Samples of Class**, you can select the class to display, and the number of samples in that class appears in the **Samples** indicator.
- Use the **Class Population** chart to graphically display the number of each type of different class of samples in the classifier file as well as the total number of samples.

Saving the Classifier File

Now that you have classified several objects, you are ready to save the classifier file. Each classifier file contains the current state of the classification engine options as well as the samples you have trained.

1. Use the navigation buttons to scroll through the images you classified in this tutorial. Review each image, and check that the class to which the image belongs is correct. When you hover your mouse over the thumbnail image in the **Edit Classifier** tab, the class name appears in the lower right corner below the image window.
2. Relabel any images that are not correctly labeled by selecting the image from the browser and clicking **Relabel**. The **Relabel Sample** dialog opens. Type the correct label for the image in the **New Label** control.
3. Delete any unwanted images by selecting the image in the browser and clicking **Delete**.
4. Click **File»Save Classifier File**, enter Tutorial.clf in **File Name** for the classifier file, and then click **Save**.

Adding Samples to the Classifier

Use the **Add Samples** tab to add images as samples in the NI Classification Training Interface.

Complete the following steps to add an image as a sample:

1. Click **File»Open Images**.
2. Navigate to the image you want to classify and click **Open**.



Tip You can select all of the files in a folder by enabling the **Select All Files** option, or you can select multiple files by holding the <Ctrl> key while clicking file names. When you select an image from the list, the **Preview Image** window displays the image, file type, image size, and image type. If you have selected a collection of images, the **Preview** window displays all images in a sequence. To view the sequence at a different rate, adjust the slide to the right of the **Preview Image** window.



Tip To browse the images you opened, use the [navigation buttons](#).

3. Draw an ROI around the sample you want to add.
4. Use the [Preprocessing](#), [Engine Options](#), and [Particle Classifier Options](#) tabs to adjust the parameters.
5. Select the appropriate label for the image you have trained from the **Class Label** drop-down menu. To add a new label, select **Add New Label** from the **Correct Label** drop-down menu. The **Enter a new label** dialog box opens. Type the label name and click **OK**. The new sample is automatically added to the group of trained samples.
6. To add a sample with an already existing label, select the label from the list and click **Add Sample** to add the sample to the group of trained samples.

The **Particle Histogram** graphically displays, for each sample, the number of instances of each type of sample in the class.

The **Total # of Samples** indicator displays the number of samples you have trained.

Classifying Samples

Use the **Classify** tab to classify image samples in the NI Classification Training Interface.

Complete the following steps to classify an image sample:

1. Click **Train Classifier**.
2. Click **File»Open Images**.
3. Navigate to the image you want to classify and click **Open**.



Tip You can select all of the files in a folder by enabling the **Select All Files** option, or you can select multiple files by holding the <Ctrl> key while clicking file names. When you select an image from the list, the **Preview Image** window displays the image, file type, image size, and image type. If you have selected a collection of images, the **Preview** window displays all images in a sequence. To view the sequence at a different rate, adjust the slide to the right of the **Preview Image** window.



Tip To browse the images you opened, use the [navigation buttons](#).

4. Draw an ROI around the sample you want to classify.

The assigned class label for the sample appears in the **Assigned Class Label** indicator.

The **Classification Score** is the degree of certainty that a sample is assigned to one class instead of another class. The **Identification Score** is the degree of similarity between a sample and members of the class to which the sample is assigned.

The **Distances** chart displays the distance between the classified sample and other classes.



Note If you change the [Preprocessing](#), [Engine Options](#), or [Particle Classifier Options](#) settings, you must retrain the classifier.

Editing the Classifier

Use the **Edit Classifier** tab to edit the image samples you have classified in the NI Classification Training Interface.

- **Classifier File Description**—Add descriptive information about the files you classify in this control.
- **Relabel**—To relabel a sample, select a sample in the browser and click **Relabel**.
- **Delete**—To delete a sample, select a sample in the browser and click **Delete**.
- **Browser Display**—The browser can display all trained samples or samples of a certain class.
 - To display all trained samples, click **All Trained Samples**.
 - To display samples of a certain class, click **Samples of Class** and select the class you want to display. The **Samples** indicator displays the number of samples from that class.
- **Class Population**—Graphically displays, for each sample, the number of instances of each type of sample in the class.



The **Total # of Samples** control displays the number of samples you have trained.

Batch Training

[Batch Results](#) [Batch Classify](#)

Use **Tools»Batch Training** to train a folder of images.

Complete the following steps to train a folder of images:

1. Click **Tools»Batch Training**.
2. Click the **Browse** button to select the folder of images to train.
After you have selected the folder of images, click **Select Cur Dir**.
3. Click **Draw ROI** to select an ROI around the sample to train.
 -  **Note** Make sure the ROI encompasses the sample to train in all images in the folder.
 -  **Note** If you do not select an ROI in the image, the largest sample will be trained.
4. Specify labels for the samples to add.
 - If all images in the folder are of the same class, enable the **Use the same label for all the samples** option, and enter the label in the **Class Label** control.
 - If the images are not of the same class, enable the **Use a file that specifies the labels of the samples** option to specify individual labels for each image. Click the **Browse** button to select a **Labels File Path**. This file is a delimited text file that contains a corresponding label for each image. A delimiter separates the image name from its label.
5. Click **Train** to train the samples in all the images of the folder. The training process trains and classifies the samples.


A dialog box displays the results of the batch training. The first tab displays the label and scores for each sample as well as if it was properly classified. The second tab displays the score histogram, which displays the number of each sample for each score value. The third tab displays the number of samples, standard deviation, accuracy, and predictive value for each class. The fourth tab displays the classification distribution. The last tab displays the mean distance from each class to each other class.

Batch Classify

[Batch Training](#) [Batch Results](#)

Use **Tools»Batch Classify** to classify a folder of images.

Complete the following steps to classify a folder of images:

1. Click **Tools»Batch Classify**.
2. Click the **Browse** button to select the folder of images to classify. After you have selected the folder of images, click **Select Cur Dir**.
3. Click **Draw ROI** to select an ROI around the sample to classify.
 **Note** Make sure the ROI encompasses the sample to classify in all images in the folder.
4. Use **Batch Classification** to verify the accuracy of the classifier. You must provide the labels of all images in the folder in order to verify the accuracy of the classifier.
 - To check the accuracy of the classification, enable the **Verify Classification** option.
 - Click the **Browse** button to select a **Results File Path**. This file is a delimited text file that contains a corresponding label for each image.
5. Click **Classify** to classify the samples in all the images in the folder. The training process trains and classifies the samples.

A dialog box displays the results of the batch classification. The first tab displays the label and scores for each sample as well as if it was properly classified. The second tab displays the score histogram, which displays the number of each sample for each score value. The third tab displays the number of samples, standard deviation, accuracy, and predictive value for each class. The fourth tab displays the classification distribution. The last tab displays the mean distance from each class to each other class.

Batch Results

[Batch Training](#) [Batch Classify](#)

After you have trained or classified a folder of images, the **Batch Results** dialog box displays the results of the batch training. The results are displayed on five tabs: **Classification Results**, **Scores Histogram**, **Class Information**, **Classification Distribution**, and **Distance Table**.

Classification Results Tab

The classification results are displayed in a chart that lists the following results for each file trained and classified:

- **Label**—Class to which the sample belongs.
- **Classification Score**—Degree of certainty that a sample is assigned to one class instead of other classes.
- **Identification Score**—Degree of similarity between a sample and members of the class to which the sample is assigned.
- **Classification**—Classification is **Good** if the sample label found during the classification process matches the label provided by the user. The classification is **Bad** if the sample label does not match.

Scores Histogram Tab

The scores histogram displays the number of each sample classified and trained for each score value.

The X-axis can represent either classification scores or identification scores. The Histogram Mode can be either linear or cumulative.

Class Information Tab

The accuracy and predictive value of the classification are displayed in a chart for each class.

- **Samples**—Number of samples belonging to the class.
- **Standard Deviation**—Standard deviation from the mean of all samples in the class.
- **Accuracy (sensitivity)**—Probability that a sample is classified into the class to which it belongs.
- **Predictive Value**—Probability that a sample classified into a given class belongs to that class.

Classification Distribution Tab

The classification distribution is displayed in a chart, and the classifier accuracy is calculated. The classification distribution is a matrix that gives the probability that a sample belonging to a specific class will be classified in another class.

Distance Table Tab

The distance table displays the mean distance from each class to each other class.



Tip You can also display this dialog by choosing **Tools»Training Summary**. Only the **Class Information**, **Classification Distribution**, and **Distance Table** tabs are available.

Configuring the Preprocessing Settings

[Engine Options](#) [Particle Classifier Options](#)

Use the settings on the **Preprocessing** tab to determine how you want the classification engine to calculate the threshold value it uses to segment particles in each image.

Complete the following steps to configure the preprocessing settings:

1. Select a **Method** for thresholding.
 - **Manual Threshold** is a method you use to manually determine the threshold range for the ROI.
 - **Clustering** is a method in which the classification engine sorts the histogram of the image within a discrete number of classes corresponding to the number of phases perceived in an image. Clustering is the most frequently used automatic thresholding method.
 - **Entropy** is a method in which the classification engine detects samples that are present in minuscule proportions on the image.
 - **Metric** is a method in which the classification engine calculates a value for each threshold that is determined by the surfaces representing the initial gray scale.
 - **Moments** is a method of thresholding used for images that have poor contrast.
 - **Inter Variance** is a method of thresholding used for images in which classes are not too disproportionate. For satisfactory results, the smallest class must be at least 5% of the largest one.
2. If you selected **Manual Threshold** in **Method**, use the **Min** and **Max** controls or the slider at the bottom of the histogram to set the threshold value. If you select an automatic threshold method, the algorithm calculates the threshold value and updates the **Threshold Range**. You can specify a **Lower Limit** and an **Upper Limit** for the threshold computed by the automatic method.
3. Select a type of object to search for from the **Look For** drop-down menu. The NI Classifier will look for **Bright Objects**, **Dark Objects**, or **Gray Objects**.

4. Click **Reject Objects Touching ROI** to ignore objects that are touching the border of the ROI you drew.
5. In **Remove Small Objects (# of Erosions)**, select the number of erosions you want the classification engine to perform to remove small objects from the ROI.

As you manipulate settings on the **Preprocessing** tab, the NI Classification Training Interface displays thresholded objects in blue.

- Tip** If the samples in the ROI are not classified as you expect them to be, experiment with settings on the [Engine Options](#) and [Particle Classifier Options](#) tabs to improve the classification.

Configuring the Engine Options

[Preprocessing Particle Classifier Options](#)

Use the **Engine Options** tab to indicate the Method and Metric values required for sample classification.

Select a **Method** on the **Engine Options** tab to configure the method of classification.

- **Nearest Neighbor**—Most direct approach to classification. In nearest neighbor classification, the distance of an input feature vector of unknown class to another class is defined as the distance to the closest samples that are used to represent that class.
- **K-Nearest Neighbor**—More tolerant of noise compared with nearest neighbor classification. In K-nearest neighbor classification, an input feature vector is classified into a class based on a voting mechanism. The NI Classifier finds *K* nearest samples from all the classes. The input feature vector of unknown class is assigned to the class with majority of the votes in the *K* nearest samples.
- **Minimum Mean Distance**—Most effective in applications that have little or no feature pattern variability or other corruptive influences. In minimum mean distance classification, an input feature vector of unknown class is classified based on its distance to each class center.

Select a **Metric** on the **Engine Options** tab to configure the metric used in the classification algorithm.

- **Maximum**—Most sensitive to small variations between samples. Use **Maximum** when you need to classify samples with very small differences into different classes.
- **Sum**—Metric used in most classification applications. **Sum** is also known as the Manhattan metric or Taxicab metric. This is the default **Metric** value.
- **Euclidean**—Least sensitive to small variations between samples. Use **Euclidean** when you need to classify samples with small differences into the same class.

Tip If the samples in the ROI are not classified as you expect them to be, experiment with settings on the [Preprocessing](#) and

Particle Classifier Options tabs to improve the classification.

Configuring the Particle Classifier Options

[Preprocessing Engine Options](#)

Use the **Particle Classifier Options** tab to indicate whether the classification is **Scale Dependent** or **Mirror Dependent**.

1. Enable the **Scale Dependent** option if you want to distinguish samples of different sizes.
2. Enter the numeric scale factor value (between 0 and 1000) in the **Scale Factor** control. If the scale factor value is 0, the samples are classified independent of scale.
3. Enable the **Mirror Dependent** option if you want to classify mirrored objects in separate classes.
4. Enter the numeric mirror factor value (between 0 and 1000) in the **Mirror Factor** control. If the mirror factor value is 0, the samples are classified independent of mirror symmetry.

Tip If the samples in the ROI are not classified as you expect them to be, experiment with settings on the [Preprocessing](#) and [Engine Options](#) tabs to improve the classification.

Developing Classification Applications

You can use the following Classification Examples to learn how to use the NI Classification Training Interface to create classification applications in LabVIEW, LabWindows/CVI, and/or Microsoft Visual Basic:

- LabVIEW [Classification Example](#), which is located in <LabVIEW>\Examples\Vision\2.Functions\Classification\Classification.vi. Where <LabVIEW> is the location to which you installed LabVIEW.
- LabWindows/CVI [Classification Example](#), which is located in <CVI>\Samples\Vision\2.Functions\Classification\Classification.prj. Where <CVI> is the location to which you installed LabWindows/CVI.
- Microsoft Visual Basic [Classification Example](#), which is located in <Vision>\Examples\MSVB\2.Functions\Classification\Classification.vbp. Where <Vision> is the location to which you installed Vision.

Classification Example for LabVIEW

You can use the Classification Example for LabVIEW to classify samples using the file you created with the [NI Classification Training Interface Tutorial](#).

Complete the following steps to use the Classification Example for LabVIEW:

1. Navigate to <LabVIEW>\Examples\Vision\2.Functions\Classification and open the Classification VI. Where <LabVIEW> is the location to which you installed LabVIEW.
2. Run the VI.
3. Click the **Browse** button of the **Classifier File Path** control and open the Tutorial.clf file you created upon completing the NI Classification Training Interface Tutorial.
4. Click **Load File**.
5. Draw an ROI around the sample to classify and click **Classify**.
6. Click **Return** to exit the example.

Classification Example for LabWindows/CVI

You can use the Classification Example for LabWindows/CVI to classify samples using the file you created with the [NI Classification Training Interface Tutorial](#).

Complete the following steps to use the Classification Example for LabWindows/CVI:

1. Navigate to
<CVI>\Samples\Vision\2.Functions\Classification\Classification.prj.
Where <CVI> is the location to which you installed LabWindows/CVI.
2. Click **Build»Configuration»Debug**, and then click **Run»Debug Classification_dbg.exe** to run the example.
3. Click the **Browse** button and open the Tutorial.clf file you created upon completing the NI Classification Training Interface Tutorial.
4. Click **Load File**, select one of the image files, and click **Load**.
5. Draw an ROI around the sample to classify and click **Classify**.
6. Click **Return** to exit the example.

WARNING REGARDING USE OF NATIONAL INSTRUMENTS PRODUCTS

(1) National Instruments products are not designed with components and testing for a level of reliability suitable for use in or in connection with surgical implants or as critical components in any life support systems whose failure to perform can reasonably be expected to cause significant injury to a human.

(2) In any application, including the above, reliability of operation of the software products can be impaired by adverse factors, including but not limited to fluctuations in electrical power supply, computer hardware malfunctions, computer operating system software fitness, fitness of compilers and development software used to develop an application, installation errors, software and hardware compatibility problems, malfunctions or failures of electronic monitoring or control devices, transient failures of electronic systems (hardware and/or software), unanticipated uses or misuses, or errors on the part of the user or applications designer (adverse factors such as these are hereafter collectively termed "system failures"). Any application where a system failure would create a risk of harm to property or persons (including the risk of bodily injury and death) should not be reliant solely upon one form of electronic system due to the risk of system failure. To avoid damage, injury, or death, the user or application designer must take reasonably prudent steps to protect against system failures, including but not limited to back-up or shut down mechanisms. Because each end-user system is customized and differs from National Instruments' testing platforms and because a user or application designer may use National Instruments products in combination with other products in a manner not evaluated or contemplated by National Instruments, the user or application designer is ultimately responsible for verifying and validating the suitability of National Instruments products whenever National Instruments products are incorporated in a system or application, including, without limitation, the appropriate design, process and safety level of such system or application.

Technical Support and Professional Services

Visit the following sections of the National Instruments Web site at ni.com for technical support and professional services:

- **Support**—Online [technical support](http://ni.com/support) resources at ni.com/support include the following:
 - **Self-Help Resources**—For answers and solutions, visit the award-winning National Instruments Web site for software drivers and updates, a searchable [KnowledgeBase](#), [product manuals](#), step-by-step troubleshooting wizards, thousands of example programs, tutorials, application notes, instrument drivers, and so on.
 - **Free Technical Support**—All registered users receive free Basic Service, which includes access to hundreds of Applications Engineers worldwide in the [NI Developer Exchange](#) at ni.com/exchange. National Instruments Applications Engineers make sure every question receives an answer.
- **Training and Certification**—Visit ni.com/training for [self-paced training](#), [eLearning virtual classrooms](#), [interactive CDs](#), and [Certification program information](#). You also can register for instructor-led, hands-on courses at locations around the world.
- **System Integration**—If you have time constraints, limited in-house technical resources, or other project challenges, [NI Alliance Program](#) members can help. To learn more, call your local NI office or visit ni.com/alliance.

If you searched ni.com and could not find the answers you need, contact your [local office](#) or NI corporate headquarters. You also can visit the [Worldwide Offices](#) section of ni.com/niglobal to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

Navigating Images

You can use the toolbar buttons to navigate the images you opened for training. Refer to the following button descriptions for information about how to view images.

- Navigates to the first image in the list of images you opened.
- Navigates to the previous image.
- Navigates to the next image.
- Navigates to the last image in the list of images you opened.

Classification Example for Microsoft Visual Basic

You can use the Classification Example for Microsoft Visual Basic to classify samples using the file you created with the [NI Classification Training Interface Tutorial](#).

Complete the following steps to use the Classification Example for Microsoft Visual Basic:

1. Navigate to <Vision>\Examples\MSVB\2.Functions\Classification and open the Classification.vbp file. Where <Vision> is the location to which you installed Vision.
2. Run the example.
3. Click the **Browse** button and open the Tutorial.clf file you created upon completing the NI Classification Training Interface Tutorial.
4. Click **Load File**, select one of the image files, and click **Open**.
5. Draw an ROI around the sample to classify and click **Classify**.
6. Click **Return** to exit the example.

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