Screenshot Comparison with AI methods
User Guide:

December 21, 2016

WHY SCREENSHOT COMPARISON:

The screenshot comparison tests the layout of the site. The layout is dependent on many factors and css values. Instead of checking them all, the screenshot comparison tests what the user actually sees. It checks the result without looking at technical values.

What does it do:

When you run the screenshot comparison, it creates different folder under results. The first folder is ai, as root folder, followed by the environment name of the testcase. In illustration 0.0.1 is this localmachine. Next to see stand the name of the testcase followed by the choosen browser, which the test take place in. All other folder contains the module names, in the current testcase also as folder. Therein are the screenshots saved, corresponding to the module names.

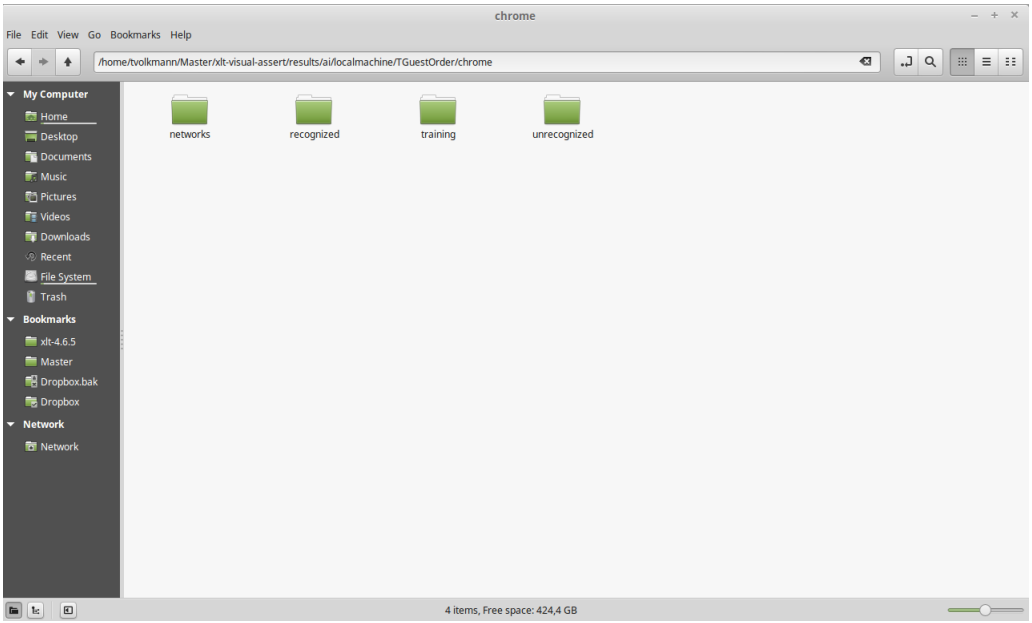

Abbildung 0.0.1: Folder structure

As seen in illustration 0.0.1 are there different named folder. Everyone of these folder have his own purpose and is generated at the point they are needed. The first folder contains files in which all settings for the testcase are saved and the allready learned screenshots. The files are coded and should not be changed, the program does this on his own. The second importent folder is the training folder. In this folder are all screenshots saved which will be considered for network training. After the network, which checks itself, is ready it creates, after seeing enough screenshots, the folder for recognized or unrecognized. It is also possible to force the network to learn screenshots which are choosen from the user. For this case simply delete the network and copy all images in the same named training folder. In the next run the network get recreated, with the settings from the config file and learn every screenshot in the training folder. With this mechanic it is possible to train the network specifically to the screenshots the user choose. The network will test itself with the next screenshot and react corresponding.

1. Network not ready, screenshot will be saved in training and it is more training necessary.

2. Network is ready and recognize the screenshot, screenshot will be saved in recognized.
3. Network is ready but not recognize the screenshot, screenshot will be saved in unrecognized.

It is also possible, if the network is not ready, too copy screenshots into the training folder and the program will learn the new screenshots together with the new screenshot. The files which can pass to the training folder are limited, with a filter, to file endings with:

- jpg,
- png,
- bmp,
- jpeg.

The screenshot comparison run completly automatic and it is not necessary to interfere in the testcase, simply run at least 6 (intern number before selftest start) testcases and the program does the rest. If there is no sort in recognized or unrecognized the program need more screenshots for learning and the sreenshot will be saved under training.

Properties:

All properties can be set ore changes under config ai.properties and there default values are:

- com.xceptance.xlt.ai.WAITINGTIME = 1000
- com.xceptance.xlt.ai.INTENDED_PERCENTAGE_MATCH = 0.80
- com.xceptance.xlt.ai.USE_COLOR_FOR_COMPARISON = false
- com.xceptance.xlt.ai.USE_ORIGINAL_SIZE = false
- com.xceptance.xlt.ai.PERCENTAGE_DIFFERENCE = 10
- com.xceptance.xlt.ai.LEARNING_RATE = 0.2
- com.xceptance.xlt.ai.FORMAT = "png"
- com.xceptance.xlt.ai.IMAGE_HEIGHT = 800
- com.xceptance.xlt.ai.IMAGE_WIDTH = 600

All properties will be explained in the next chapter. All parameter are saved in the specific network and will be loaded with the network. Changing the parameter affect the program only if there is no saved network. Through this mechanic all network can be set to individual setings for different screenshots. Simply delete the network, change the properties and run the testcase again.

AI parameters:

- com.xceptance.xlt.ai.util.Constants.WAITINGTIME = 1000

Is a value, in milliseconds, for the program to wait, until the screenhsot will be taken. This property can be choosen to higher values to ensure the website is done with loading.

- com.xceptance.xlt.ai.INTENDED_PERCENTAGE_MATCH = 0.80

Stand for the accordance from learned screenshots and new ones. Allowed values are between 0.00 and 1.00 as percentage interpretation. If all screenshots show the same content the accordance will be 1.0, this value should considered be choosen. Even for a human images can not easily be compared one to another, for a machine it is even a bit more complicated and a 100% accordance is very rare.

- com.xceptance.xlt.ai.USE_COLOR_FOR_COMPARISON = false

This propertie does exactly what its name stand for. If it is false no color will be used for the comparison of screenshots. The use of color for comparison is only recommended for screenshots which are almost static and only color change ist interesting. In websides with many changing content (like images) it is not recommended, because of the almost everytime changing colors.

- com.xceptance.xlt.ai.USE_ORIGINAL_SIZE = false

The use of the original size of the webside depends on the size and the used browser. Tested browser with the selenium webdriver are Firefox and Chrome. In Firefox the entire page get captured and in chrome only the visible part of the webside. Some websides can be very long and so the screenshot will be. Large screenshots need a lot more time to get analyzed and compared one to another. If this setting is set to false the properties for width and height will be used.

- com.xceptance.xlt.ai.PERCENTAGE_DIFFERENCE = 10

Is the difference level between screenshots, but not in a global way of comparison. The difference is considered in every structure element of the webside, like header, footer, navigation bars and so on. The percentage value is considered in size and many other valuese for checking. For websides with much expanding or resizing elements, it is recommended to choose a larger percentage value. Allowed values are between 1 and 100.

- com.xceptance.xlt.ai.LEARNING_RATE = 0.2

Learning rate is a factor which is used to train the neural network, a larger value increase the speed of learning. A higher value can also lead to wrong learning, therefore it is difficuilt to say what is the perfect value. The value get transformed into a percentage interpretation. Allowed values are between 0.01 and 1.0.

- com.xceptance.xlt.ai.FORMAT = "png"

File ending for the screenshots. Allowed file endings are png, jpg, jpeg and bmp. All other endings or other files are ignored and will not be loaded.

- com.xceptance.xlt.ai.IMAGE_HEIGHT = 800
- com.xceptance.xlt.ai.IMAGE_WIDTH = 600

Size of the image can be set to rescale the screenshot for faster comparison. This values are only used if the USE_ORIGINAL_SIZE is false and should be in a proper relation to each other.