# Python Image Slicing & Down Sampling

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This document describes the functionality of the ‘Siam Weed Identification And Resampling’ repository at: <https://github.com/jcw12/Siam-Weed-Identification-And-Re-Sampling/>, which provides means to slice an image for processing in an object detection neural network and down-sample the image to replicate the spatial resolution of an image taken at a different altitude.

## Python Scripts

There are two Python scripts included in the repository, one which defines each function of the program as a separately, so that they can be used individually for a variety of purposes and one which includes all of the required functionality compressed into one function for the specified purpose of Siam Weed Slicing & Down-sampling.

Downsampling: When an image is down-sampled by a factor of 2, the spatial resolution of that image is multiplied by 2 (2cm resolution image down-sampled by 5 is now effectively 10cm).

### Slicer.py

This is the refined script with one function designed specifically for Siam Weed downsampling. The parameters of the function are described below.

**Function name: Slicer()**

**Slicer() takes an input image and ‘slices’ it into tiles. Slicer() also has the ability to downsample the image before slicing.**

**Required parameters:**

|  |  |
| --- | --- |
| **Parameter Name** | **Description** |
| inputFolder | Folder containing the images to be sliced. All images in the folder will be sliced. |
| outputFolder | Folder for the sliced images to be output to. |

**Optional parameters:**

|  |  |  |
| --- | --- | --- |
| **Parameter Name** | **Description** | **Default** |
| tile\_size | Size of output sliced images | (456,456) |
| offset | The amount in which the window moves between each tile.  If this is the same as Tile size, there will be no overlap. If the offset is half of the tile\_size eg.(228x228), the overlap between tiles will be 50%. | Same as tile\_size |
| offset\_shift | If offset\_shift is True, the amount of offset in the last tile of a row or column will be adjusted to ensure that the tile\_size is consistent.  If false, the offset will remain the same and the tile\_size of the last row or column may be cut off. | True |
| Downsampling | List containing:  [Down sampling method, down sampling Factor].  **Down sampling method:**  The method to use for down sampling, including the following options:   * ‘PIXEL\_AGG’ * cv2.INTER\_CUBIC * cv2.INTER\_LANCZOS4 * cv2.INTER\_LINEAR   ‘PIXEL\_AGG’ is the recommended down sampling method, which takes the average value of pixels for downsampling.  See OpenCV documentation for details on other down sampling methods.  **Down sampling factor:**  This is the factor by which the image will be downsampled – for example, a factor of 2 will reduce the image size by half.  An image with a spatial resolution of 2cm downsampled by a factor of 3 will now have a spatial resolution of 6cm. | No Downsampling |

**Example:**

|  |
| --- |
| inputFolder = r'C:\Documents\GitHub\Siam-Weed-Identification-And-Re-Sampling\Siam Weed Git\UnSliced'  outputFolder = r'C:\Documents\GitHub\Siam-Weed-Identification-And-Re-Sampling\Siam Weed Git\Test'  Slicer(inputFolder, outputFolder , Downsampling = ['PIXEL\_AGG', 3]) |

### Slicer\_Seperate.py

This script contains separate functions to load images from a folder, slice an individual image, and downsample an individual image. These functions are independent of each other.

**Function name:** Slicer()

**Slicer() takes an input image and ‘slices’ it into tiles.**

**Required Parameters:**

|  |  |
| --- | --- |
| **Parameter Name** | **Description** |
| imageName | The path to the input image |
| outputFolder | *Same as Slicer.py* |

Optional Parameters:

|  |  |  |
| --- | --- | --- |
| **Parameter Name** | **Description** | **Default** |
| tile\_size | *Same as Slicer.py* | *Same as Slicer.py* |
| offset | *Same as Slicer.py* | *Same as Slicer.py* |
| offset\_shift | *Same as Slicer.py* | *Same as Slicer.py* |

Example:

|  |
| --- |
| Slicer(r"C:\Users\user\Documents\GitHub\Siam-Weed-Identification-And-Re-Sampling\Siam Weed Git\UnSliced\thu (20).JPG", r"C:\Users\user\Documents\GitHub\Siam-Weed-Identification-And-Re-Sampling\Siam Weed Git\Test\Slicer\_Seperate") |

**Function name:** downsample()

downsample() takes an input image and resizes it, changing the resolution.

**Required Parameters:**

|  |  |
| --- | --- |
| **Parameter Name** | **Description** |
| img | Path to the image to be down sampled. |
| Downsampling\_method | *Same as Slicer.py* |
| Factor | *Same as Slicer.py* |

Optional Parameters:

|  |  |  |
| --- | --- | --- |
| **Parameter Name** | **Description** | **Default** |
| outputFile | File path to the output image. If left blank, an opencv image object is returned. | None |

Example:

|  |
| --- |
| img = r‘C:/Documents/Example\_Image.png’  downsample(img, cv2.INTER\_CUBIC,4, ‘C:/Documents/Output\_image.png’ |

**Function name:** load\_images\_from\_folder()

Returns a list of paths to images.

**Required Parameters:**

|  |  |
| --- | --- |
| **Parameter Name** | **Description** |
| inputFolder | Folder containing the images to be added to the list |

**Optional Parameters:**

*NA*

**Example:**

|  |
| --- |
| load\_images\_from\_folder(r’C:/Documents’) |