# Python Image Slicing & Down Sampling

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.

### 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). | 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’ |