preassignment

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```
In [5]: """
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        """

        from __future__ import print_function

        import matplotlib.image as mpimg
        import matplotlib.pyplot as plt
        import numpy as np

        from PIL import Image

        %matplotlib inline
        plt.rcParams['figure.figsize'] = (10.0, 8.0) # set default size of plots

        # for auto-reloading external modules
        # see http://stackoverflow.com/questions/1907993/autoreload-of-modules-in-ipython
        %load_ext autoreload
        %autoreload 2
```
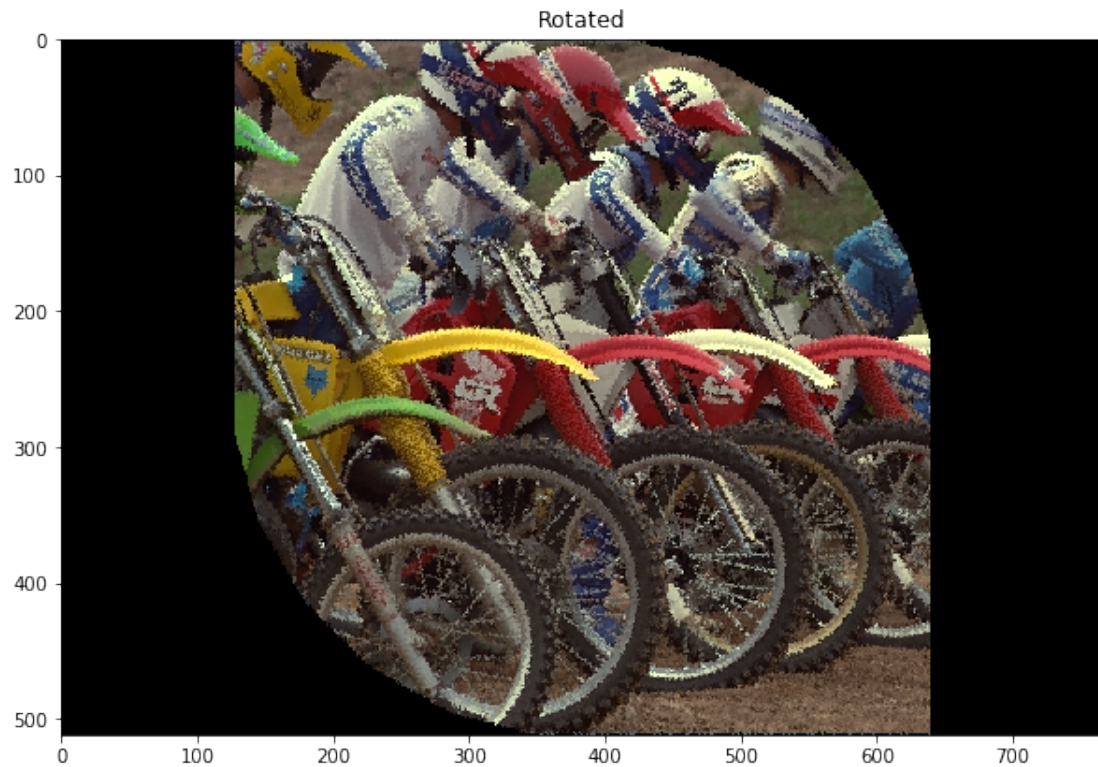
```
The autoreload extension is already loaded. To reload it, use:
  %reload_ext autoreload
```

```
In [6]: original = Image.open('Original.png')
        plt.imshow(original)
        plt.title('Original')
        plt.show()
```

Original

```
In [7]: rotated = Image.open('Original.png')
        for rot_angle in [15, 15, 15, 15, 15, 15, -90]:
            rotated = rotated.rotate(rot_angle)
        plt.imshow(rotated)
        plt.title('Rotated')
        plt.show()
```

Rotated

```
In [8]: np_original = np.array(original)
        np_rotated = np.array(rotated)

        diff = np_original - np_rotated
        diff *= 4
        diff += 128
        plt.subplot(1, 2, 1)
        plt.imshow(diff)
        plt.title('My Difference')
        plt.subplot(1, 2, 2)
        plt.imshow(mpimg.imread('Difference.png'))
        plt.title('Szeliski\'s Difference')
        plt.show()
```

3