Image Analogy

In [ ]:

```
import matplotlib.pyplot as plt
import numpy as np
import imageio
from main import *
```

Part 1. Basic Usage

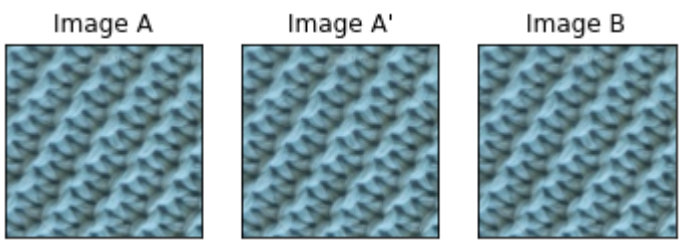
Identity Filter

In [ ]:

```
a1_img_fn = 'images/identityE.jpg'
a1_img = np.float32(cv2.cvtColor(cv2.imread(a1_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

a2_img_fn = 'images/identityE.jpg'
a2_img = np.float32(cv2.cvtColor(cv2.imread(a2_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

b1_img_fn = 'images/identityE.jpg'
b1_img = np.float32(cv2.cvtColor(cv2.imread(b1_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

a1_img=resize_img(a1_img,0.9)
a2_img=resize_img(a2_img,0.9)
b1_img=resize_img(b1_img,0.9)

fig, axes = plt.subplots(1, 3)
axes[0].imshow(a1_img)
axes[0].set_title('Image A'), axes[0].set_xticks([]), axes[0].set_yticks([])
axes[1].imshow(a2_img)
axes[1].set_title("Image A'"), axes[1].set_xticks([]), axes[1].set_yticks([])
axes[2].imshow(b1_img)
axes[2].set_title("Image B"), axes[2].set_xticks([]), axes[2].set_yticks([])
```

Out[ ]:

```
(Text(0.5, 1.0, 'Image B'), [], [])
```



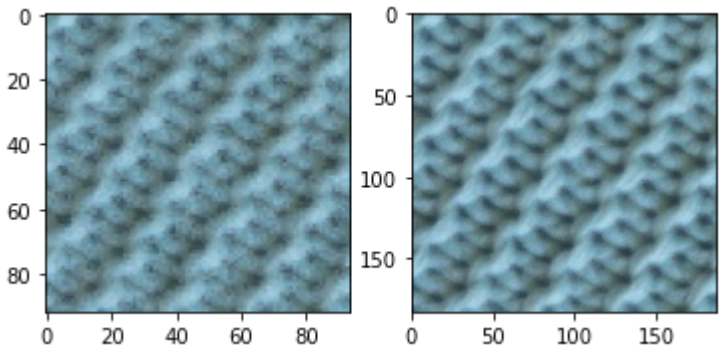
In [ ]:

```
kappa = 0
b2_img_list_id = start(a1_img,b1_img,a2_img,kappa,False)
```

In [ ]:

```
length = len(b2_img_list_id)

fig, axes = plt.subplots(1, length)
for i in range(length):
    axes[i].imshow(b2_img_list_id[i])

imageio.imsave('output/identity.jpg', b2_img_list_id[-1])
```

```
Lossy conversion from float32 to uint8. Range [0, 1]. Convert image
to uint8 prior to saving to suppress this warning.
```



Blur Filter

In [ ]:

```
a1_img_fn = 'images/blurA1.jpg'
a1_img = np.float32(cv2.cvtColor(cv2.imread(a1_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

a2_img_fn = 'images/blurA2.jpg'
a2_img = np.float32(cv2.cvtColor(cv2.imread(a2_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

b1_img_fn = 'images/blurB1.jpg'
b1_img = np.float32(cv2.cvtColor(cv2.imread(b1_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

a1_img=resize_img(a1_img,0.7)
a2_img=resize_img(a2_img,0.7)
b1_img=resize_img(b1_img,0.7)

fig, axes = plt.subplots(1, 3)
axes[0].imshow(a1_img)
axes[0].set_title('Image A'), axes[0].set_xticks([]), axes[0].set_yticks([])
axes[1].imshow(a2_img)
axes[1].set_title("Image A'"), axes[1].set_xticks([]), axes[1].set_yticks([])
axes[2].imshow(b1_img)
axes[2].set_title("Image B"), axes[2].set_xticks([]), axes[2].set_yticks([])
```

Out[ ]:

```
(Text(0.5, 1.0, 'Image B'), [], [])
```

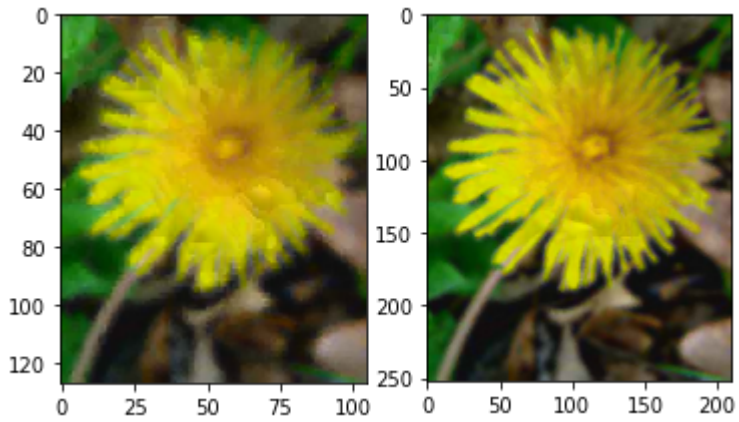
In [ ]:

```
kappa = 0.5
b2_img_list_blur = start(a1_img,b1_img,a2_img,kappa,False)
```

In [ ]:

```
length = len(b2_img_list_blur)

fig, axes = plt.subplots(1, length)
for i in range(length):
    axes[i].imshow(b2_img_list_blur[i])

imageio.imsave('output/blur.jpg', b2_img_list_blur[-1])
```

```
Lossy conversion from float32 to uint8. Range [0, 1]. Convert image
to uint8 prior to saving to suppress this warning.
```



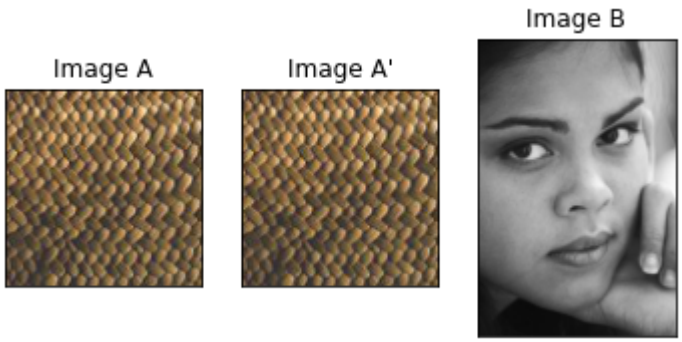
Texture Transfer

In [ ]:

```
a1_img_fn = 'images/transfer2_A1.jpg'
a1_img = np.float32(cv2.cvtColor(cv2.imread(a1_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

a2_img_fn = 'images/transfer2_A2.jpg'
a2_img = np.float32(cv2.cvtColor(cv2.imread(a2_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

b1_img_fn = 'images/transfer2_B1.jpg'
b1_img = np.float32(cv2.cvtColor(cv2.imread(b1_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

fig, axes = plt.subplots(1, 3)
axes[0].imshow(a1_img)
axes[0].set_title('Image A'), axes[0].set_xticks([]), axes[0].set_yticks([])
axes[1].imshow(a2_img)
axes[1].set_title("Image A'"), axes[1].set_xticks([]), axes[1].set_yticks([])
axes[2].imshow(b1_img)
axes[2].set_title("Image B"), axes[2].set_xticks([]), axes[2].set_yticks([])
```

Out[ ]:

```
(Text(0.5, 1.0, 'Image B'), [], [])
```



In [ ]:

```
a1_img=resize_img(a1_img,1)
a2_img=resize_img(a2_img,1)
b1_img=resize_img(b1_img,1)
```

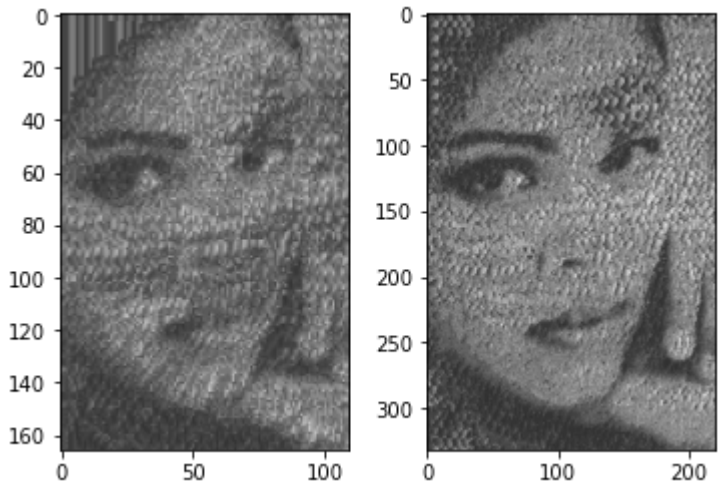
In [ ]:

```
kappa = 1
b2_img_list_trans = start(a1_img,b1_img,a2_img,kappa,False)
```

In [ ]:

```
length = len(b2_img_list_trans)

fig, axes = plt.subplots(1, length)
for i in range(length):
    axes[i].imshow(b2_img_list_trans[i])

imageio.imsave('output/texture_transfer.jpg', b2_img_list_trans[-1])
```

```
Lossy conversion from float32 to uint8. Range [0, 1]. Convert image
to uint8 prior to saving to suppress this warning.
```



Super-resolution

In [ ]:

```
a1_img_fn = 'images/BlurA2.jpg'
a1_img = np.float32(cv2.cvtColor(cv2.imread(a1_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

a2_img_fn = 'images/BlurA1.jpg'
a2_img = np.float32(cv2.cvtColor(cv2.imread(a2_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

b1_img_fn = 'output/blur.jpg'
b1_img = np.float32(cv2.cvtColor(cv2.imread(b1_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

a1_img=resize_img(a1_img,0.7)
a2_img=resize_img(a2_img,0.7)
b1_img=resize_img(b1_img,1)

fig, axes = plt.subplots(1, 3)
axes[0].imshow(a1_img)
axes[0].set_title('Image A'), axes[0].set_xticks([]), axes[0].set_yticks([])
axes[1].imshow(a2_img)
axes[1].set_title("Image A'"), axes[1].set_xticks([]), axes[1].set_yticks([])
axes[2].imshow(b1_img)
axes[2].set_title("Image B"), axes[2].set_xticks([]), axes[2].set_yticks([])
```

Out[ ]:

```
(Text(0.5, 1.0, 'Image B'), [], [])
```

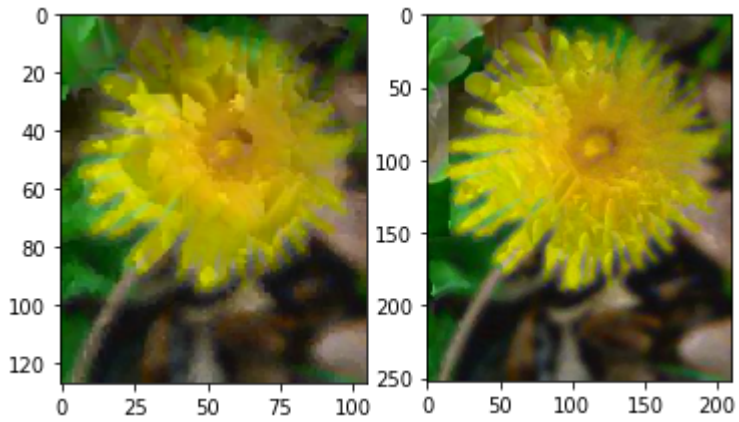
In [ ]:

```
kappa = 2
b2_img_list_sup = start(a1_img,b1_img,a2_img,kappa,False)
```

In [ ]:

```
length = len(b2_img_list_sup)

fig, axes = plt.subplots(1, length)
for i in range(length):
    axes[i].imshow(b2_img_list_sup[i])

imageio.imsave('output/supRes.jpg', b2_img_list_sup[-1])
```

```
Lossy conversion from float32 to uint8. Range [0, 1]. Convert image
to uint8 prior to saving to suppress this warning.
```



Re-color

In [ ]:

```
a1_img_fn = 'images/rose-src.jpg'
a1_img = np.float32(cv2.cvtColor(cv2.imread(a1_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

a2_img_fn = 'images/blurA1.jpg'
a2_img = np.float32(cv2.cvtColor(cv2.imread(a2_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

b1_img_fn = 'images/fadenA1.jpg'
b1_img = np.float32(cv2.cvtColor(cv2.imread(b1_img_fn), cv2.COLOR_BGR2RGB)/255.0
)

a1_img=resize_img(a1_img,0.7)
a2_img=resize_img(a2_img,0.7)
b1_img=resize_img(b1_img,0.7)

fig, axes = plt.subplots(1, 3)
axes[0].imshow(a1_img)
axes[0].set_title('Image A'), axes[0].set_xticks([]), axes[0].set_yticks([])
axes[1].imshow(a2_img)
axes[1].set_title("Image A'"), axes[1].set_xticks([]), axes[1].set_yticks([])
axes[2].imshow(b1_img)
axes[2].set_title("Image B"), axes[2].set_xticks([]), axes[2].set_yticks([])
```

Out[ ]:

```
(Text(0.5, 1.0, 'Image B'), [], [])
```

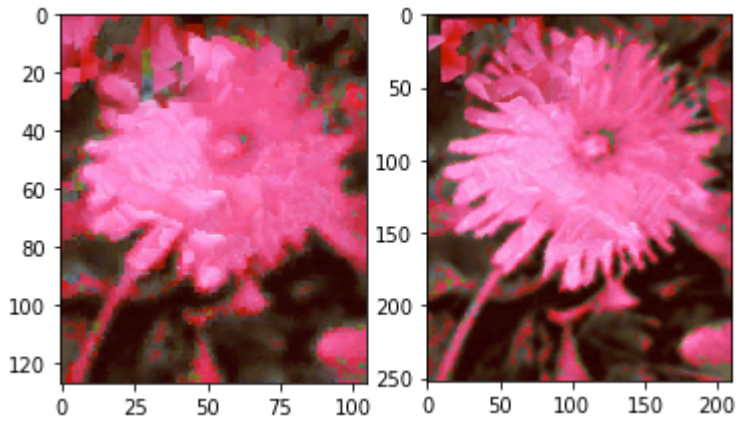
In [ ]:

```
kappa = 1
b2_img_list_rec = start2(a1_img,b1_img,a2_img,kappa,False)
```

In [ ]:

```
length = len(b2_img_list_rec)

fig, axes = plt.subplots(1, length)
for i in range(length):
    axes[i].imshow(b2_img_list_rec[i])

imageio.imsave('output/rec.jpg', b2_img_list_rec[-1])
```

```
Lossy conversion from float32 to uint8. Range [0, 1]. Convert image
to uint8 prior to saving to suppress this warning.
```



Part 2. Artistic Filters