

Threshold_sampling

May 10, 2022

```
[ ]: import os
%matplotlib inline
import numpy as np
import matplotlib.pyplot as plt
from skimage import io
import cv2 as cv

FILE_DIR = './material/images'
```

```
[ ]: def normalized(rgb):

    norm=np.zeros_like(rgb,np.float32)

    r = rgb[:, :, 0]
    g = rgb[:, :, 1]
    b = rgb[:, :, 2]
    sum = rgb.sum(axis=2)

    norm[:, :, 0]=r/sum
    norm[:, :, 1]=g/sum
    norm[:, :, 2]=b/sum
    return norm
```

```
[ ]: def run_skin_analysis_norm():

    with os.scandir(FILE_DIR+"/skin/") as direct:
        maxes_rg = []
        maxes_rb = []
        mins_rg = []
        mins_rb = []
        for file in direct:
            plt.figure(figsize=(32, 8))
            plt.suptitle(file.name)
            skin_img = io.imread(FILE_DIR + "/skin/" + file.name)
            skin_img_array = normalized(np.asarray(skin_img))
            plt.subplot(1, 9, 1)
            plt.imshow(skin_img_array)
            plt.subplot(1, 9, 2)
```

```

        plt.scatter(skin_img_array[:, :, 0], skin_img_array[:, :, 1], u
˓→norm=True)
        plt.subplot(1, 9, 3)
        plt.scatter(skin_img_array[:, :, 0], skin_img_array[:, :, 2], u
˓→norm=True)
        plt.subplot(1, 9, 4)
        plt.scatter(skin_img_array[:, :, 1], skin_img_array[:, :, 2], u
˓→norm=True)
        plt.subplot(1, 9, 5)
        plt.imshow(skin_img)
        plt.subplot(1, 9, (6, 7))
        tmp_mx = (skin_img_array[:, :, 0]/skin_img_array[:, :, 1]).
˓→max(axis=1)
        tmp_mn = (skin_img_array[:, :, 0]/skin_img_array[:, :, 1]).
˓→min(axis=1)
        plt.plot(tmp_mx)
        plt.plot(tmp_mn)
        tmp_mx = tmp_mx.max()
        tmp_mn = tmp_mn.min()
        maxes_rg.append(tmp_mx)
        mins_rg.append(tmp_mn)
        plt.subplot(1, 9, (8, 9))
        tmp_mx = (skin_img_array[:, :, 0]/skin_img_array[:, :, 2]).
˓→max(axis=1)
        tmp_mn = (skin_img_array[:, :, 0]/skin_img_array[:, :, 2]).
˓→min(axis=1)
        plt.plot(tmp_mx)
        plt.plot(tmp_mn)
        tmp_mx = tmp_mx.max()
        tmp_mn = tmp_mn.min()
        maxes_rb.append(tmp_mx)
        mins_rb.append(tmp_mn)
        print(f"95 perc max = {np.percentile(np.asarray(maxes_rg), 95)}, {np.
˓→percentile(np.asarray(maxes_rb), 95)}")
        print(f"10 perc min = {np.percentile(np.asarray(mins_rg), 10)}, {np.
˓→percentile(np.asarray(mins_rb), 10)}")

```

```
[ ]: def run_skin_analysis_hsv():
    with os.scandir(FILE_DIR+"/skin/") as direct:
        maxes_rg = []
        maxes_rb = []
        mins_rg = []
        mins_rb = []
        for file in direct:
            plt.figure(figsize=(32, 4))
            plt.suptitle(file.name)
```

```

skin_img = io.imread(FILE_DIR + "/skin/" + file.name)
skin_img_hsb = cv.cvtColor(skin_img, cv.COLOR_BGR2HSV)
plt.figure(figsize=(32, 8))
plt.subplot(1, 7, 1)
plt.imshow(skin_img_hsb[:, :, 0], cmap="hsv")
plt.colorbar(orientation='horizontal')
plt.subplot(1, 7, 2)
plt.imshow(skin_img_hsb[:, :, 1], cmap="Reds")
plt.colorbar(orientation='horizontal')
plt.subplot(1, 7, 3)
plt.imshow(skin_img_hsb[:, :, 2], cmap="gray")
plt.colorbar(orientation='horizontal')
plt.subplot(1, 7, (4, 5))
tmp_mx = (skin_img_hsb[:, :, 0]).max(axis=1)
tmp_mn = (skin_img_hsb[:, :, 0]).min(axis=1)
plt.plot(tmp_mx)
plt.plot(tmp_mn)
tmp_mx = tmp_mx.max()
tmp_mn = tmp_mn.min()
maxes_rg.append(tmp_mx)
mins_rg.append(tmp_mn)
plt.subplot(1, 7, (6, 7))
tmp_mx = (skin_img_hsb[:, :, 1]).max(axis=1)
tmp_mn = (skin_img_hsb[:, :, 1]).min(axis=1)
plt.plot(tmp_mx)
plt.plot(tmp_mn)
tmp_mx = tmp_mx.max()
tmp_mn = tmp_mn.min()
maxes_rb.append(tmp_mx)
mins_rb.append(tmp_mn)
print(f"98% perc max = {np.percentile(np.asarray(maxes_rg), 98)}, {np.
˓→percentile(np.asarray(maxes_rb), 98)}")
print(f"5% perc min = {np.percentile(np.asarray(mins_rg), 5)}, {np.
˓→percentile(np.asarray(mins_rb), 5)}")

```

```

[ ]: def run_skin_analysis_ycbcr():
    with os.scandir(FILE_DIR+"/skin/") as direct:
        maxes_rg = []
        maxes_rb = []
        mins_rg = []
        mins_rb = []
        for file in direct:
            plt.figure(figsize=(32, 4))
            plt.suptitle(file.name)
            skin_img = io.imread(FILE_DIR + "/skin/" + file.name)
            skin_img_ycbcr = cv.cvtColor(skin_img, cv.COLOR_RGB2YCrCb)
            plt.subplot(1, 2, 1)

```

```

plt.imshow(skin_img_ycbcr)
plt.subplot(1, 2, 2)
plt.imshow(skin_img)
plt.figure(figsize=(32, 8))
plt.subplot(1, 7, 1)
plt.imshow(skin_img_ycbcr[:, :, 0], cmap="gray")
plt.colorbar(orientation='horizontal')
plt.subplot(1, 7, 2)
plt.imshow(skin_img_ycbcr[:, :, 1], cmap="Greens")
plt.colorbar(orientation='horizontal')
plt.subplot(1, 7, 3)
plt.imshow(skin_img_ycbcr[:, :, 2], cmap="Reds")
plt.colorbar(orientation='horizontal')
plt.subplot(1, 7, (4, 5))
tmp_mx = (skin_img_ycbcr[:, :, 1]).max(axis=1)
tmp_mn = (skin_img_ycbcr[:, :, 1]).min(axis=1)
plt.plot(tmp_mn)
plt.plot(tmp_mx)
tmp_mx = tmp_mx.max()
tmp_mn = tmp_mn.min()
maxes_rg.append(tmp_mx)
mins_rg.append(tmp_mn)
plt.subplot(1, 7, (6, 7))
tmp_mx = (skin_img_ycbcr[:, :, 2]).max(axis=1)
tmp_mn = (skin_img_ycbcr[:, :, 2]).min(axis=1)
plt.plot(tmp_mn)
plt.plot(tmp_mx)
tmp_mx = tmp_mx.max()
tmp_mn = tmp_mn.min()
maxes_rb.append(tmp_mx)
mins_rb.append(tmp_mn)
print(f"98% perc max = {np.percentile(np.asarray(maxes_rg), 98)}, {np.
˓→percentile(np.asarray(maxes_rb), 98)}")
print(f"2% perc min = {np.percentile(np.asarray(mins_rg), 2)}, {np.
˓→percentile(np.asarray(mins_rb), 2)}")

```

[]: run_skin_analysis_norm()

```

<ipython-input-3-d0de6e4f23aa>:32: RuntimeWarning: divide by zero encountered in
true_divide
    tmp_mx = (skin_img_array[:, :, 0]/skin_img_array[:, :, 2]).max(axis=1)
<ipython-input-3-d0de6e4f23aa>:33: RuntimeWarning: divide by zero encountered in
true_divide
    tmp_mn = (skin_img_array[:, :, 0]/skin_img_array[:, :, 2]).min(axis=1)
<ipython-input-3-d0de6e4f23aa>:8: RuntimeWarning: More than 20 figures have been
opened. Figures created through the pyplot interface
(`matplotlib.pyplot.figure`) are retained until explicitly closed and may

```

```

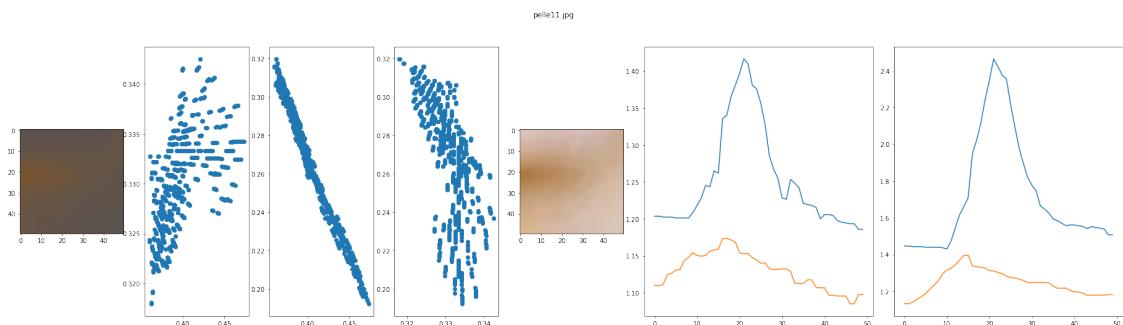
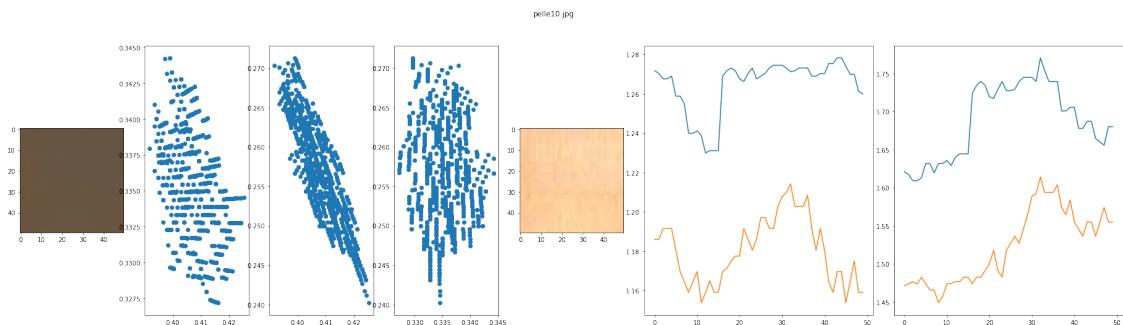
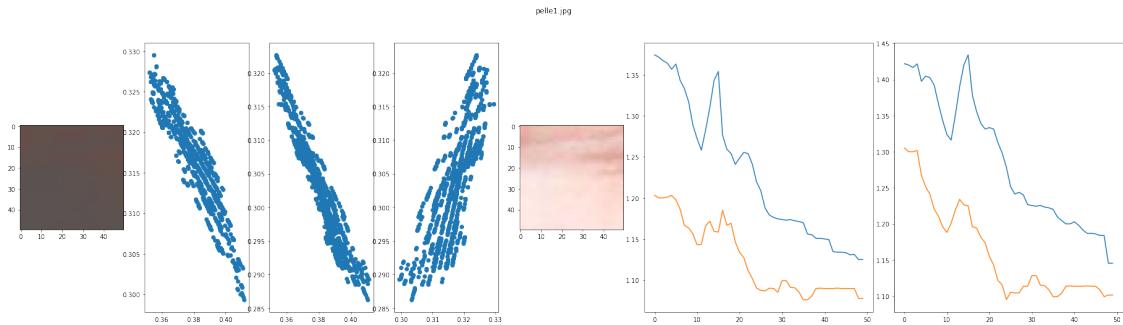
consume too much memory. (To control this warning, see the rcParam
`figure.max_open_warning`).

plt.figure(figsize=(32, 8))

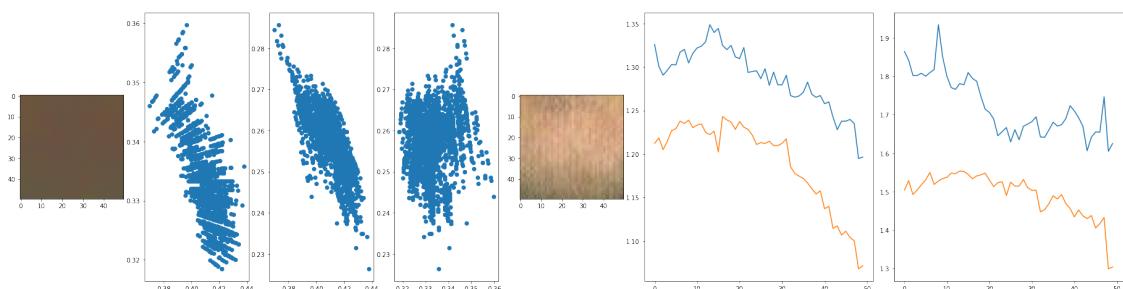
<ipython-input-3-d0de6e4f23aa>:32: RuntimeWarning: divide by zero encountered in
true_divide
    tmp_mx = (skin_img_array[:, :, 0]/skin_img_array[:, :, 2]).max(axis=1)
<ipython-input-3-d0de6e4f23aa>:33: RuntimeWarning: divide by zero encountered in
true_divide
    tmp_mn = (skin_img_array[:, :, 0]/skin_img_array[:, :, 2]).min(axis=1)

95 perc max = 2.368037152290344, inf
10 perc min = 1.0686118721961975, 1.0960114479064942

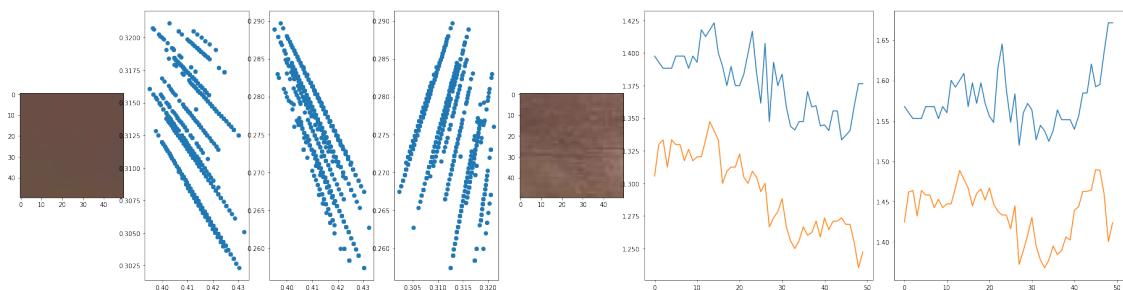
```



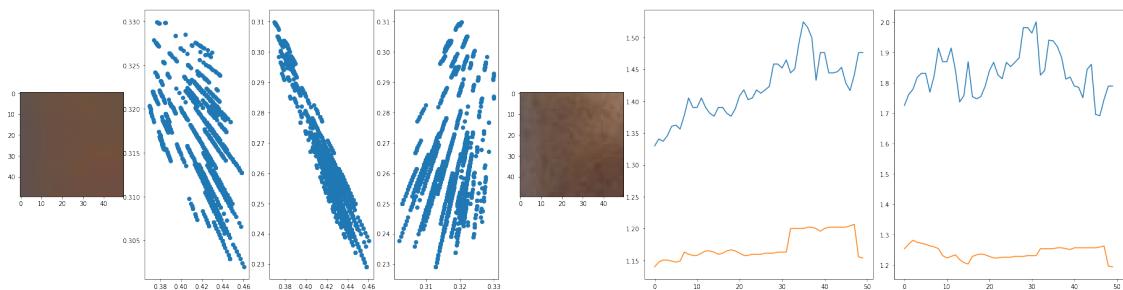
pelle12.jpg



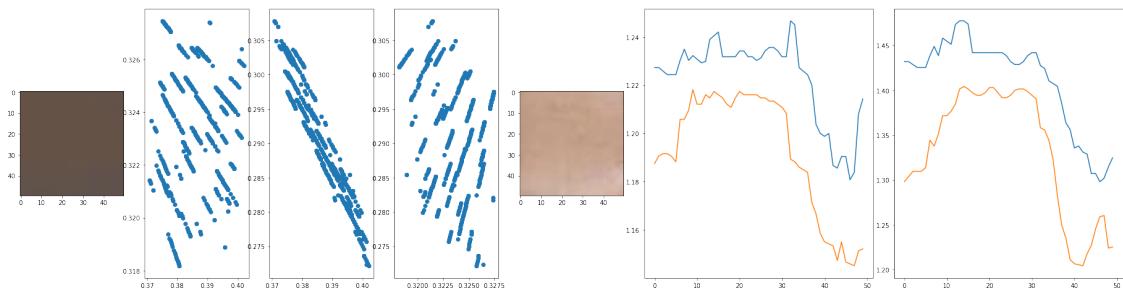
pelle13.jpg



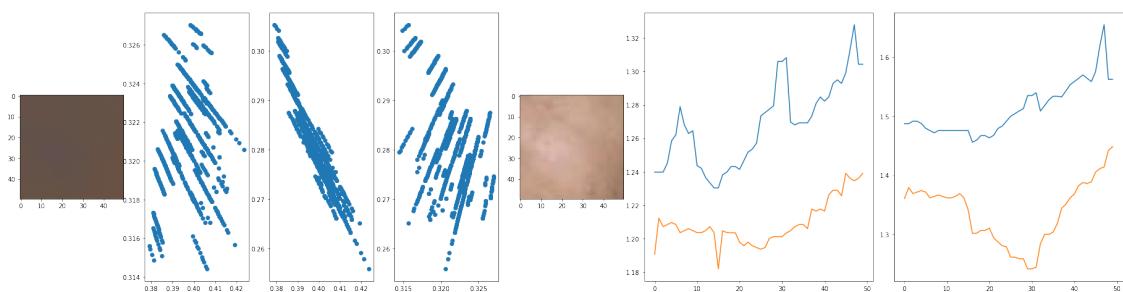
pelle14.jpg



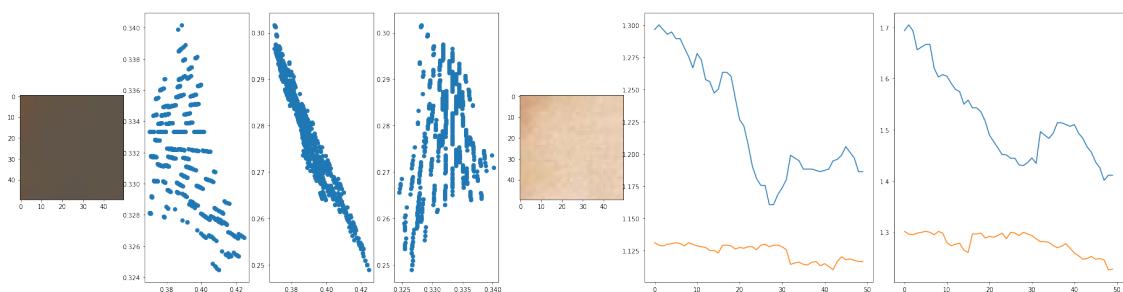
pelle15.jpg



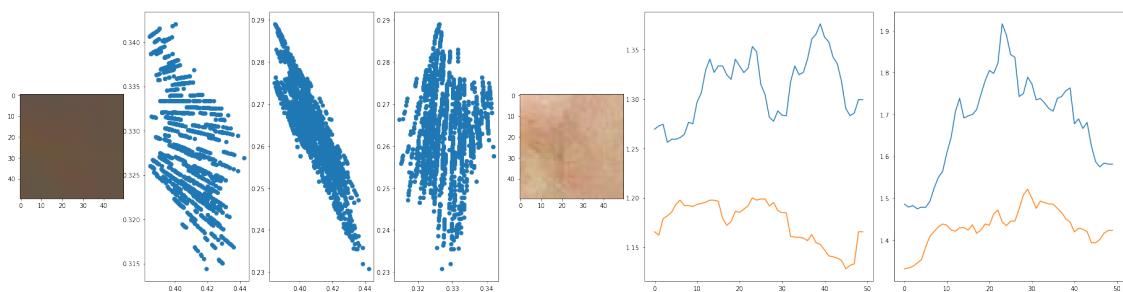
pelle16.jpg



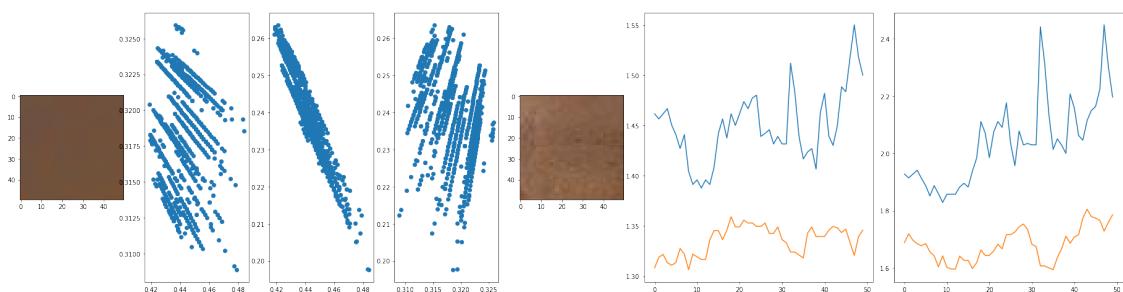
pelle17.jpg



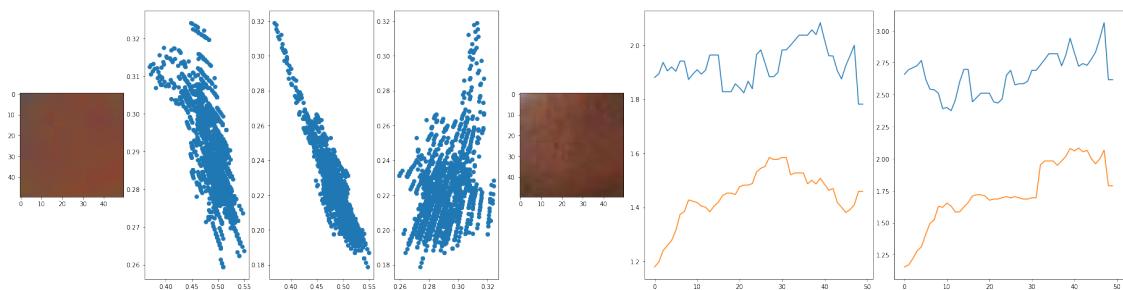
pelle18.jpg



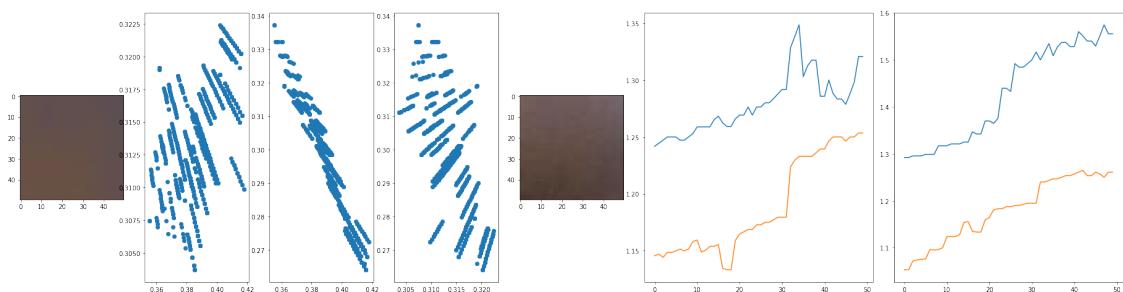
pelle19.jpg



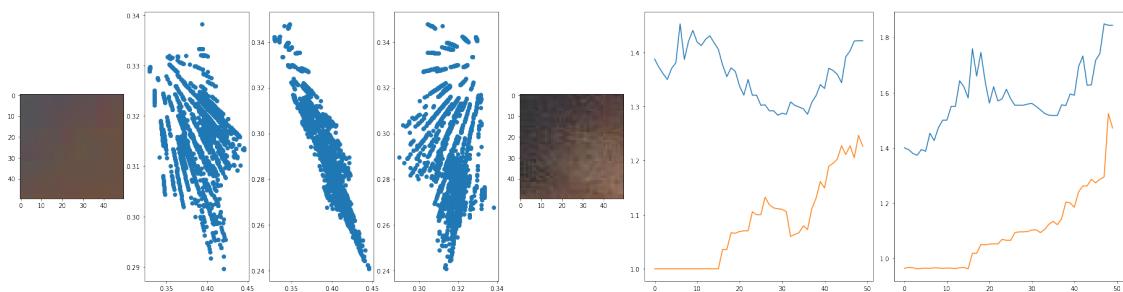
pelle2.jpg



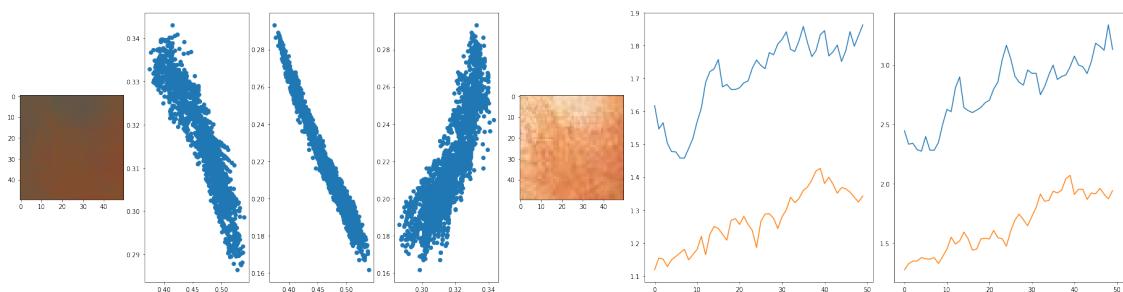
pelle20.jpg



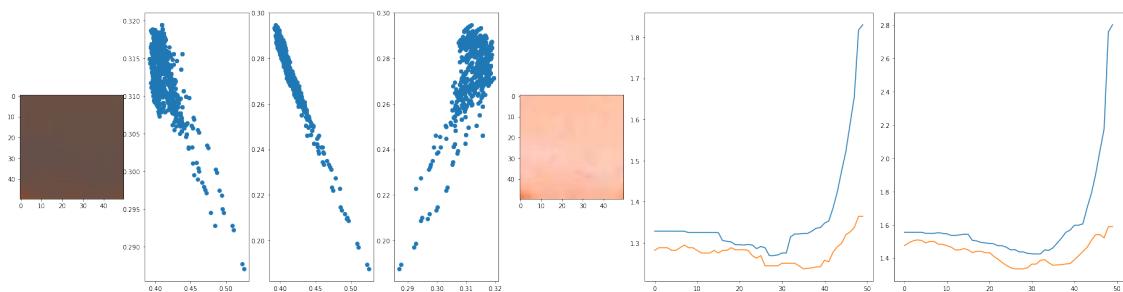
pelle21.jpg



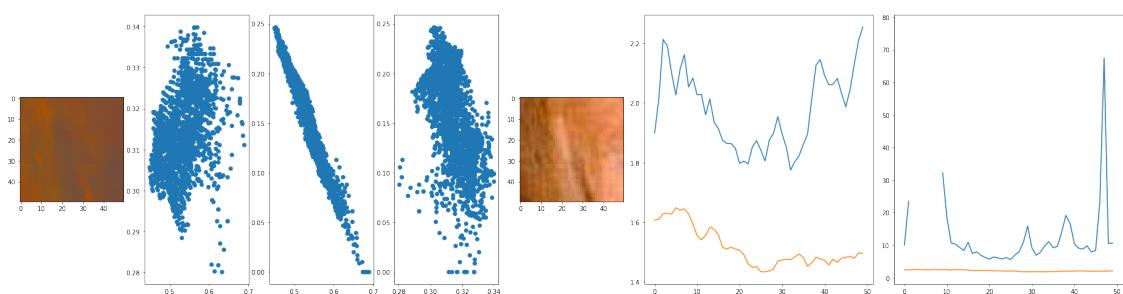
pelle22.jpg



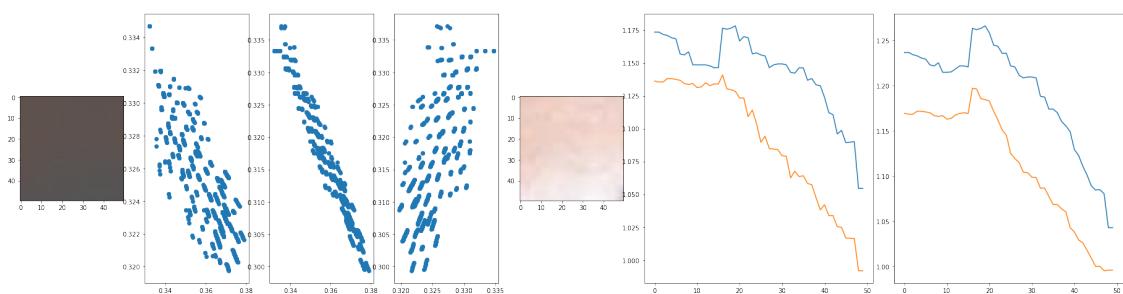
pelle23.jpg



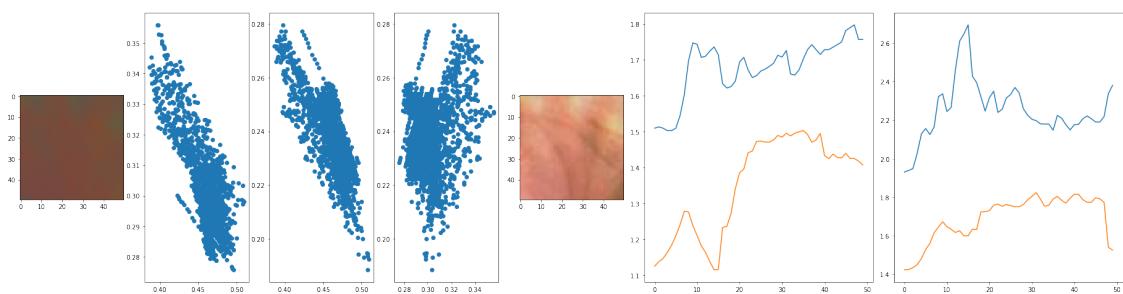
pelle24.jpg



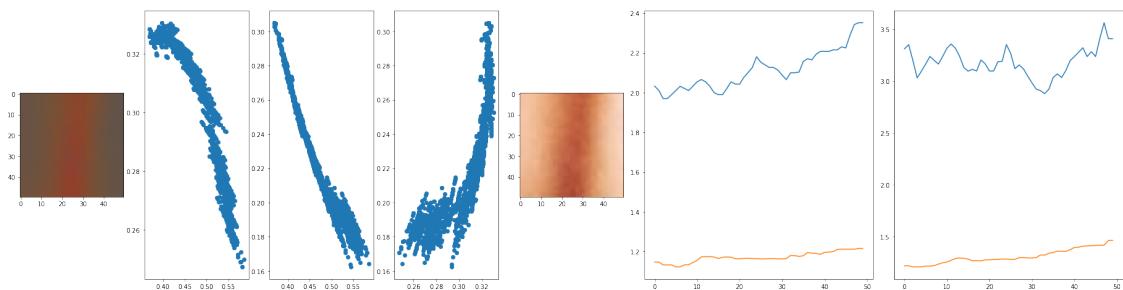
pelle25.jpg



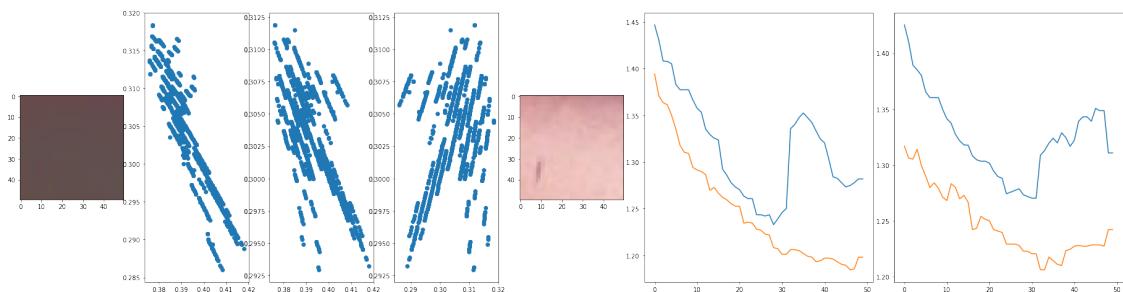
pelle26.jpg



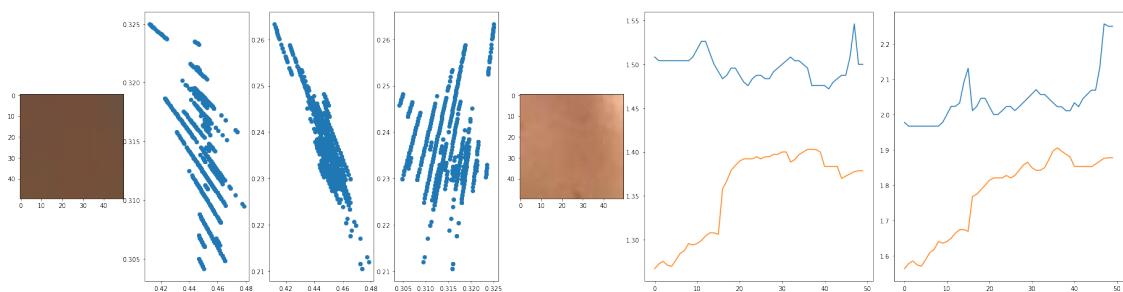
pelle27.jpg



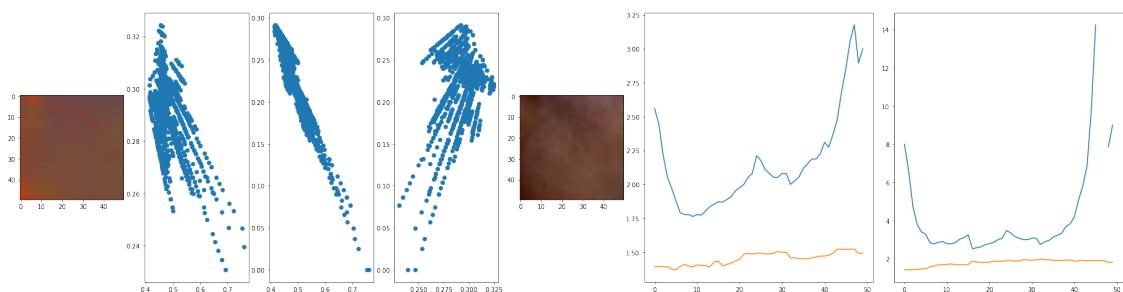
pelle28.jpg



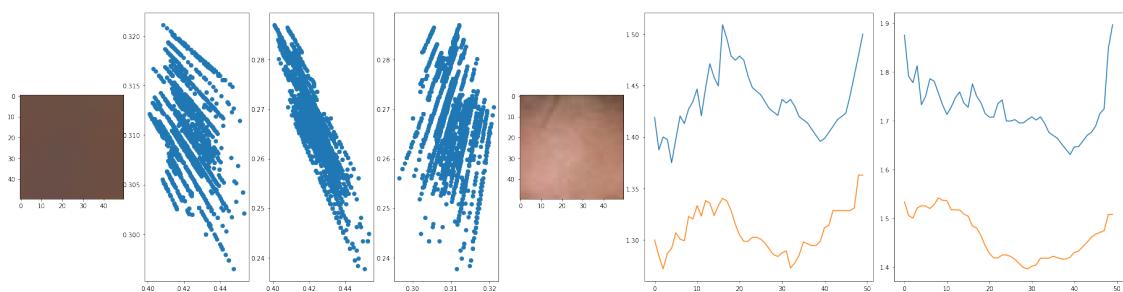
pelle29.jpg



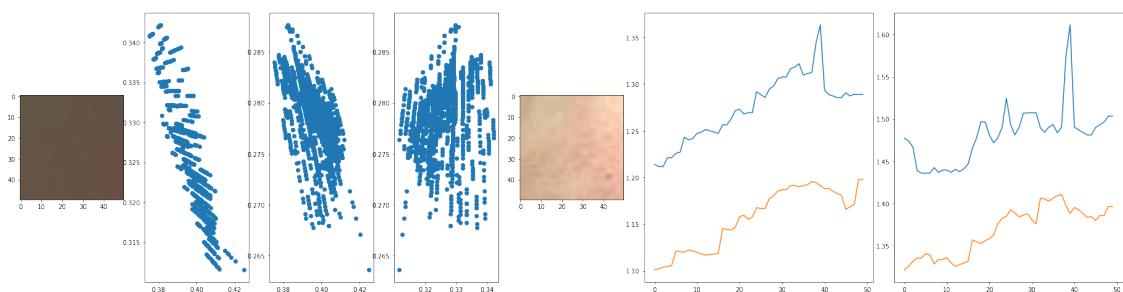
pelle3.jpg



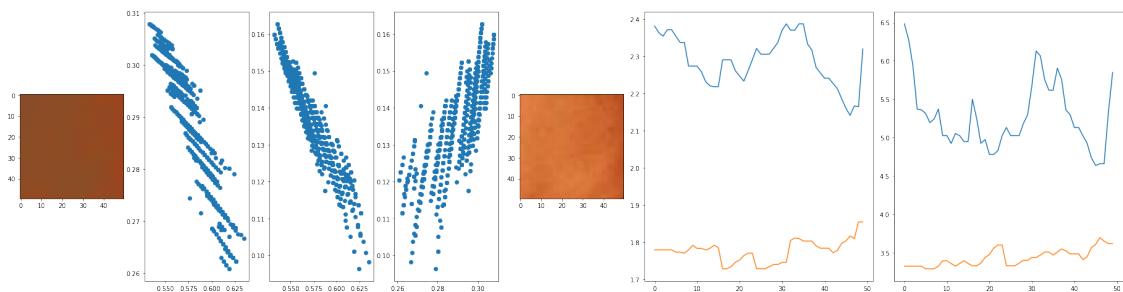
pelle30.jpg



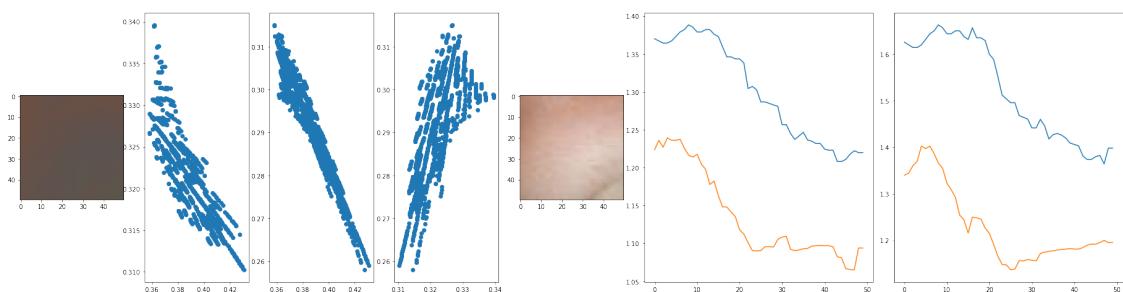
pelle31.jpg



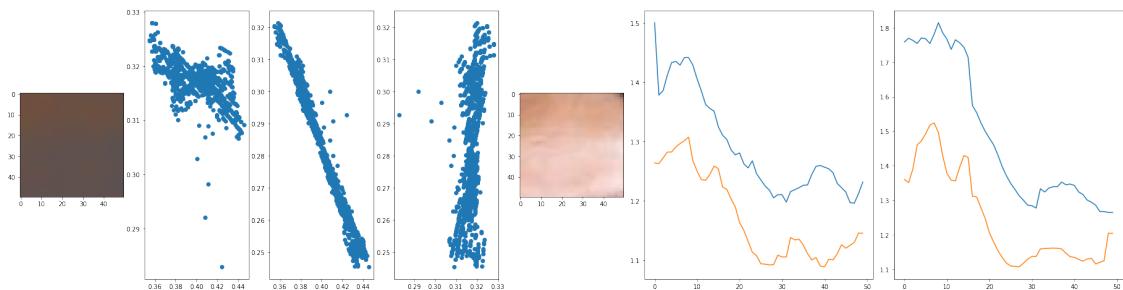
pelle32.jpg



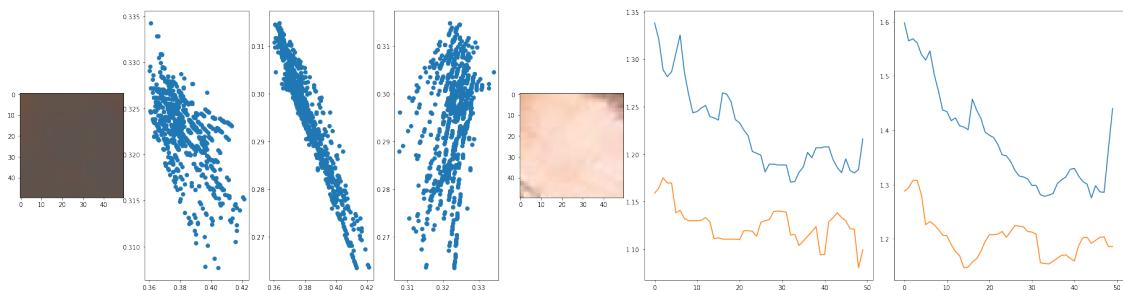
pelle4.jpg



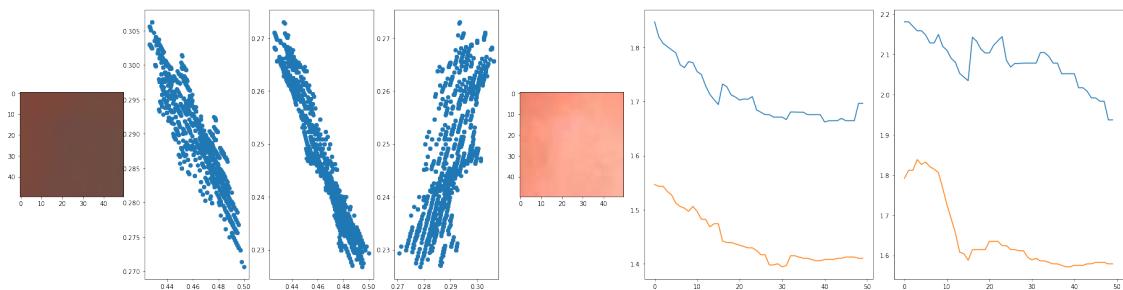
pelle5.jpg



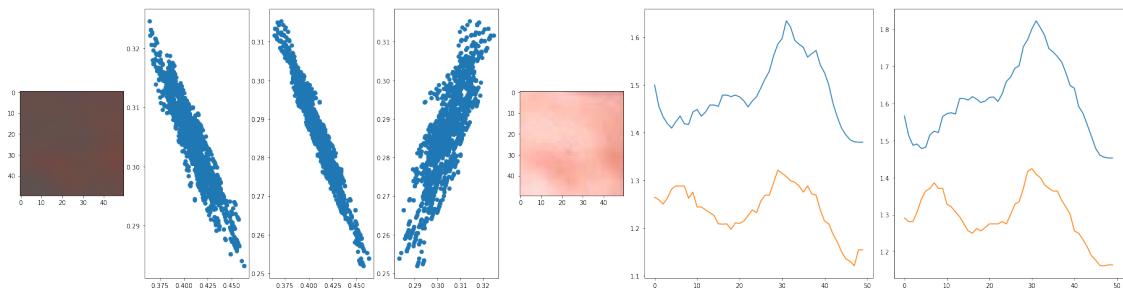
pelle6.jpg

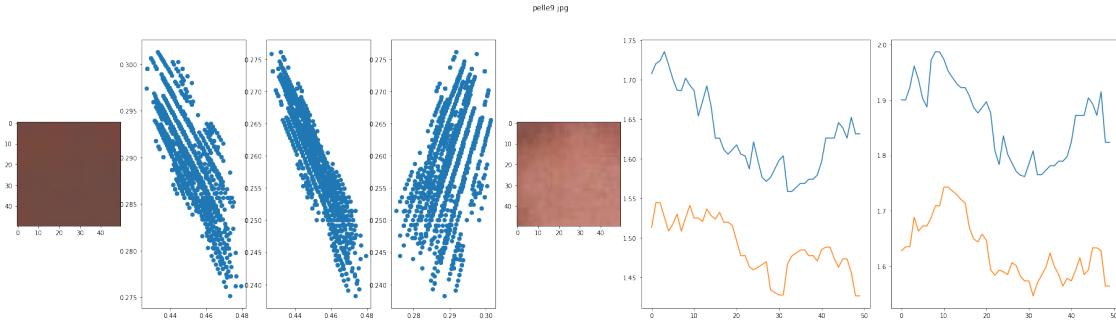


pelle7.jpg



pelle8.jpg





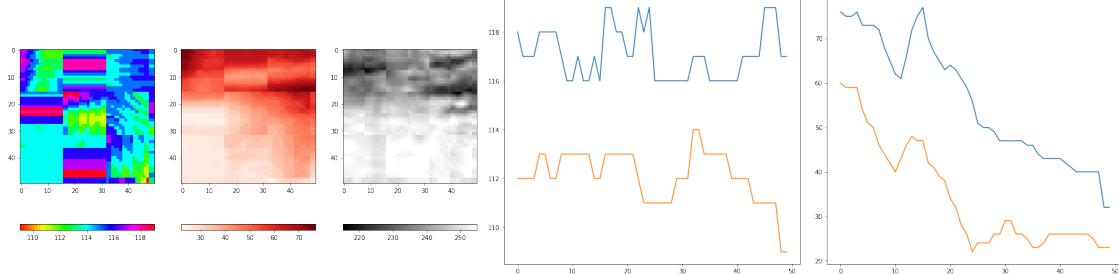
[]: `run_skin_analysis_hsv()`

```
<ipython-input-4-61252013205d>:8: RuntimeWarning: More than 20 figures have been
opened. Figures created through the pyplot interface
(`matplotlib.pyplot.figure`) are retained until explicitly closed and may
consume too much memory. (To control this warning, see the rcParam
`figure.max_open_warning`).
```

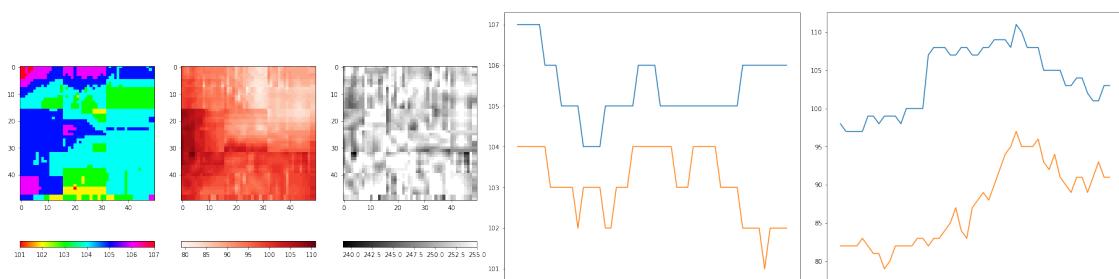
```
plt.figure(figsize=(32, 4))
```

```
98% perc max = 156.9, 255.0
5% perc min = 53.35, 15.700000000000001
```

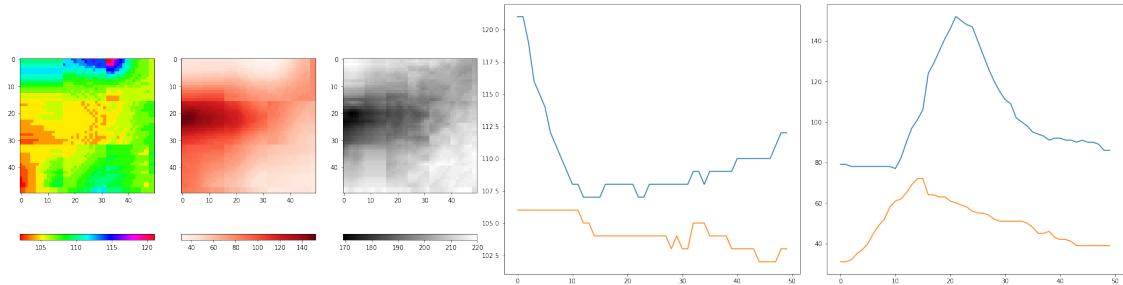
<Figure size 2304x288 with 0 Axes>



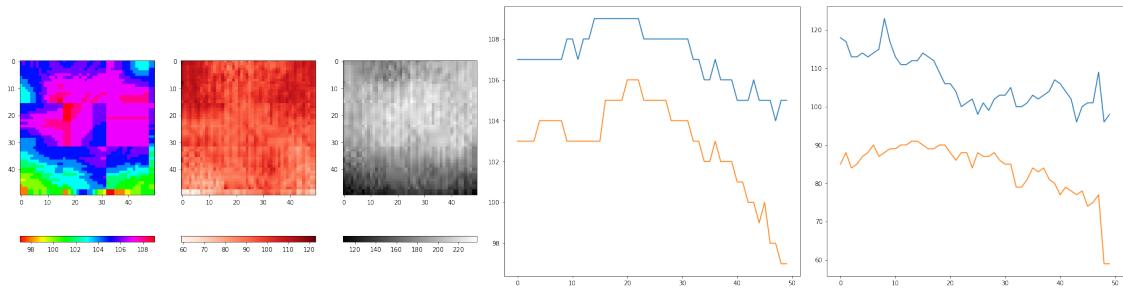
<Figure size 2304x288 with 0 Axes>



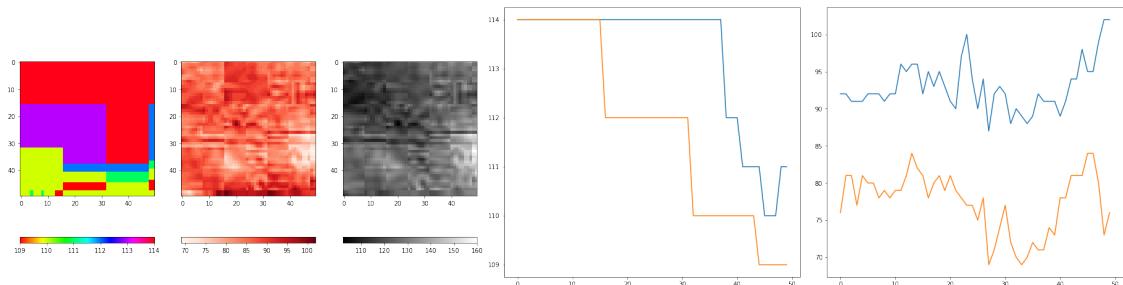
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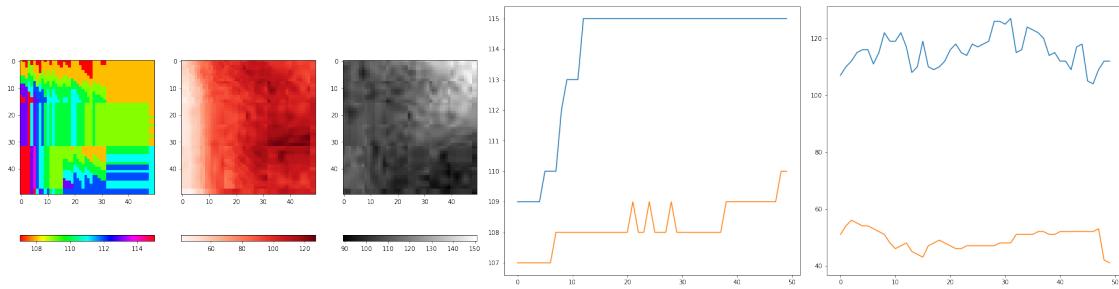
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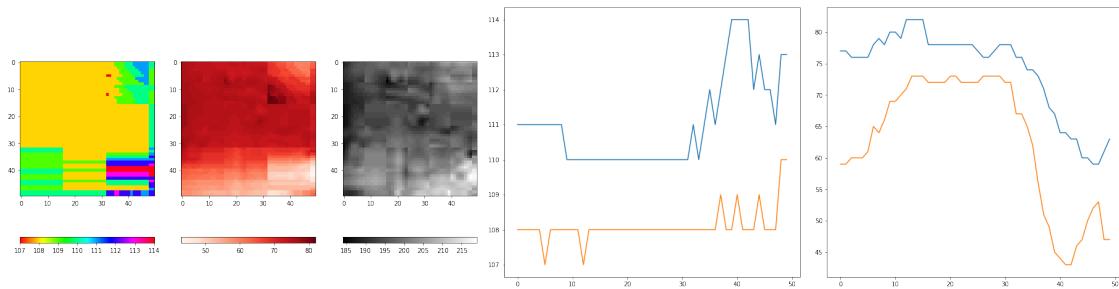
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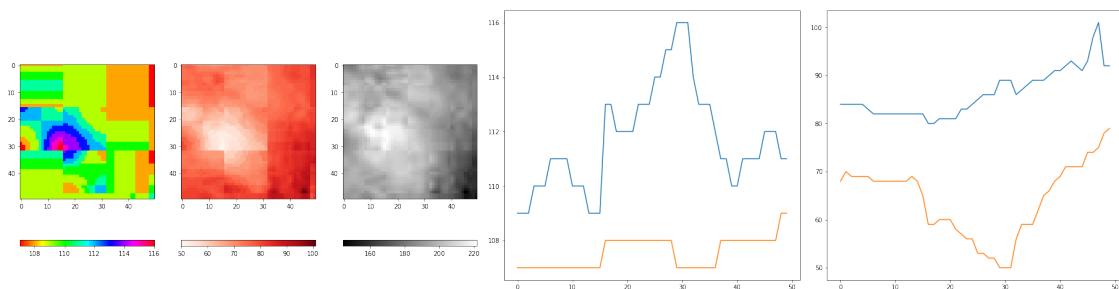
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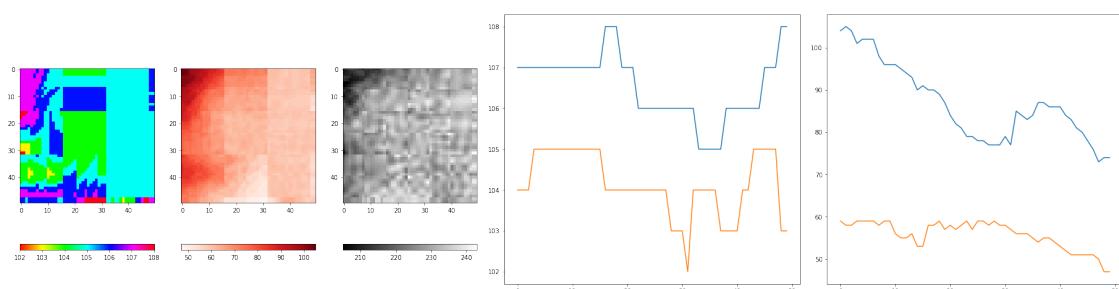
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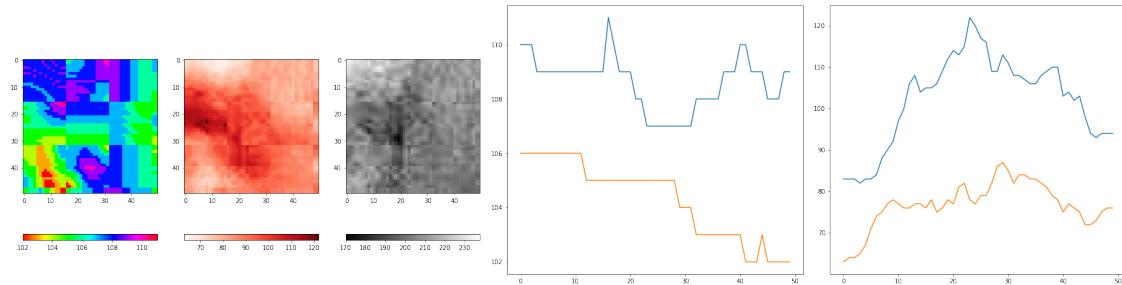
<Figure size 2304x288 with 0 Axes>



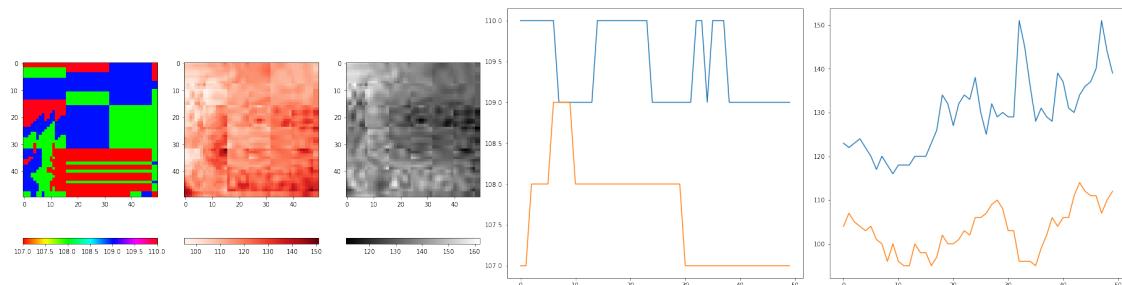
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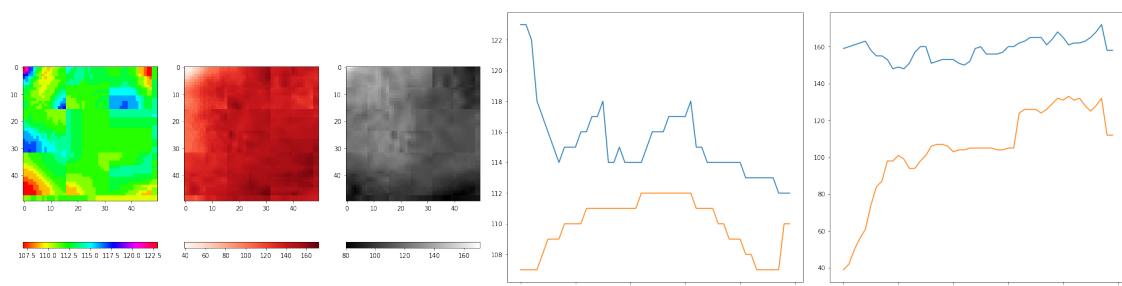
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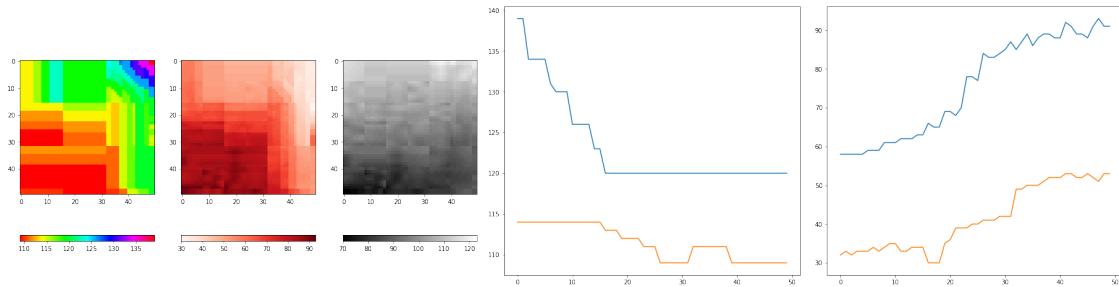
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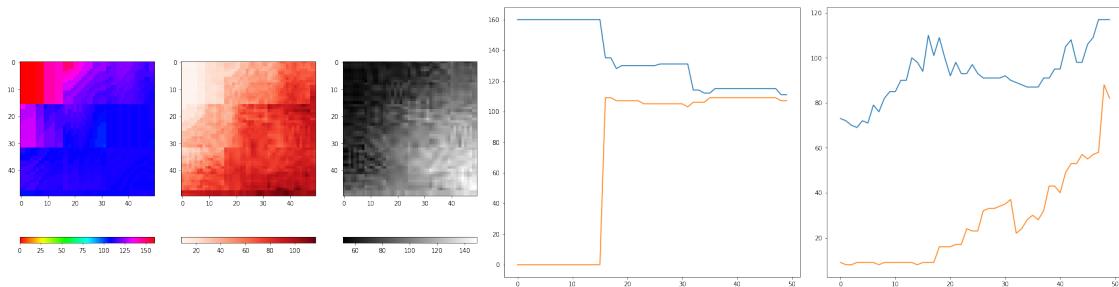
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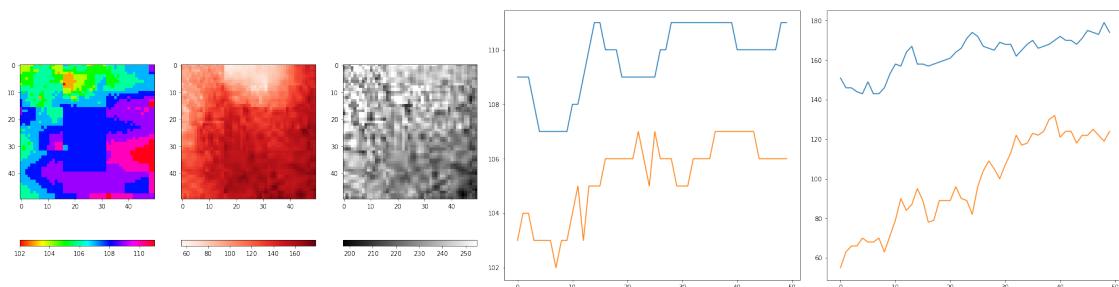
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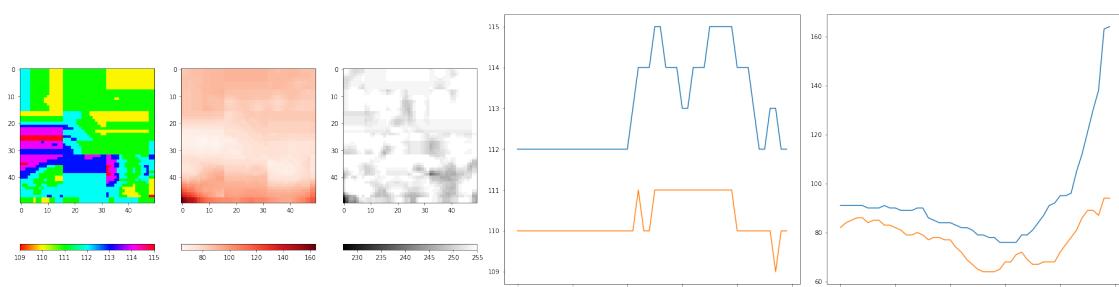
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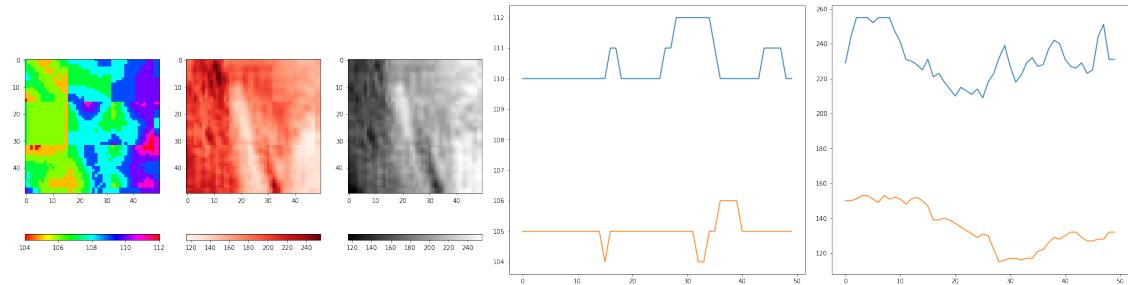
<Figure size 2304x288 with 0 Axes>



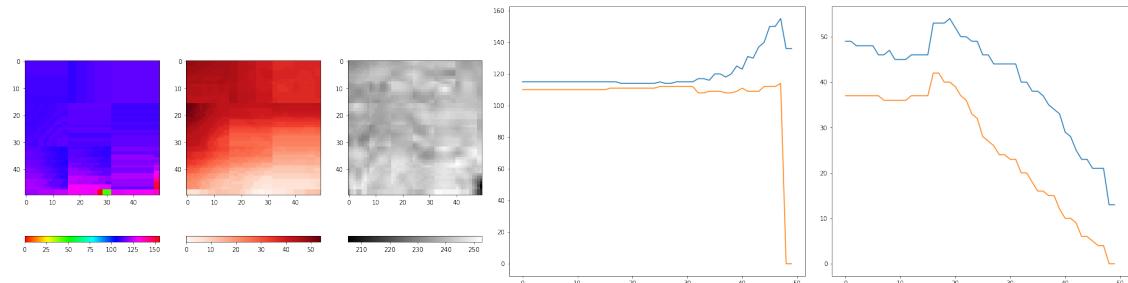
<Figure size 2304x288 with 0 Axes>



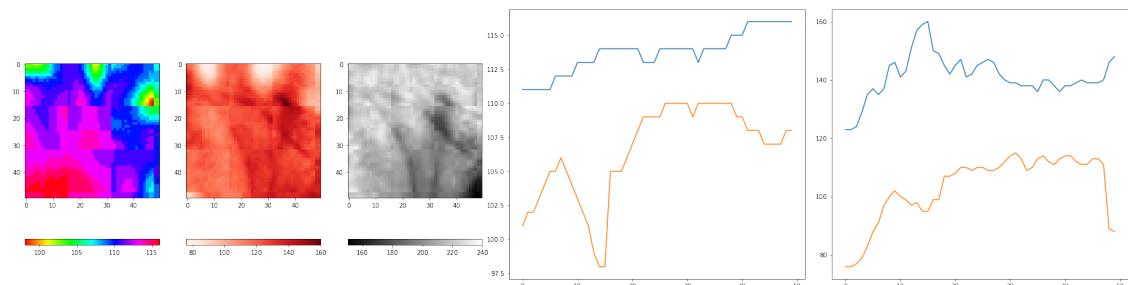
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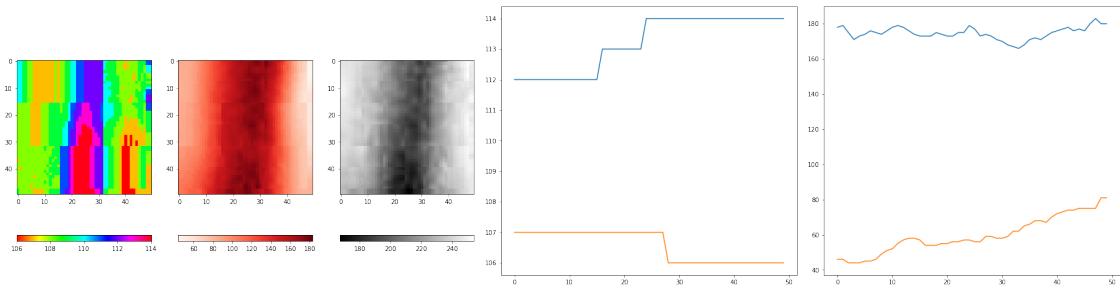
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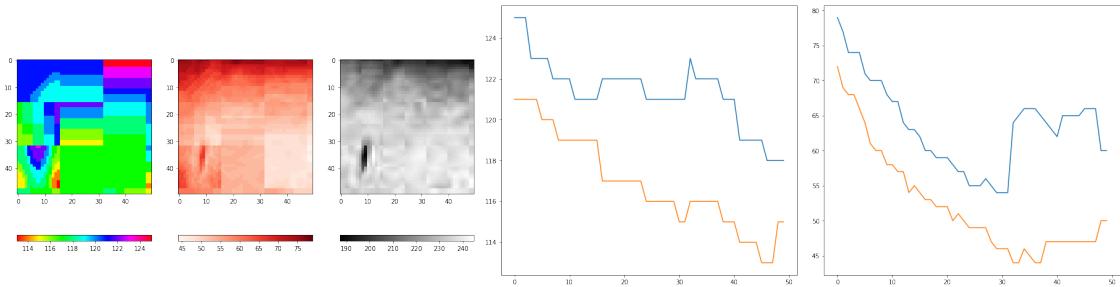
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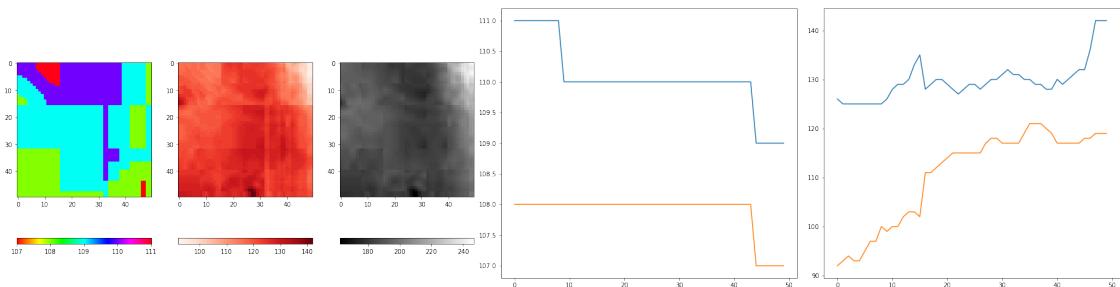
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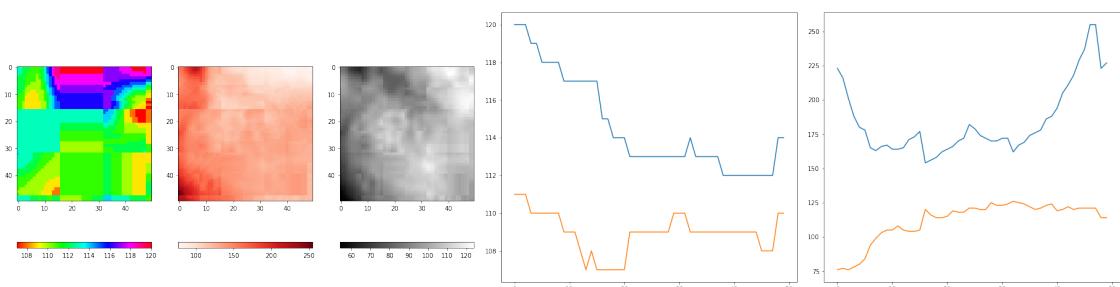
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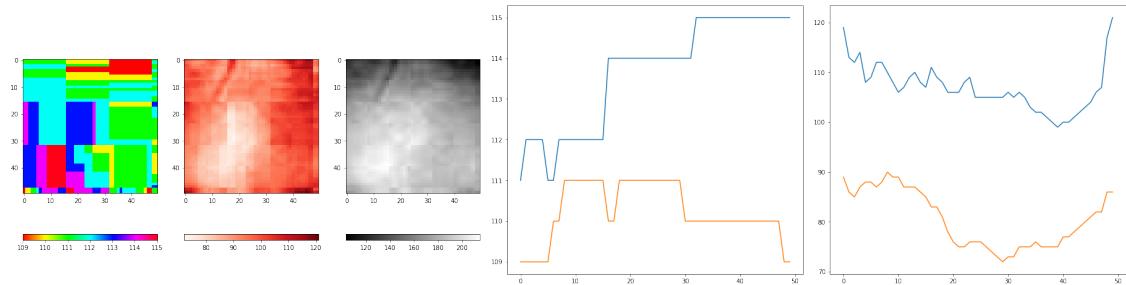
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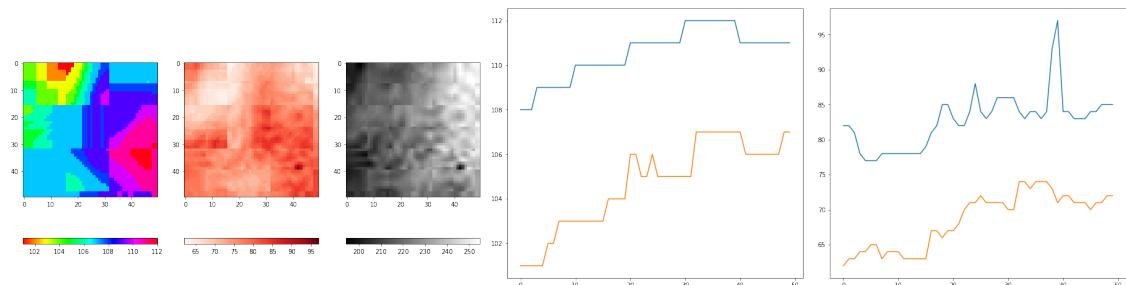
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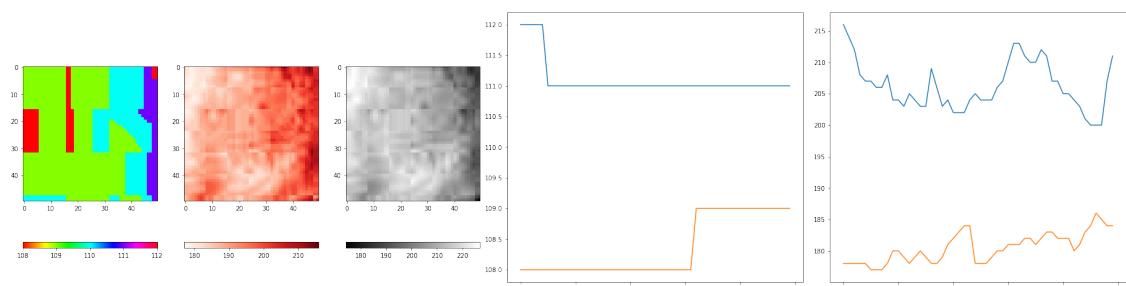
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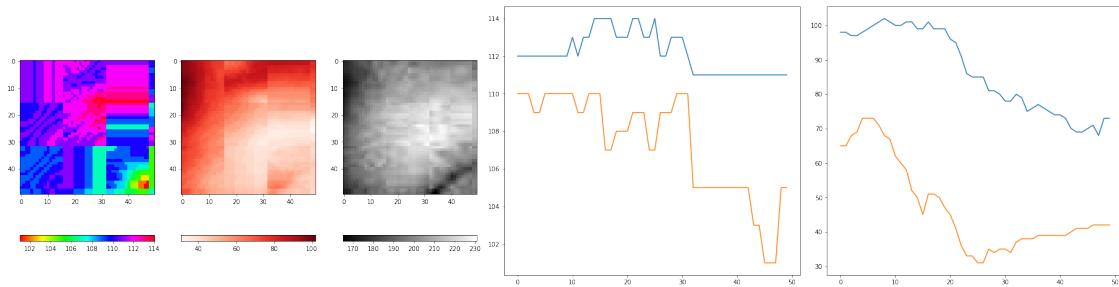
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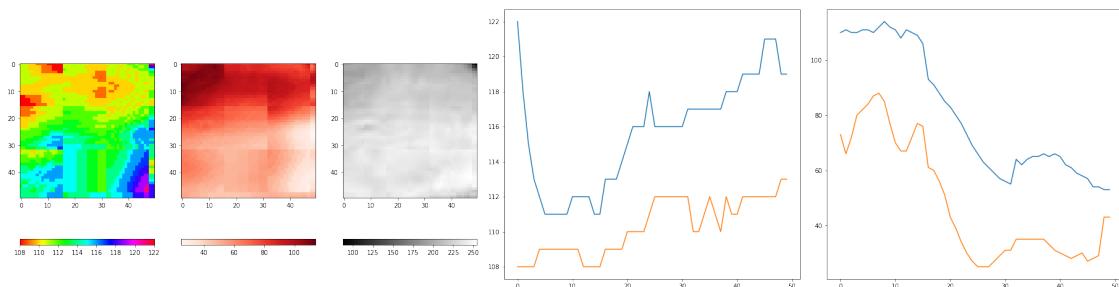
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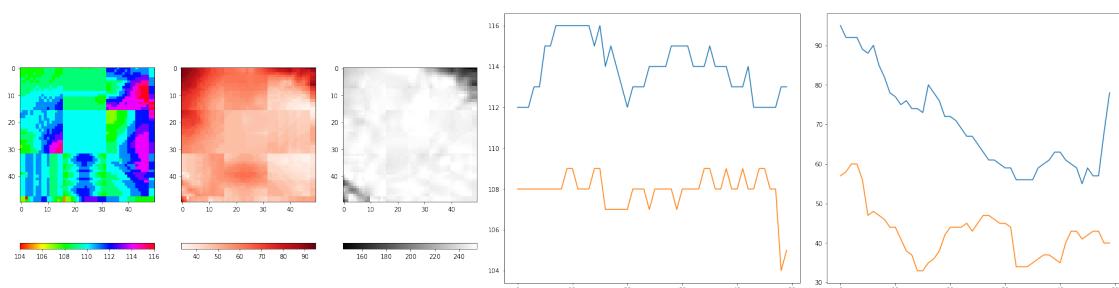
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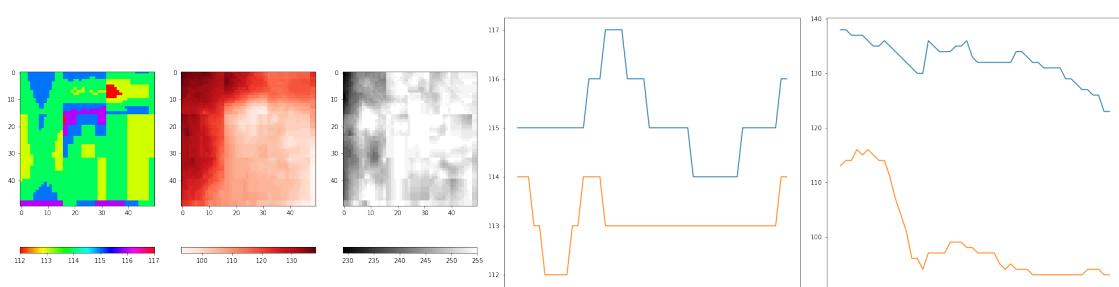
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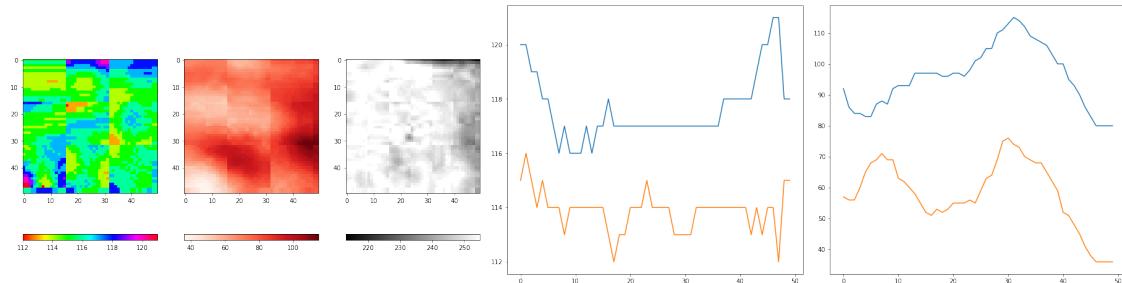
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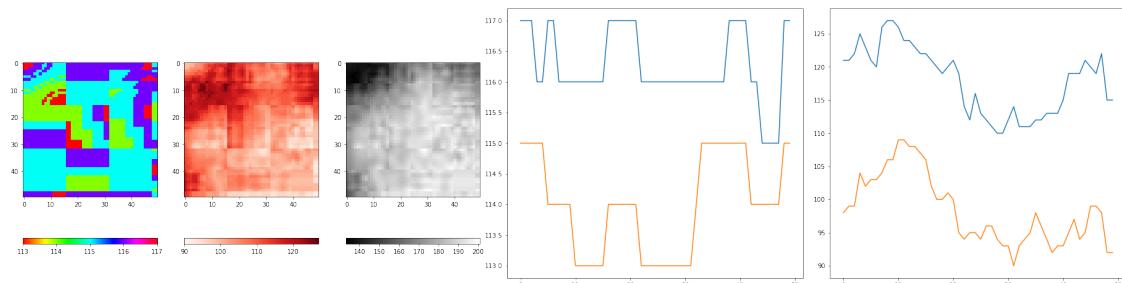
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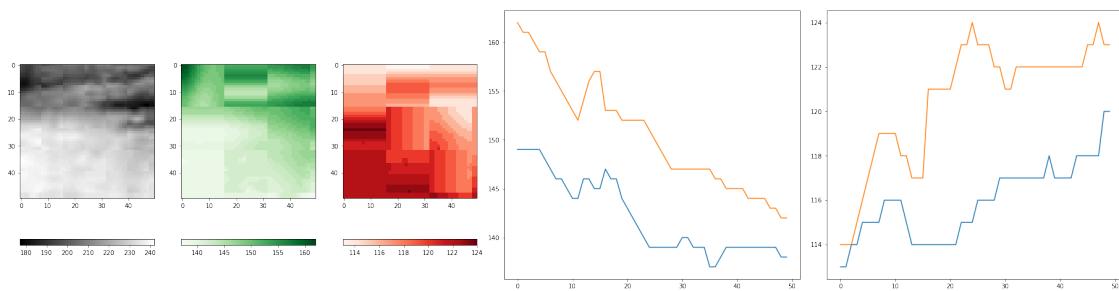
[]: run_skin_analysis_ycbcr()

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opened. Figures created through the pyplot interface
(`matplotlib.pyplot.figure`) are retained until explicitly closed and may
consume too much memory. (To control this warning, see the rcParam
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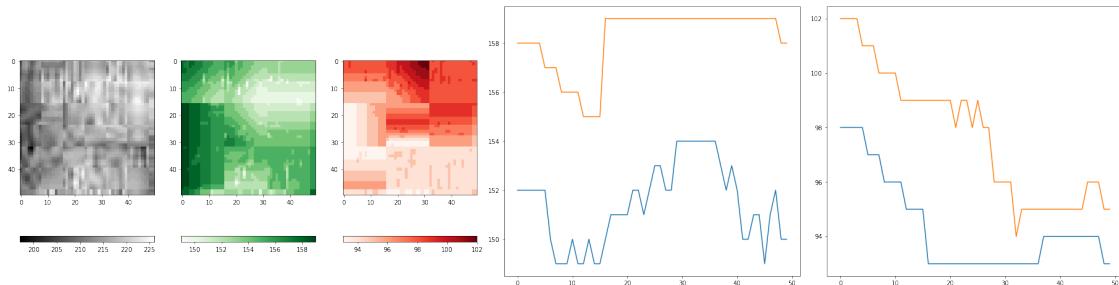
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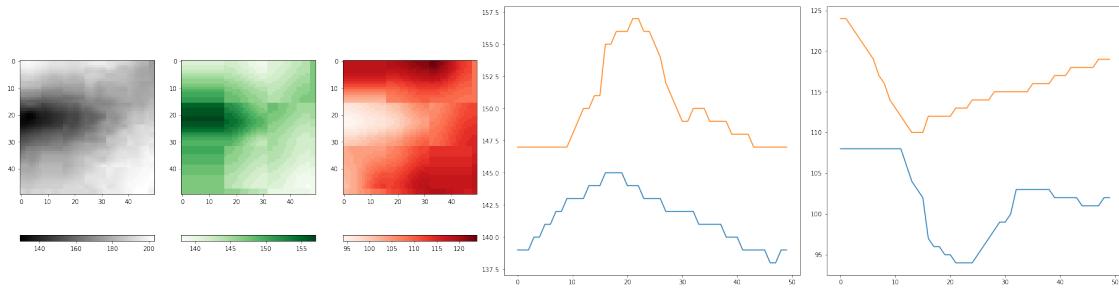


peille10.jpg

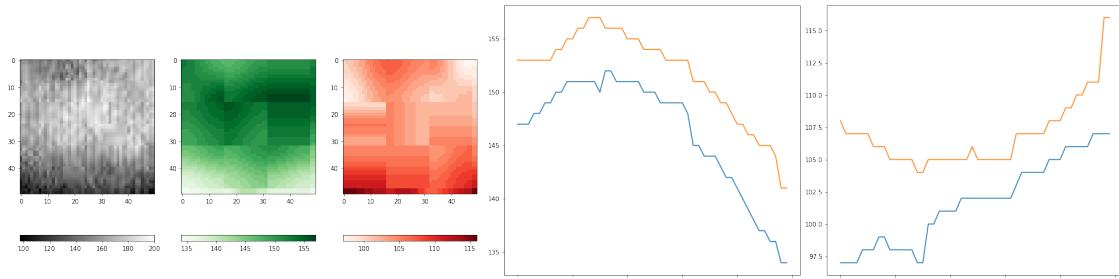
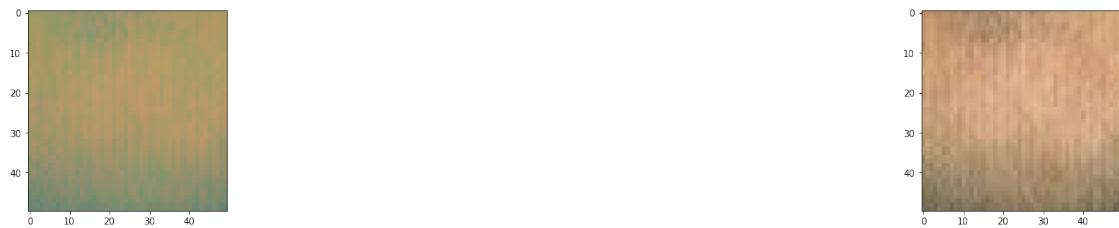


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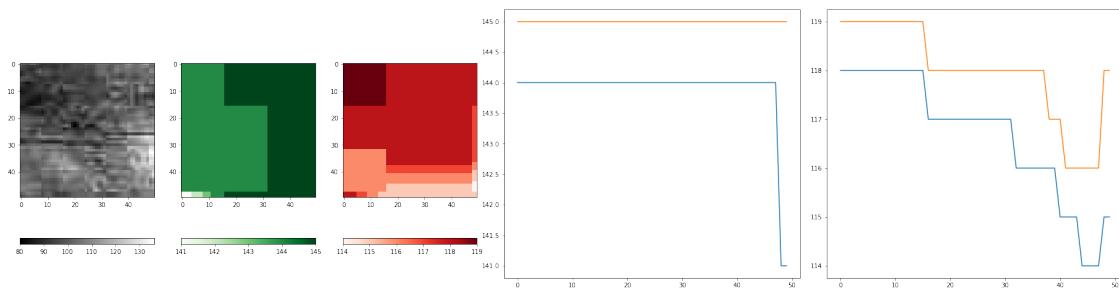


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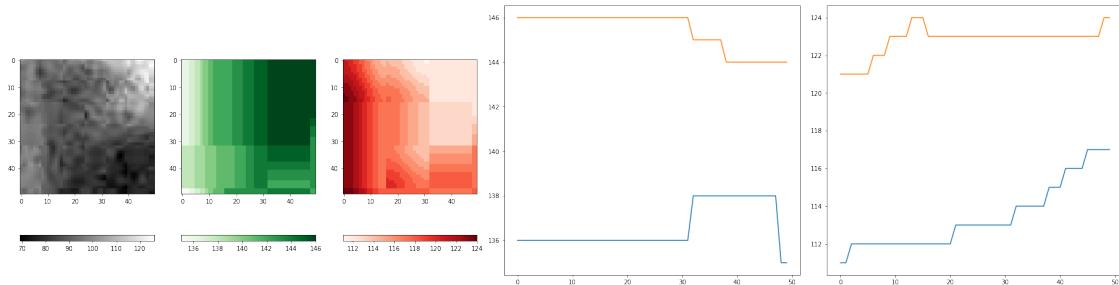


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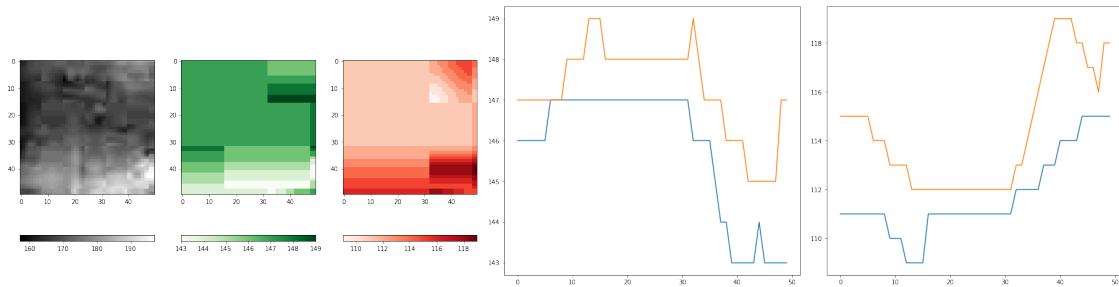


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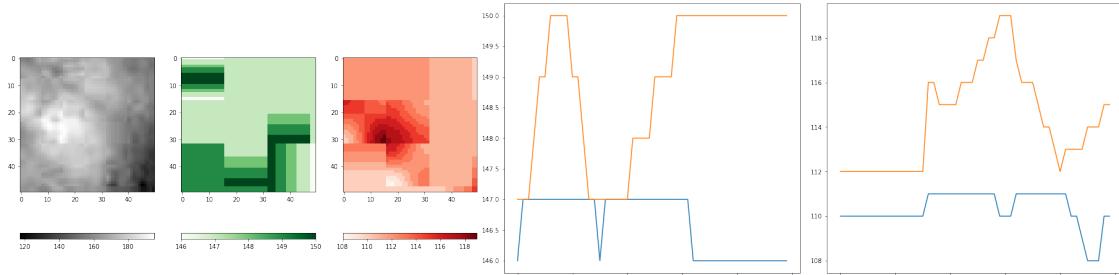


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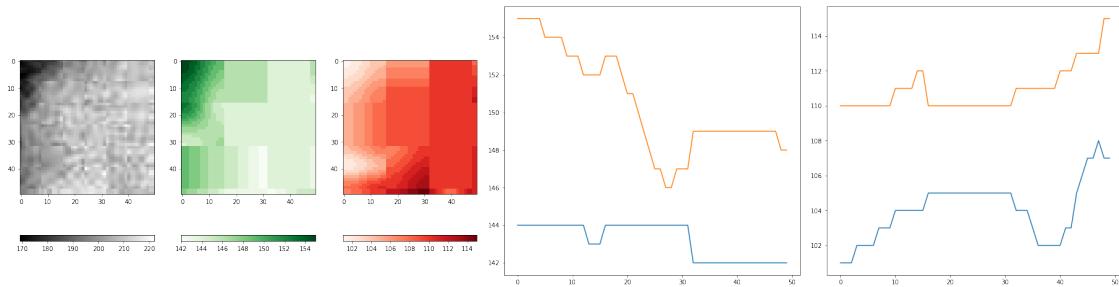


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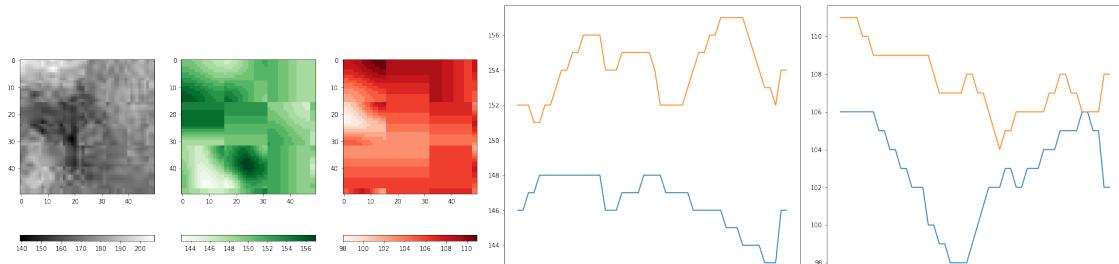


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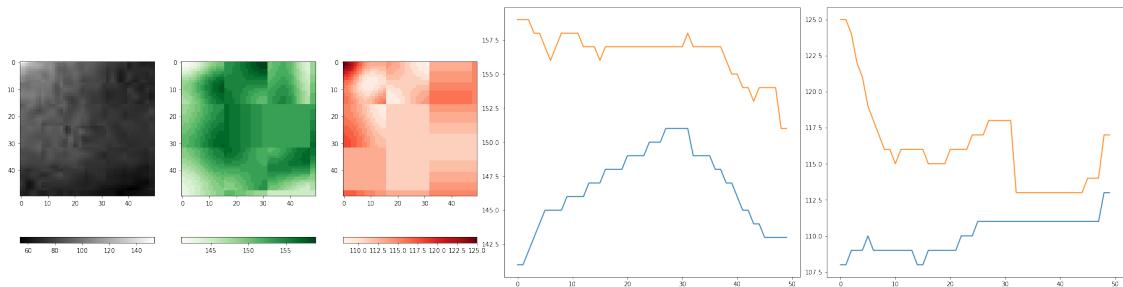
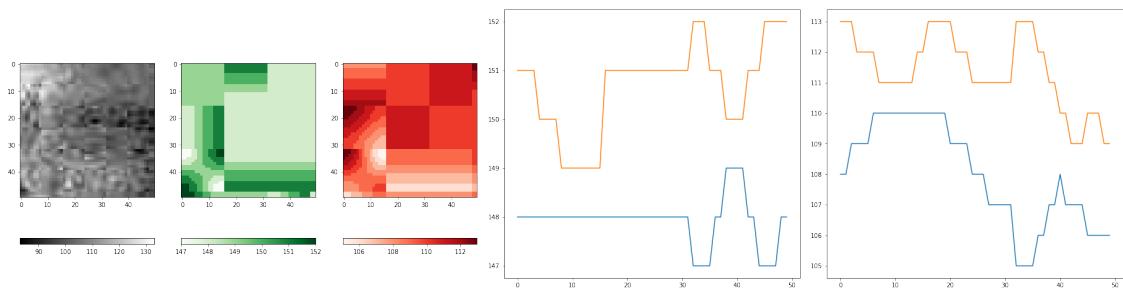


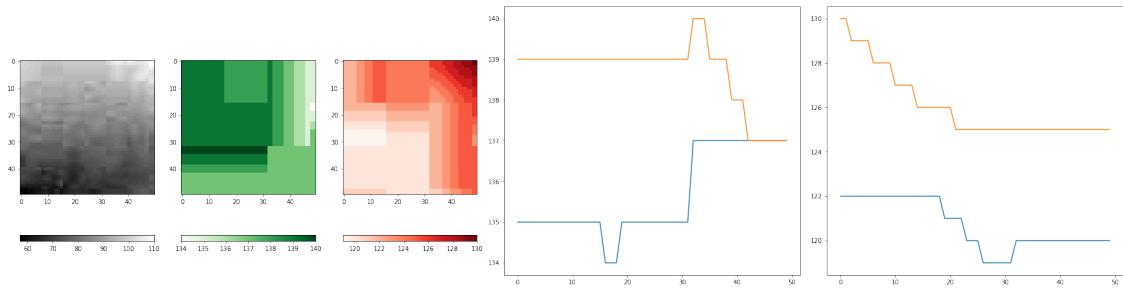
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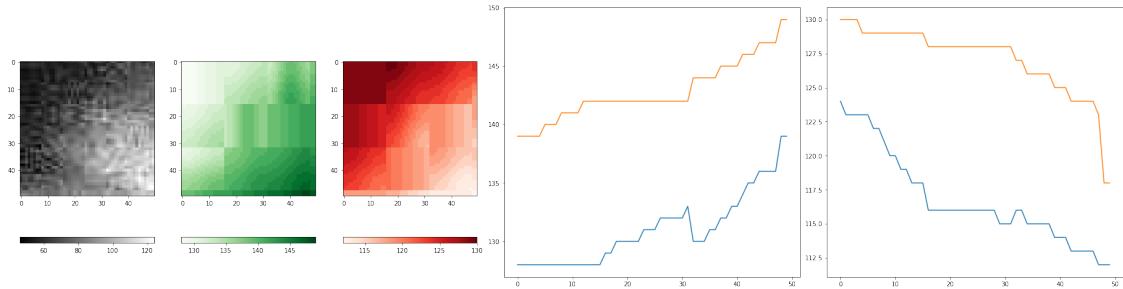
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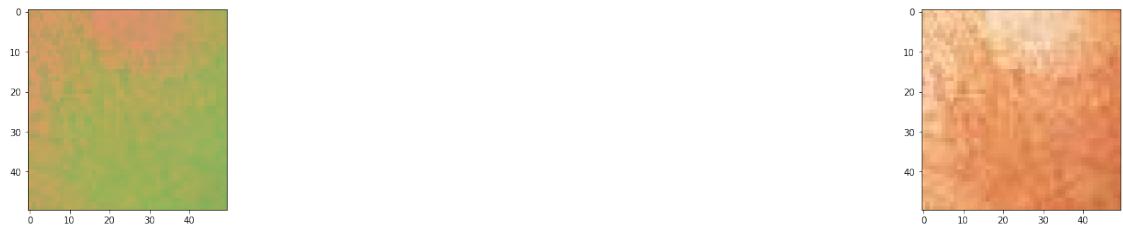


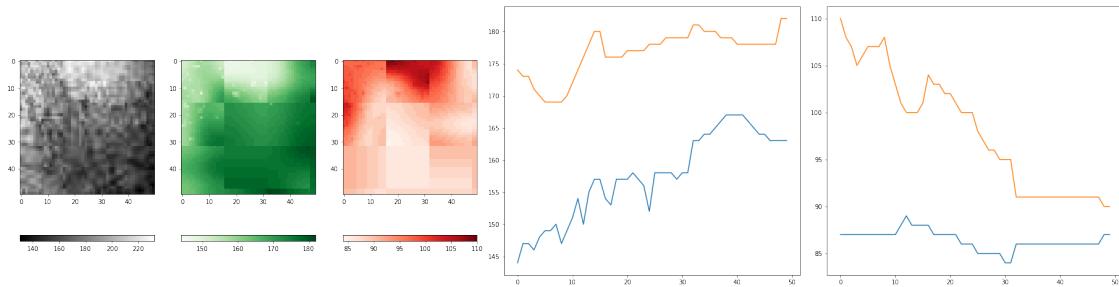


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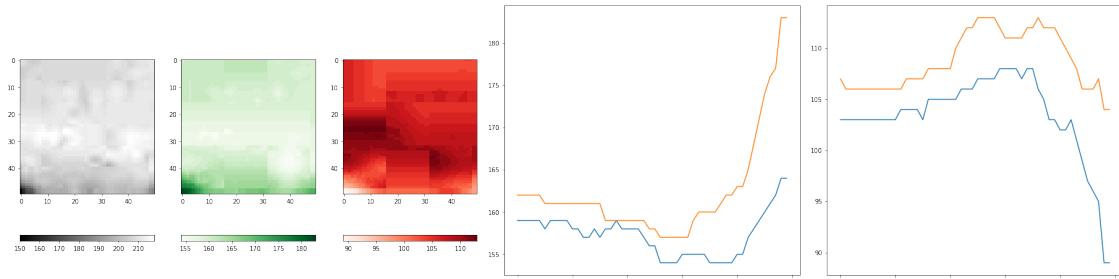


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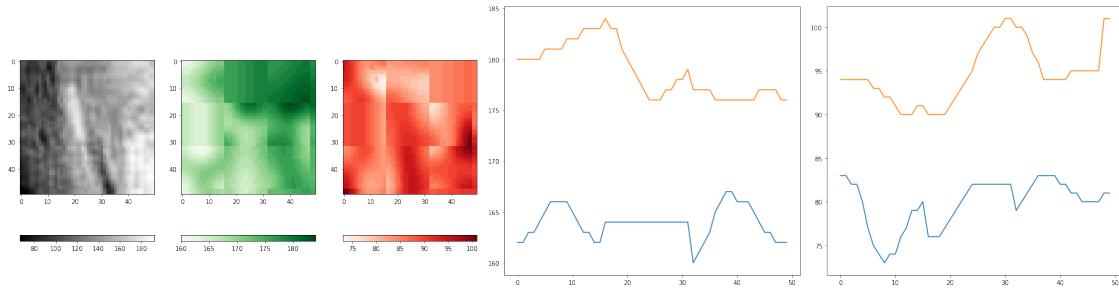


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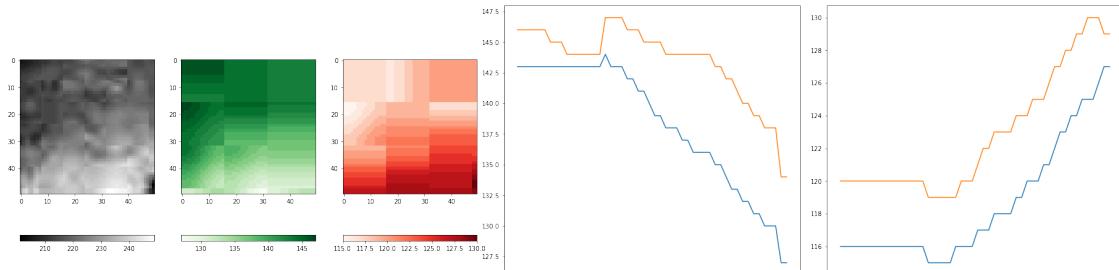


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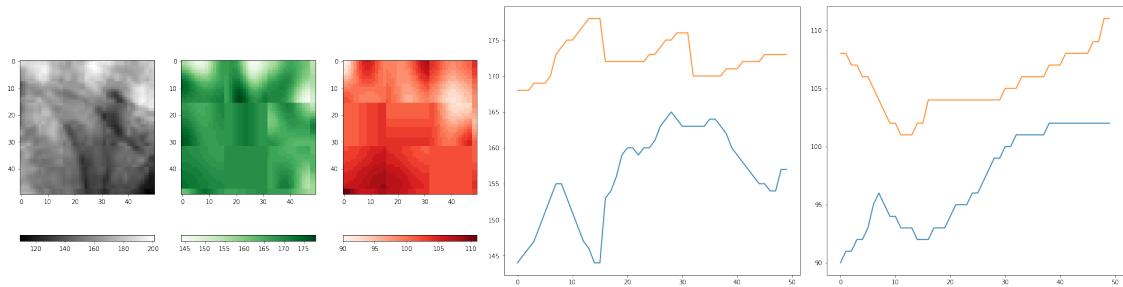


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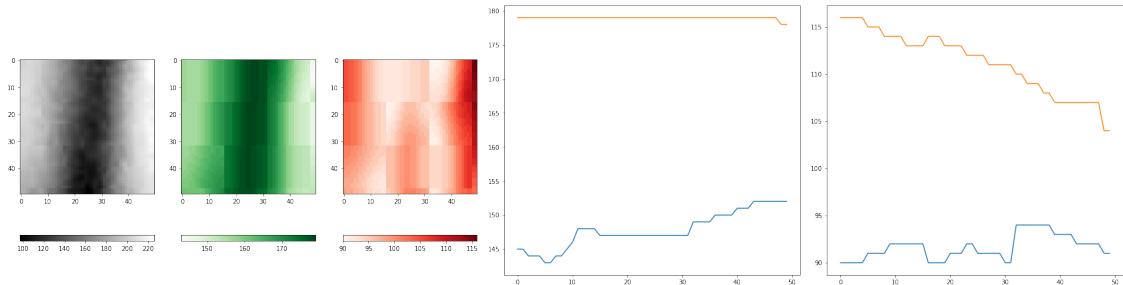


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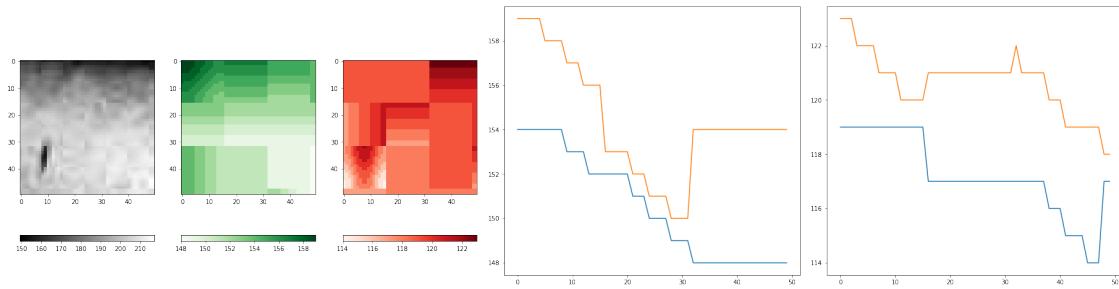


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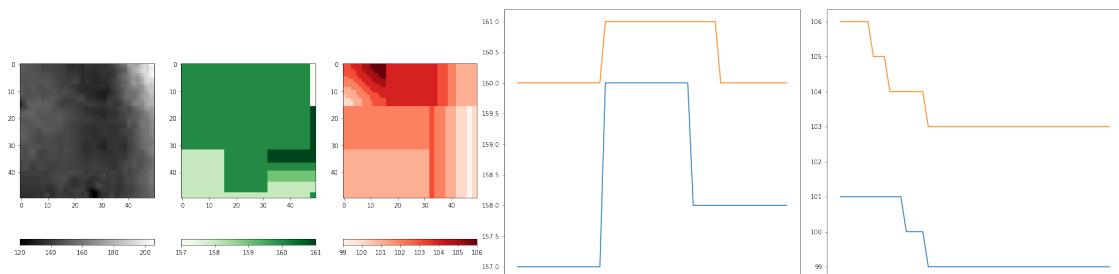


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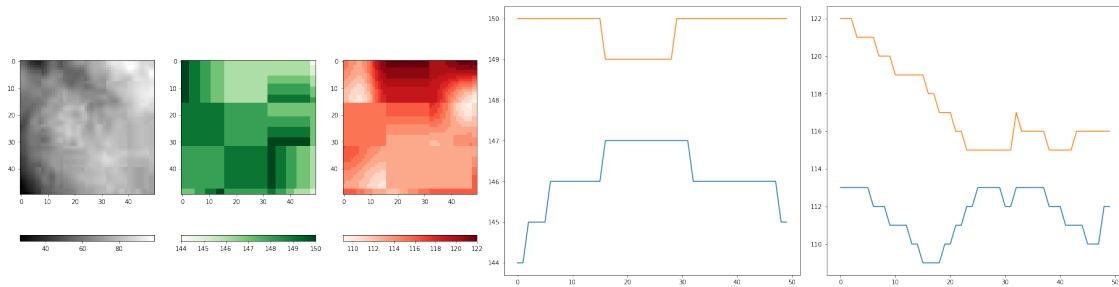


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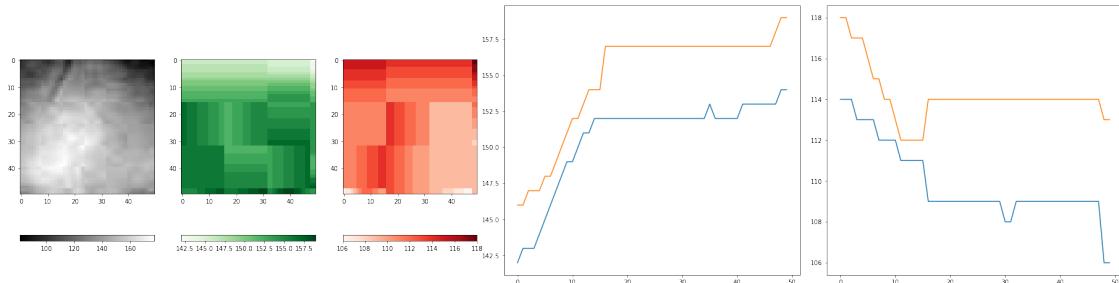


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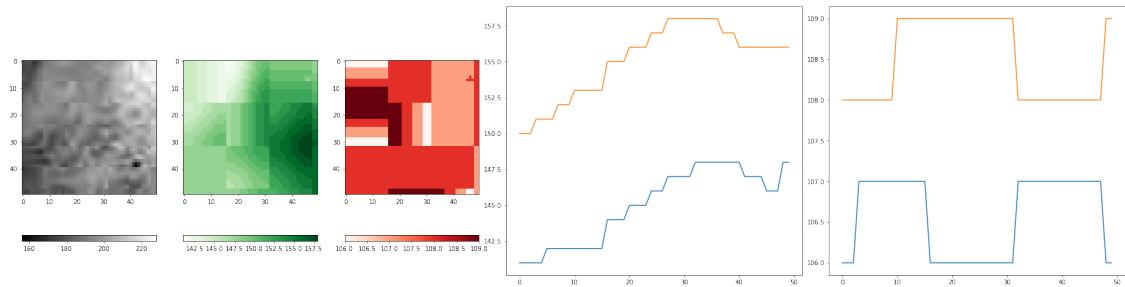


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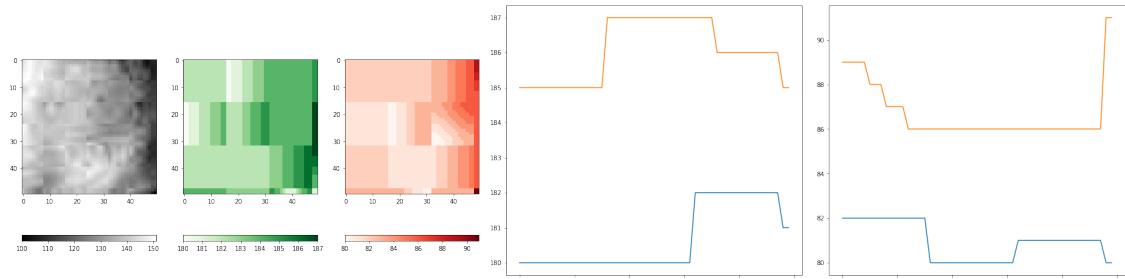


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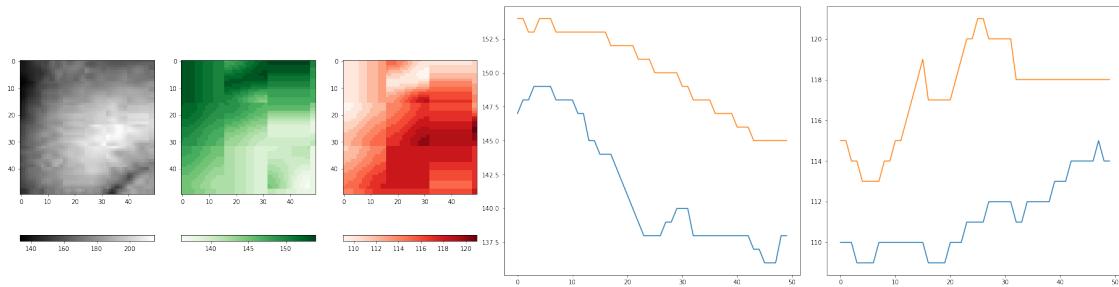


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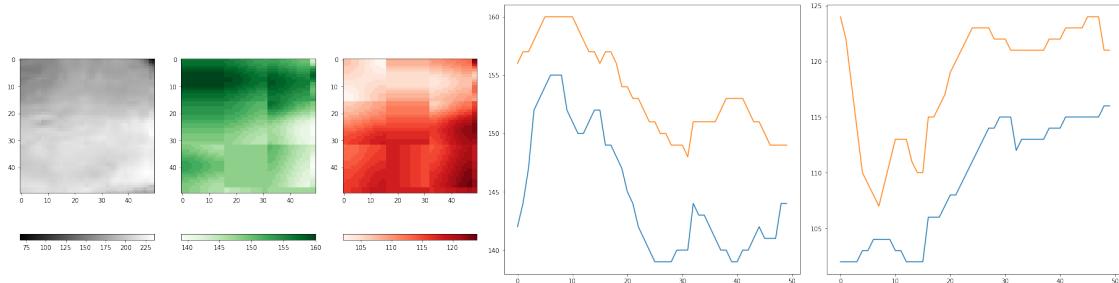


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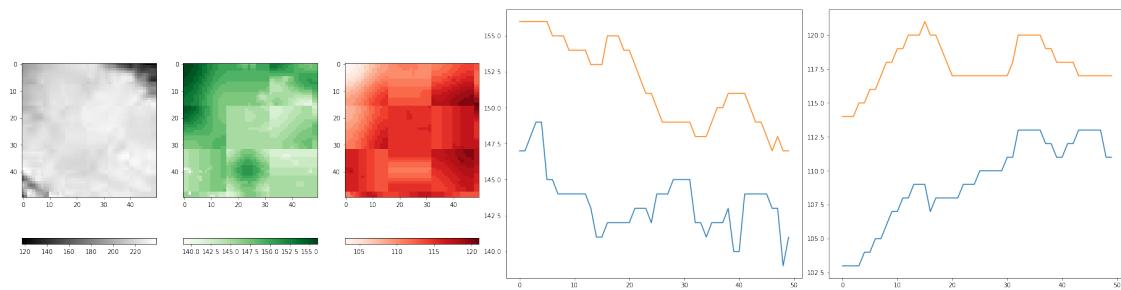


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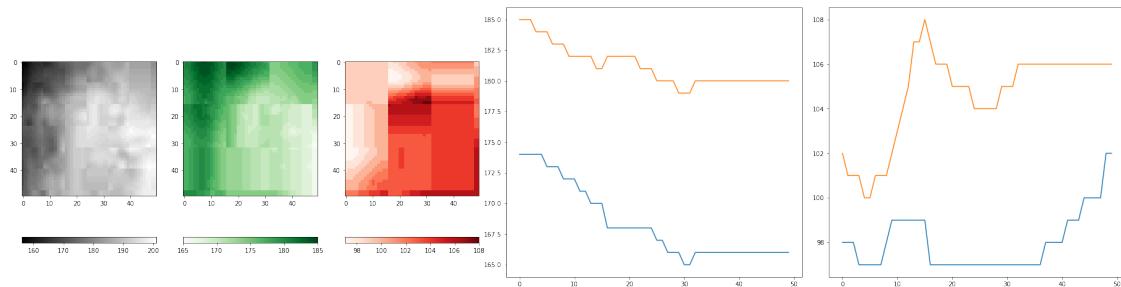


pelle6.jpg





pelle7.jpg



pelle8.jpg



