In [ ]:
```
!pip install pandas
!pip install basic-image-eda
!pip install scikit-image
!pip install matplotlib
import pandas as pd
```

In [ ]:
```
train = pd.read_csv('data/train/train1A_relabeled.csv') # reading the csv file
```

In [ ]:
```
train.head() # printing first five rows of the file
```

Out[ ]:

	name	upperLength	clothesStyles	hairStyles	upperBlack	upperBrown	upperBlue	u
0	img_qh_train1A_00000000076.jpg	ShortSleeve	Solidcolor	Short	NaN	NaN	NaN	
1	img_qh_train1A_00001004361.jpg	LongSleeve	Solidcolor	Short	1.0	NaN	NaN	
2	img_qh_train1A_00002008174.jpg	LongSleeve	Solidcolor	Long	NaN	NaN	NaN	
3	img_qh_train1A_00003006632.jpg	LongSleeve	multicolour	Long	0.7	NaN	NaN	
4	img_qh_train1A_00004001877.jpg	ShortSleeve	Solidcolor	Short	NaN	NaN	NaN	

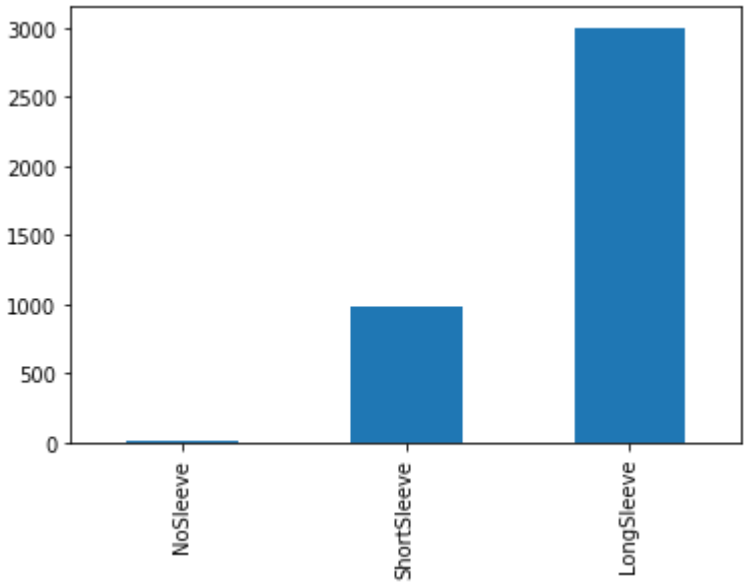
In [ ]:
```
train.columns
```

Out[ ]:
```
Index(['name', 'upperLength', 'clothesStyles', 'hairStyles', 'upperBlack',
       'upperBrown', 'upperBlue', 'upperGreen', 'upperGray', 'upperOrange',
       'upperPink', 'upperPurple', 'upperRed', 'upperWhite', 'upperYellow'],
      dtype='object')
```

In [ ]:
```
# print(train.groupby('upperLength').count()['name'])
# train['upperLength'].hist()
print('upperLength: ')
print(train['upperLength'].value_counts(ascending=True))
train['upperLength'].value_counts(ascending=True).plot.bar()
```

```
upperLength:
NoSleeve          9
ShortSleeve     988
LongSleeve     3003
Name: upperLength, dtype: int64
```

Out[ ]:
```
<AxesSubplot:>
```

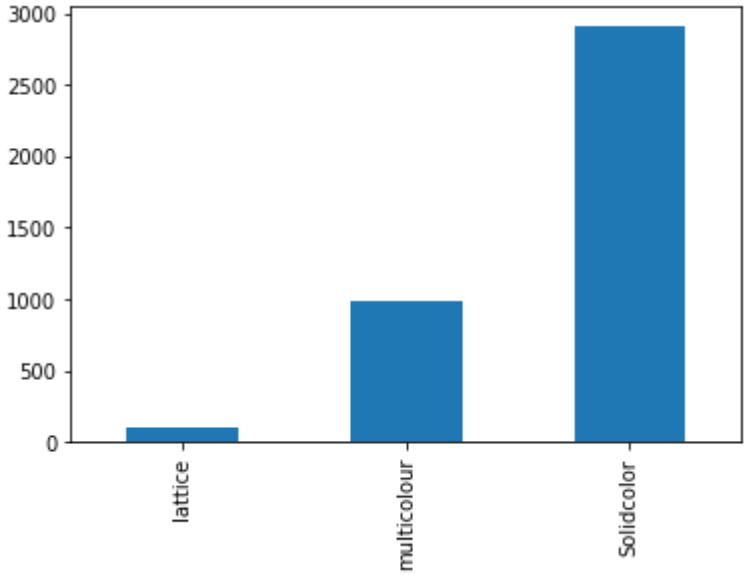


In [ ]:

```
# print(train.groupby('clothesStyles').count()['name'])
# train['clothesStyles'].hist()

print('clothesStyles: ')
print(train['clothesStyles'].value_counts(ascending=True))
train['clothesStyles'].value_counts(ascending=True).plot.bar()
```

```
clothesStyles:
lattice         107
multicolour     986
Solidcolor     2907
Name: clothesStyles, dtype: int64
<AxesSubplot:>
```

Out[ ]:



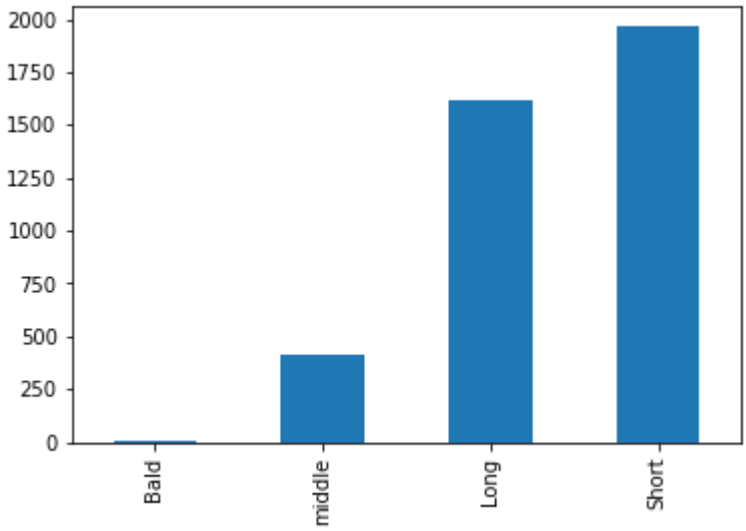
In [ ]:

```
# print(train.groupby('hairStyles').count()['name'])
# train['hairStyles'].hist()

print('hairStyles: ')
print(train['hairStyles'].value_counts(ascending=True))
train['hairStyles'].value_counts(ascending=True).plot.bar()
```

```
hairStyles:
Bald          7
middle      409
Long       1620
```

```
Short     1964
Name: hairStyles, dtype: int64
<AxesSubplot:>
```

Out[ ]:

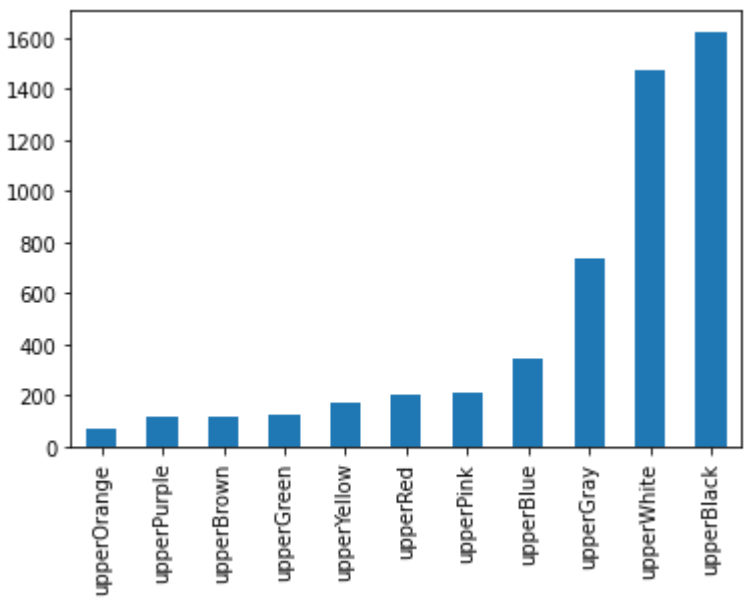


In [ ]:

```
new_df = train.copy(deep=True)
new_df.pop('name')
new_df.pop('upperLength')
new_df.pop('clothesStyles')
new_df.pop('hairStyles')
uppercolorsCount = new_df.count().sort_values()
print(uppercolorsCount)
uppercolorsCount.plot.bar()
```

```
upperOrange      67
upperPurple     116
upperBrown      120
upperGreen      125
upperYellow     174
upperRed        206
upperPink       213
upperBlue       343
upperGray       739
upperWhite     1476
upperBlack     1626
dtype: int64
<AxesSubplot:>
```

Out[ ]:



In [ ]:
```
clothesStyles_group = train.groupby('clothesStyles').count()
clothesStyles_group.head()
```

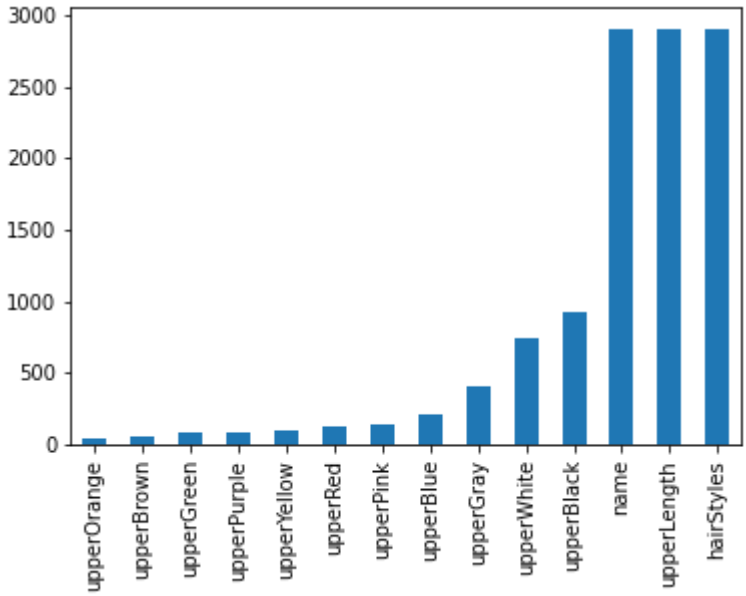
Out[ ]:

clothesStyles	name	upperLength	hairStyles	upperBlack	upperBrown	upperBlue	upperGreen	upperGray	upp
Solidcolor	2907	2907	2907	929	60	203	75	406	
lattice	107	107	107	78	6	7	1	29	
multicolour	986	986	986	619	54	133	49	304	

In [ ]:
```
print(clothesStyles_group.loc['Solidcolor'].sort_values())
clothesStyles_group.loc['Solidcolor'].sort_values().plot.bar()
```

```
upperOrange      43
upperBrown       60
upperGreen       75
upperPurple      78
upperYellow     101
upperRed        123
upperPink       143
upperBlue       203
upperGray       406
upperWhite      746
upperBlack      929
name           2907
upperLength    2907
hairStyles     2907
Name: Solidcolor, dtype: int64
```

Out[ ]:
```
<AxesSubplot:>
```

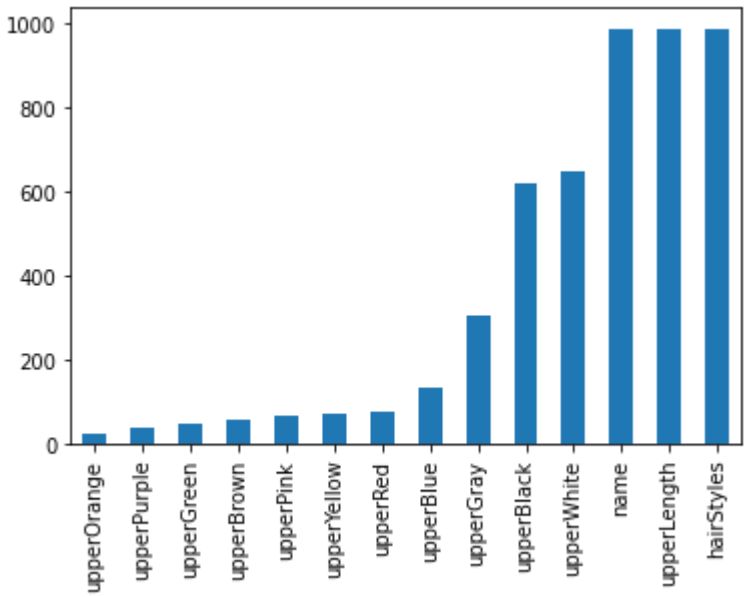


In [ ]:

```
print(clothesStyles_group.loc['multicolour'].sort_values())
clothesStyles_group.loc['multicolour'].sort_values().plot.bar()
```

```
upperOrange      24
upperPurple      38
upperGreen       49
upperBrown       54
upperPink        66
upperYellow      70
upperRed         74
upperBlue       133
upperGray       304
upperBlack      619
upperWhite      645
name            986
upperLength     986
hairStyles      986
Name: multicolour, dtype: int64
<AxesSubplot:>
```

Out[ ]:



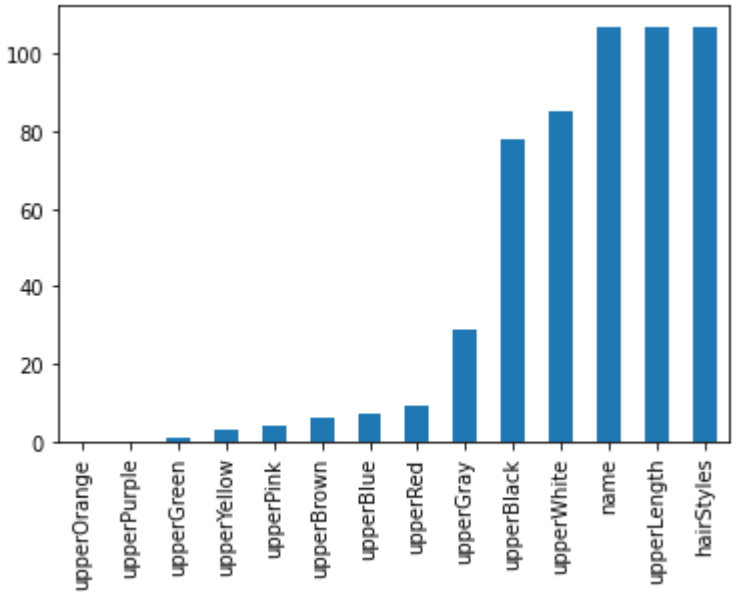
In [ ]:

```
print(clothesStyles_group.loc['lattice'].sort_values())
clothesStyles_group.loc['lattice'].sort_values().plot.bar()
```

```
upperOrange      0
```

```
upperPurple      0
upperGreen       1
upperYellow      3
upperPink        4
upperBrown       6
upperBlue        7
upperRed         9
upperGray       29
upperBlack      78
upperWhite      85
name           107
upperLength    107
hairStyles     107
Name: lattice, dtype: int64
<AxesSubplot:>
```

Out[ ]:



In [ ]:

```
color_count_df = train.copy(deep=True)
colors = ['upperBlack',
       'upperBrown', 'upperBlue', 'upperGreen', 'upperGray', 'upperOrange',
       'upperPink', 'upperPurple', 'upperRed', 'upperWhite', 'upperYellow']
def apply_color_count(series):
    count = 0
    for i in colors:
        if series[i] > 0:
            count = count + 1
    return count

color_count_df["color_count"] = color_count_df.apply(apply_color_count, axis=1)

color_count_df = color_count_df.drop(['upperLength', 'hairStyles', 'upperBlack',
       'upperBrown', 'upperBlue', 'upperGreen', 'upperGray', 'upperOrange',
       'upperPink', 'upperPurple', 'upperRed', 'upperWhite', 'upperYellow'], axis=1)

color_count_df.head()
```

Out[ ]:

	name	clothesStyles	color_count
0	img_qh_train1A_00000000076.jpg	Solidcolor	1
1	img_qh_train1A_00001004361.jpg	Solidcolor	1
2	img_qh_train1A_00002008174.jpg	Solidcolor	1
3	img_qh_train1A_00003006632.jpg	multicolour	2

	name	clothesStyles	color_count
4	img_qh_train1A_00004001877.jpg	Solidcolor	1

In [ ]:
```
for index, row in color_count_df.iterrows():
    if row['clothesStyles'] == 'Solidcolor' and row['color_count'] > 1:
        print('[error label Solidcolor] name: ', row['name'])
    if row['clothesStyles'] == 'lattice' and row['color_count'] < 2:
        print('[error label lattice] name: ', row['name'])
    if row['clothesStyles'] == 'multicolour' and row['color_count'] < 2:
        print('[error label multicolour] name: ', row['name'])
```

In [ ]:
```
color_frequency_df = color_count_df.copy(deep=True)
def apply_color_frequency_item(series, frequency):
    if series['color_count'] == frequency:
        return 1
    else:
        return 0

color_frequency_df["one"] = color_frequency_df.apply(apply_color_frequency_item, args=(1,), axis
color_frequency_df["two"] = color_frequency_df.apply(apply_color_frequency_item, args=(2,), axis
color_frequency_df["three"] = color_frequency_df.apply(apply_color_frequency_item, args=(3,), ax

color_frequency_df = color_frequency_df.drop(['name', 'color_count'], axis=1)
color_frequency_df.head()
```

Out[ ]:

	clothesStyles	one	two	three
0	Solidcolor	1	0	0
1	Solidcolor	1	0	0
2	Solidcolor	1	0	0
3	multicolour	0	1	0
4	Solidcolor	1	0	0

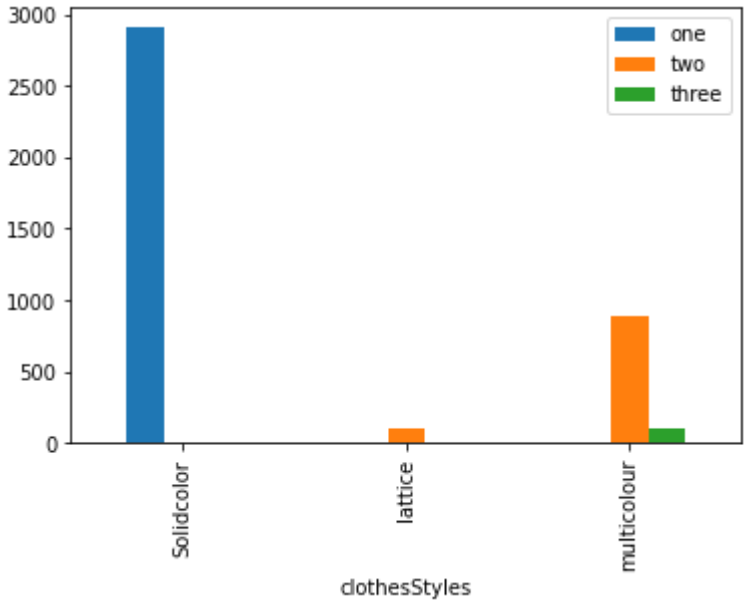
In [ ]:
```
color_frequency_df = color_frequency_df.groupby('clothesStyles').sum()
color_frequency_df.head()
```

Out[ ]:

clothesStyles	one	two	three
Solidcolor	2907	0	0
lattice	0	99	8
multicolour	0	882	104

In [ ]:
```
color_frequency_df.plot.bar()
```

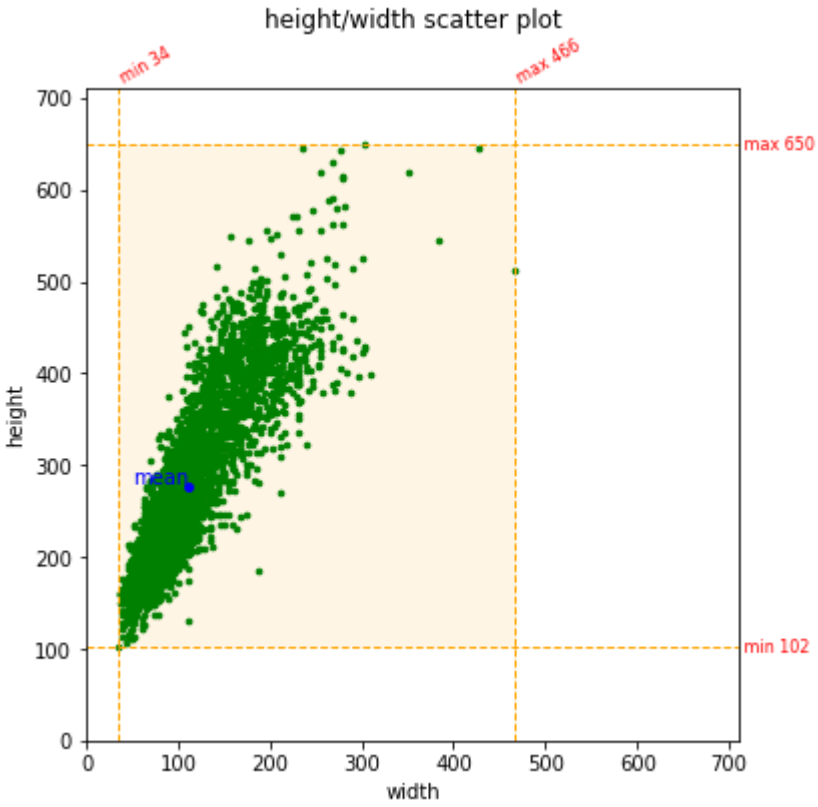
Out[ ]:
```
<AxesSubplot:xlabel='clothesStyles'>
```

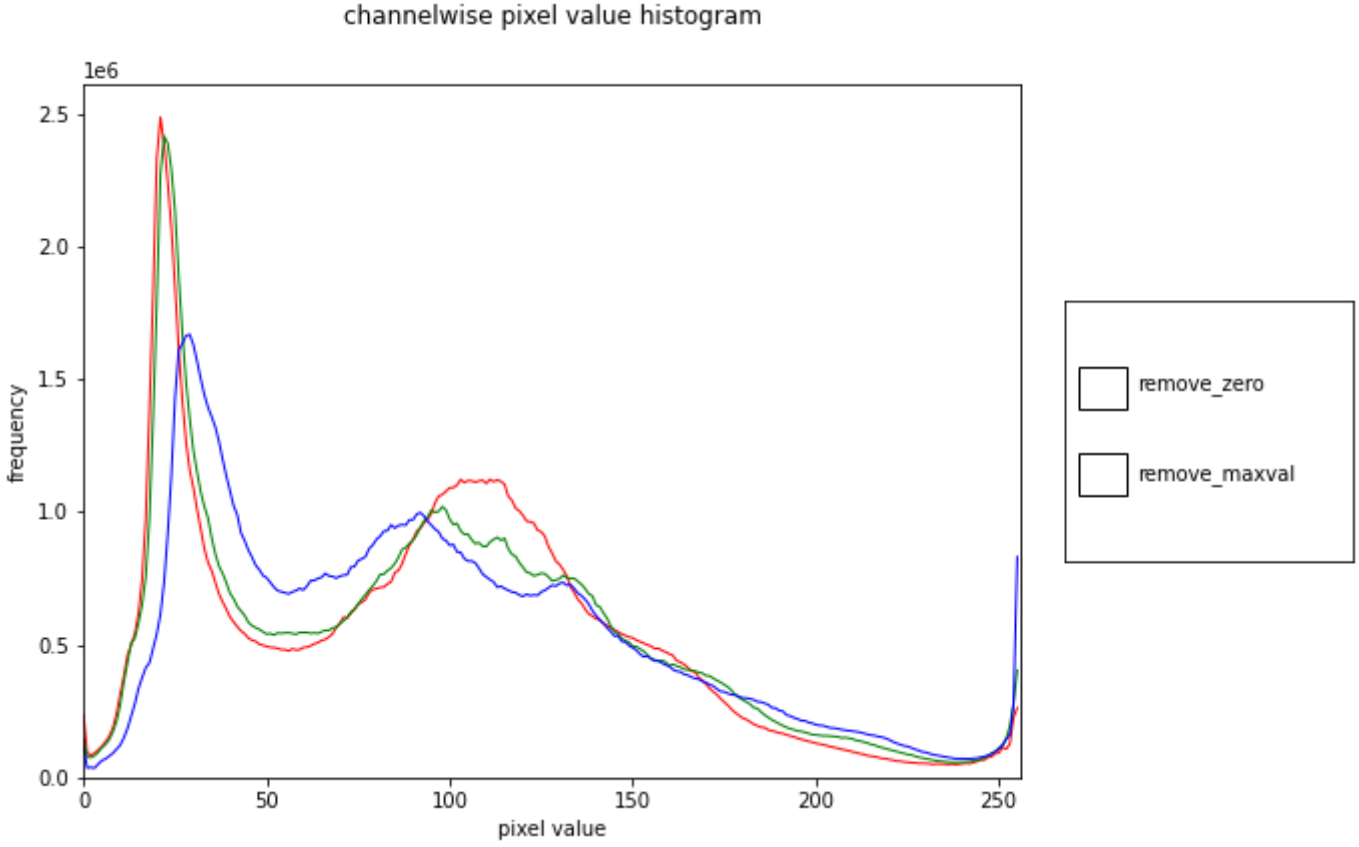


In [ ]:

```
from basic_image_eda import BasicImageEDA

data_dir = "./data/train/train1A/"
# BasicImageEDA.explore(data_dir)
extensions = ['png', 'jpg', 'jpeg']
threads = 0
dimension_plot = True
channel_hist = True
nonzero = False
hw_division_factor = 1.0

BasicImageEDA.explore(data_dir, extensions, threads, dimension_plot, channel_hist, nonzero, hw_d
```

```
found 4000 images.
Using 8 threads. (max:8)

100%|██████████| 4000/4000 [00:03<00:00, 1038.76it/s]
*-------------------------------------------------------------------------------------*
number of images                          |  4000

dtype                                     |  uint8
channels                                  |  [3]
extensions                                |  ['jpg']

min height                                |  102
max height                                |  650
mean height                               |  276.5775
median height                             |  252

min width                                 |  34
max width                                 |  466
mean width                                |  111.763
median width                              |  100

mean height/width ratio                   |  2.4746785608832975
median height/width ratio                 |  2.52
recommended input size(by mean)           |  [280 112] (h x w, multiples of 8)
recommended input size(by mean)           |  [272 112] (h x w, multiples of 16)
recommended input size(by mean)           |  [288  96] (h x w, multiples of 32)

channel mean(0~1)                         |  [0.38409257 0.39312777 0.41374138]
channel std(0~1)                          |  [0.24571171 0.25555196 0.25309744]
*-------------------------------------------------------------------------------------*
eda ended in 00 hours 00 minutes 04 seconds
```





Out[ ]:

```
{'dtype': 'uint8',
 'channels': [3],
 'extensions': ['jpg'],
 'min_h': 102,
 'max_h': 650,
 'mean_h': 276.5775,
 'median_h': 252,
 'min_w': 34,
 'max_w': 466,
 'mean_w': 111.763,
 'median_w': 100,
 'mean_hw_ratio': 2.4746785608832975,
 'median_hw_ratio': 2.52,
 'rec_hw_size_8': array([280, 112]),
 'rec_hw_size_16': array([272, 112]),
 'rec_hw_size_32': array([288,  96]),
```

```
'mean': array([0.38409257, 0.39312777, 0.41374138], dtype=float32),
'std': array([0.24571171, 0.25555196, 0.25309744], dtype=float32)}
```

In [ ]: