In [10]:
```
import numpy as np
import pandas as pd
from IPython.display import Image
from sklearn.datasets import *
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score, balanced_accuracy_score

import seaborn as sns
import matplotlib. pyplot as plt
%matplotlib inline
sns.set(style="ticks")

# sklearn.ensemble
from sklearn.ensemble import *

from sklearn.metrics import *
```

Dataset

In [11]:
```
digits = load_digits()
digits_df = pd.DataFrame(data=np.c_[digits['data'], digits['target']], columns=digits['feature_names'] + ['target'])
digits_x = digits.data
digits_y = digits.target
digits_df
```

Out[11]:

	pixel_0_0	pixel_0_1	pixel_0_2	pixel_0_3	pixel_0_4	pixel_0_5	pixel_0_6	pixel_0_7	pixel_1_0	pixel_1_1	...	pixel_6_7	pixel_7_0	pixel_7_1	pixel_7_2	pixel_7_3	pixel_7_4	pixel_7_5	pixel_7_6	pixel_7_7	target
0	0.0	0.0	5.0	13.0	9.0	1.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	6.0	13.0	10.0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	12.0	13.0	5.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	11.0	16.0	10.0	0.0	0.0	1.0
2	0.0	0.0	0.0	4.0	15.0	12.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	3.0	11.0	16.0	9.0	0.0	2.0
3	0.0	0.0	7.0	15.0	13.0	1.0	0.0	0.0	0.0	8.0	...	0.0	0.0	0.0	7.0	13.0	13.0	9.0	0.0	0.0	3.0
4	0.0	0.0	0.0	1.0	11.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	2.0	16.0	4.0	0.0	0.0	4.0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1792	0.0	0.0	4.0	10.0	13.0	6.0	0.0	0.0	0.0	1.0	...	0.0	0.0	0.0	2.0	14.0	15.0	9.0	0.0	0.0	9.0
1793	0.0	0.0	6.0	16.0	13.0	11.0	1.0	0.0	0.0	0.0	...	0.0	0.0	0.0	6.0	16.0	14.0	6.0	0.0	0.0	0.0
1794	0.0	0.0	1.0	11.0	15.0	1.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	2.0	9.0	13.0	6.0	0.0	0.0	8.0
1795	0.0	0.0	2.0	10.0	7.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	5.0	12.0	16.0	12.0	0.0	0.0	9.0
1796	0.0	0.0	10.0	14.0	8.0	1.0	0.0	0.0	0.0	2.0	...	0.0	0.0	1.0	8.0	12.0	14.0	12.0	1.0	0.0	8.0

1797 rows × 65 columns

train_test_split

In [12]:
```
digits_x_train, digits_x_test, digits_y_train, digits_y_test = train_test_split(digits.data, digits.target, test_size=0.3, random_state=1)
digits_x_train.shape, digits_x_test.shape
```

Out[12]:
```
((1257, 64), (540, 64))
```

BaggingRegressor

In [13]:
```
br = BaggingClassifier(n_estimators=5, random_state=10)
br.fit(digits_x_train, digits_y_train)
br_res = br.predict(digits_x_test)
```

AdaBoostRegressor

In [14]:
```
adb = AdaBoostClassifier(n_estimators=5, random_state=10)
adb.fit(digits_x_train, digits_y_train)
adb_res = adb.predict(digits_x_test)
```

ExtraTreesRegressor

In [15]:
```
ext = ExtraTreesClassifier(n_estimators=5, random_state=10)
ext.fit(digits_x_train, digits_y_train)
ext_res = ext.predict(digits_x_test)
```

Визуализация и сравнение

In [16]:
```
def get_arr(results, metr, y):
    arr = []
    for i in results:
        arr.append(metr(i, y))
    return arr
```

In [17]:
```
models = [br, adb, ext]
results = [br_res, adb_res, ext_res]
metr = mean_absolute_error
```

In [18]:
```
m_arr = get_arr(results, metr, digits_y_test)
```

In [19]:
```
m_arr
```

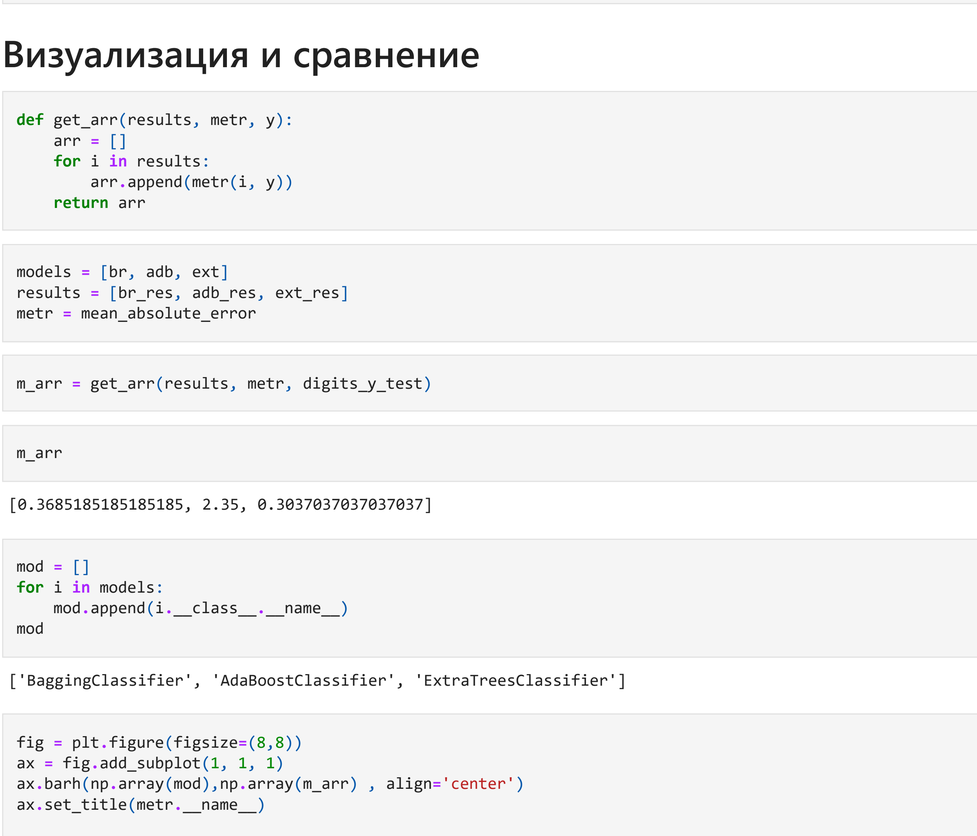
Out[19]:
```
[0.3685185185185185, 2.35, 0.3037037037037037]
```

In [20]:
```
mod = []
for i in models:
    mod.append(i.__class__.__name__)
mod
```

Out[20]:
```
['BaggingClassifier', 'AdaBoostClassifier', 'ExtraTreesClassifier']
```

In [21]:
```
fig = plt.figure(figsize=(8,8))
ax = fig.add_subplot(1, 1, 1)
ax.barh(np.array(mod),np.array(m_arr) , align='center')
ax.set_title(metr.__name__)

pos = np.arange(len(mod))
for a,b in zip(pos, m_arr):
    ax.text(0.1, a-0.1, str(round(b,3)), color='white')
plt.show()
```



In [ ]: