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In [586... import numpy as np
```

```
In [587... import pandas as pd
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```
In [588... df=pd.read_csv('heart.csv')
```

```
In [589... df
```

```
Out[589]:
```

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
0	63	1	3	145	233	1	0	150	0	2.3	0	0	1	
1	37	1	2	130	250	0	1	187	0	3.5	0	0	2	
2	41	0	1	130	204	0	0	172	0	1.4	2	0	2	
3	56	1	1	120	236	0	1	178	0	0.8	2	0	2	
4	57	0	0	120	354	0	1	163	1	0.6	2	0	2	
...	
298	57	0	0	140	241	0	1	123	1	0.2	1	0	3	
299	45	1	3	110	264	0	1	132	0	1.2	1	0	3	
300	68	1	0	144	193	1	1	141	0	3.4	1	2	3	
301	57	1	0	130	131	0	1	115	1	1.2	1	1	3	
302	57	0	1	130	236	0	0	174	0	0.0	1	1	2	

303 rows × 14 columns

```
In [613... df.head(13)
```

```
Out[613]:
```

	age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	target
0	63	1	3	145	233	1	0	150	0	2.3	0	0	1	1
1	37	1	2	130	250	0	1	187	0	3.5	0	0	2	1
2	41	0	1	130	204	0	0	172	0	1.4	2	0	2	1
3	56	1	1	120	236	0	1	178	0	0.8	2	0	2	1
4	57	0	0	120	354	0	1	163	1	0.6	2	0	2	1
5	57	1	0	140	192	0	1	148	0	0.4	1	0	1	1
6	56	0	1	140	294	0	0	153	0	1.3	1	0	2	1
7	44	1	1	120	263	0	1	173	0	0.0	2	0	3	1
8	52	1	2	172	199	1	1	162	0	0.5	2	0	3	1
9	57	1	2	150	168	0	1	174	0	1.6	2	0	2	1
10	54	1	0	140	239	0	1	160	0	1.2	2	0	2	1
11	48	0	2	130	275	0	1	139	0	0.2	2	0	2	1
12	49	1	1	130	266	0	1	171	0	0.6	2	0	2	1

```
In [591...] df.isnull().sum()
```

```
Out[591]: age          0
sex          0
cp          0
trestbps    0
chol        0
fbs         0
restecg     0
thalach     0
exang       0
oldpeak     0
slope       0
ca          0
thal        0
target      0
dtype: int64
```

```
In [592...] df['target'].value_counts()
```

```
Out[592]: 1    165
0    138
Name: target, dtype: int64
```

```
In [593...] len(df['target'].value_counts())
```

```
Out[593]: 2
```

```
In [594...] df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 303 entries, 0 to 302
Data columns (total 14 columns):
#   Column      Non-Null Count  Dtype
---  -
0   age         303 non-null   int64
1   sex         303 non-null   int64
2   cp          303 non-null   int64
3   trestbps    303 non-null   int64
4   chol        303 non-null   int64
5   fbs         303 non-null   int64
6   restecg     303 non-null   int64
7   thalach     303 non-null   int64
8   exang       303 non-null   int64
9   oldpeak     303 non-null   float64
10  slope       303 non-null   int64
11  ca          303 non-null   int64
12  thal        303 non-null   int64
13  target      303 non-null   int64
dtypes: float64(1), int64(13)
memory usage: 33.3 KB
```

```
In [595...] X1 = df.iloc[:, :-1].values
Y1 = df.iloc[:, -1].values
pd.DataFrame(Y1).head()
```

```
Out[595]:
```

	0
0	1
1	1
2	1
3	1
4	1

```
In [596]: pd.DataFrame(X1).head(2)
```

```
Out[596]:
```

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	63.0	1.0	3.0	145.0	233.0	1.0	0.0	150.0	0.0	2.3	0.0	0.0	1.0
1	37.0	1.0	2.0	130.0	250.0	0.0	1.0	187.0	0.0	3.5	0.0	0.0	2.0

```
In [597]: from sklearn.model_selection import train_test_split
```

```
In [598]: X_train, X_test, Y_train, Y_test = train_test_split(X1,Y1,test_size=0.2,random_state=42)
```

```
In [599]: X_train.shape, X_test.shape
```

```
Out[599]: ((242, 13), (61, 13))
```

```
In [600]: from sklearn.neighbors import KNeighborsClassifier
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```
In [601]: knn = KNeighborsClassifier(n_neighbors=17)
```

```
In [602]: knn.fit(X_train, Y_train)
```

```
Out[602]: KNeighborsClassifier(n_neighbors=17)
```

```
In [603]: # X_test
```

```
In [604]: y_predict1 = knn.predict(X_test)
y_predict1
```

```
Out[604]: array([1, 0, 1, 1, 0, 0, 1, 1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 1, 0, 1, 1, 1,
          0, 1, 0, 0, 0, 1, 1, 0, 1, 0, 1, 1, 0, 1, 1, 0, 1, 0, 0, 0,
          1, 0, 0, 1, 0, 0, 0, 1, 0, 1, 1, 1, 1, 1, 1, 0, 0], dtype=int64)
```

```
In [605]: pd.DataFrame(X1).head(2)
```

```
Out[605]:
```

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	63.0	1.0	3.0	145.0	233.0	1.0	0.0	150.0	0.0	2.3	0.0	0.0	1.0
1	37.0	1.0	2.0	130.0	250.0	0.0	1.0	187.0	0.0	3.5	0.0	0.0	2.0

```
In [606]: knn.predict([[45,1,0,132,200,0,1,180,0,1,1,1,0]])
```

```
Out[606]: array([1], dtype=int64)
```

```
In [ ]:
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```
In [607... from sklearn.metrics import confusion_matrix,accuracy_score
```

```
In [608... confusion_matrix(Y_test,y_predict1)
```

```
Out[608]: array([[17,  8],  
              [10, 26]], dtype=int64)
```

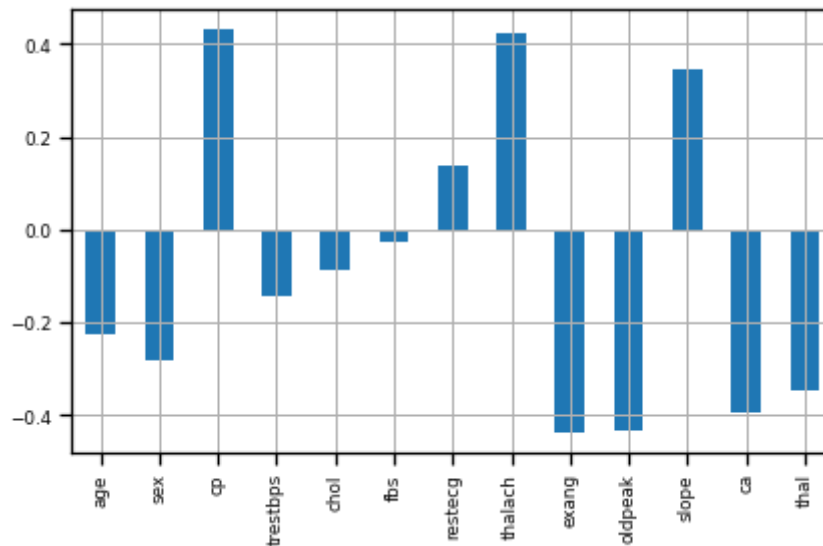
```
In [609... accuracy_score(Y_test,y_predict1)
```

```
Out[609]: 0.7049180327868853
```

```
In [610... import matplotlib.pyplot as plt
```

```
In [611... import seaborn as sns
```

```
In [612... sns.set_context('notebook',font_scale=0.8)  
df.drop('target',axis=1).corrwith(df.target).plot(kind='bar',grid=True)  
title="correction with target feature"  
plt.tight_layout()
```



```
In [ ]:
```