AF schouderafstand

December 26, 2020

[1]:
```
import sys
sys.path.append("../")
import pandas as pd
from ortho_lib import *
import os
import matplotlib.pyplot as plt
import numpy as np
```

[2]:
```
path_cats = ['..//transformed_data/Category_1/', '..//transformed_data/
 ↪Category_2/', '..//transformed_data/Category_3/', '..//transformed_data/
 ↪Category_4/']
exercise = '/AF1'
df = pd.DataFrame()

def schouderafstand(path_cat, df = pd.DataFrame()): #bij het aanroepen van de␣
 ↪functie het indexnummer voor de categorie uit path_cats
    patientID = os.listdir(path_cats[path_cat])
    if path_cat == 3:
        patientID.remove('41')


    for patient in patientID:
        path = path_cats[path_cat] + patient + exercise + '.txt'
        df_patient = exercise_to_df(path)
        df_patient['patientID'] = patient
        df = df.append([df_patient])
        del df['z']
        del df['y']


    elbow_df = df[df['sensor'] != '2'] #anker verwijderen uit de dataframe, dit␣
 ↪datapunt is nooit nodig
    elbow_df = elbow_df.set_index( ['patientID', 'frame'], drop=True,␣
 ↪inplace=False, verify_integrity=False)
    elbow_df = elbow_df[elbow_df['sensor'] != '3'] #sensoren verwijderen die␣
 ↪niet van belang zijn. Alleen de sensoren bewaren die vergeleken moeten␣
 ↪worden.
```

```
    elbow_df = elbow_df[elbow_df['sensor'] != '5']
    elbow_df = elbow_df[elbow_df['sensor'] != '6']
    elbow_df = elbow_df[elbow_df['sensor'] != '8']
    elbow_df = elbow_df[elbow_df['sensor'] != '9']

    minschouderafstand_list = []
    for patient in patientID:
        dfpatient = df[df['patientID']==str(patient)]
        per_patient_4 = dfpatient[dfpatient['sensor'] == '4']
        per_patient_7 = dfpatient[dfpatient['sensor'] == '7']
        max_4 = max(per_patient_4['x'])
        min_4 = min(per_patient_4['x'])
        verschil_4 = max_4 - min_4
        max_7 = max(per_patient_7['x'])
        min_7 = min(per_patient_7['x'])
        verschil_7 = max_7 - min_7
        minschouderafstand = min(verschil_4, verschil_7)
        minschouderafstand_list.append(minschouderafstand)

    shoulder_distance_df = pd.DataFrame()
    shoulder_distance_df['patientID'] = patientID
    shoulder_distance_df.set_index(['patientID'], drop = True, inplace = True)
    shoulder_distance_df['shoulder distance'] = minschouderafstand_list
    shoulder_distance_df['category'] = path_cat + 1

    return shoulder_distance_df
```

[3]:
```
df_schouders = pd.concat([schouderafstand(0), schouderafstand(1),␣
↪schouderafstand(2), schouderafstand(3)])
```

[4]:
```
df_schouders
```

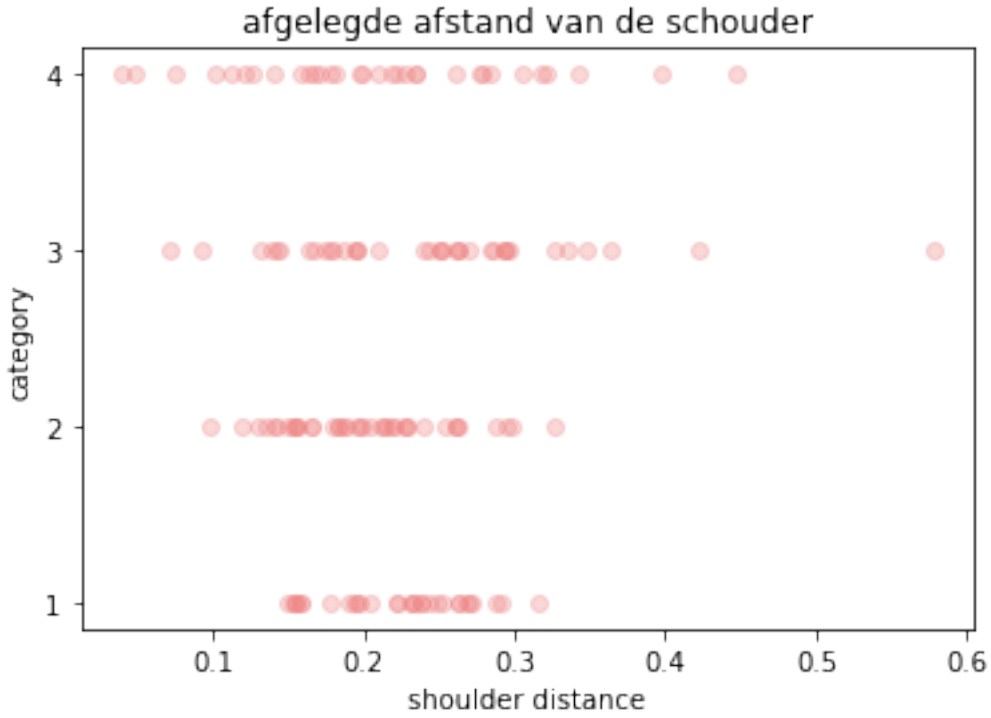
[4]:

patientID	shoulder distance	category
8	0.154578	1
3	0.222953	1
1	0.288041	1
14	0.238534	1
22	0.261994	1
…	…	…
5	0.304512	4
2	0.322105	4
4	0.235204	4
28	0.198968	4
24	0.121678	4

[138 rows x 2 columns]

[6]:
```
plt.scatter(df_schouders['shoulder distance'], df_schouders['category'], alpha␣
↪= 0.3, color ='lightcoral')
plt.title('afgelegde afstand van de schouder')
plt.yticks([1,2,3,4])
plt.xlabel('shoulder distance')
plt.ylabel('category')
```

[6]:
```
Text(0, 0.5, 'category')
```



[11]:
```
from sklearn.model_selection import train_test_split
from sklearn.model_selection import StratifiedKFold
import numpy as np
from sklearn.linear_model import LogisticRegression

#splitten test en train set
X = np.asarray(df_schouders[['shoulder distance']])
y = np.asarray(df_schouders[['category']])

scores=[]

skf = StratifiedKFold(n_splits=6)
for train, test in skf.split(X, y):
    X_train, X_test = X[train], X[test]
```

```python
    y_train, y_test = y[train], y[test]
    logistic_reg = LogisticRegression(multi_class='ovr', solver='saga')
    logistic_reg.fit(X_train,y_train)
    y_predict = logistic_reg.predict(X_test)
    score = logistic_reg.score(X_test, y_test)
    print(y_predict, score)
    scores.append(score)

print(np.mean(scores))
```

```
[2 2 3 2 3 2 2 2 3 2 2 3 3 2 2 3 2 2 2 2 3 3 2] 0.30434782608695654
[3 2 2 3 2 2 2 2 2 2 2 2 2 2 2 3 2 2 2 2 2 2 2] 0.34782608695652173
[2 3 2 2 2 2 2 3 2 2 2 2 3 2 2 2 2 2 3 2 2 3 2] 0.30434782608695654
[2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 3 2 2 2 2 2 2 3] 0.30434782608695654
[2 2 2 2 2 2 2 2 2 3 2 2 2 2 2 2 2 2 2 2 2 2 2] 0.21739130434782608
[2 2 2 2 2 2 2 2 2 2 2 3 2 3 3 3 2 2 3 3 2 2 2] 0.43478260869565216
0.31884057971014496
```

```
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packages/sklearn/utils/validation.py:72: DataConversionWarning: A column-vector
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[11]:
```
df_schouders_subset = df_schouders[(df_schouders['category']==␣
↪3)|(df_schouders['category']== 4)]
plt.scatter(df_schouders_subset['shoulder distance'],␣
↪df_schouders_subset['category'], alpha = 0.3, color = 'springgreen')
plt.title('afgelegde afstand van de schouder')
plt.yticks([1,2])
plt.xlabel('shoulder distance')
plt.ylabel('category')
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[11]:
```
Text(0, 0.5, 'category')
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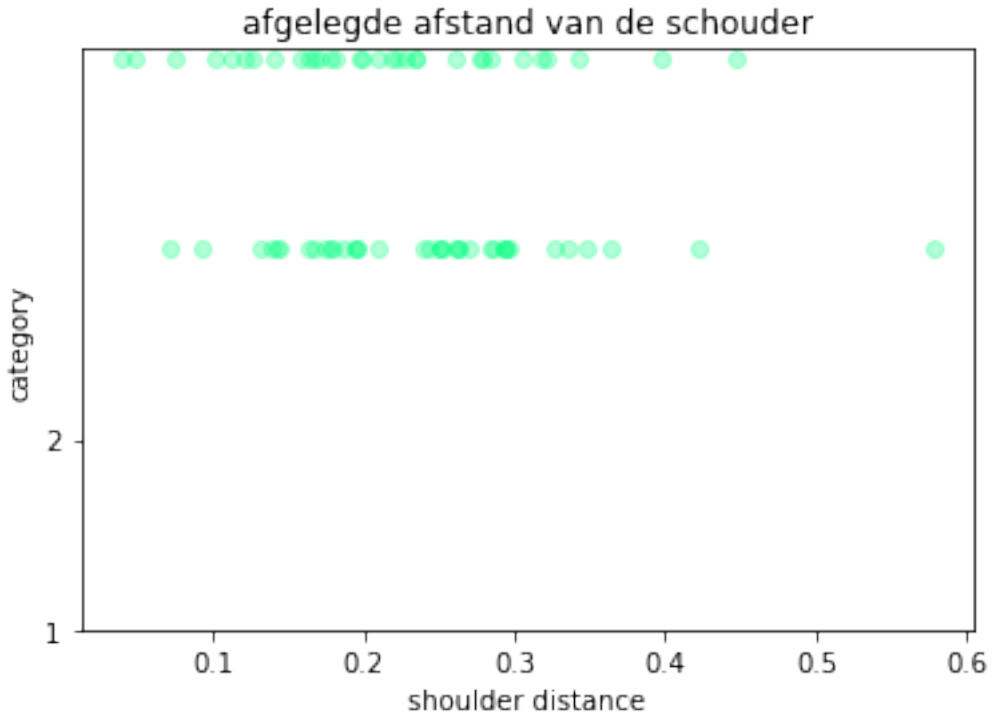

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from sklearn.model_selection import train_test_split
from sklearn.model_selection import StratifiedKFold
import numpy as np
from sklearn.linear_model import LogisticRegression

#splitten test en train set
X = np.asarray(df_schouders_subset[['shoulder distance']])
y = np.asarray(df_schouders_subset[['category']])

scores=[]

skf = StratifiedKFold(n_splits=6)
```

```python
for train, test in skf.split(X, y):
    X_train, X_test = X[train], X[test]
    y_train, y_test = y[train], y[test]
    logistic_reg = LogisticRegression()
    logistic_reg.fit(X_train,y_train)
    y_predict = logistic_reg.predict(X_test)
    score = logistic_reg.score(X_test, y_test)
    print(y_predict, score)
    scores.append(score)

print(np.mean(scores))
```

```
[3 3 3 3 3 3 3 3 3 3 3 3] 0.5833333333333334
[3 3 3 3 3 3 3 3 3 3 3 3] 0.5
[3 3 3 3 3 3 3 3 3 3 3 3] 0.5
[3 3 3 3 3 3 3 3 3 3 3] 0.5454545454545454
[3 3 3 3 3 3 3 3 3 3 3] 0.5454545454545454
[3 3 3 3 3 3 3 3 3 3 3] 0.5454545454545454
0.5366161616161617
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