Leids Universitair Medisch Centrum

THE HAGUE UNIVERSITY OF APPLIED SCIENCES

Ortho Eyes

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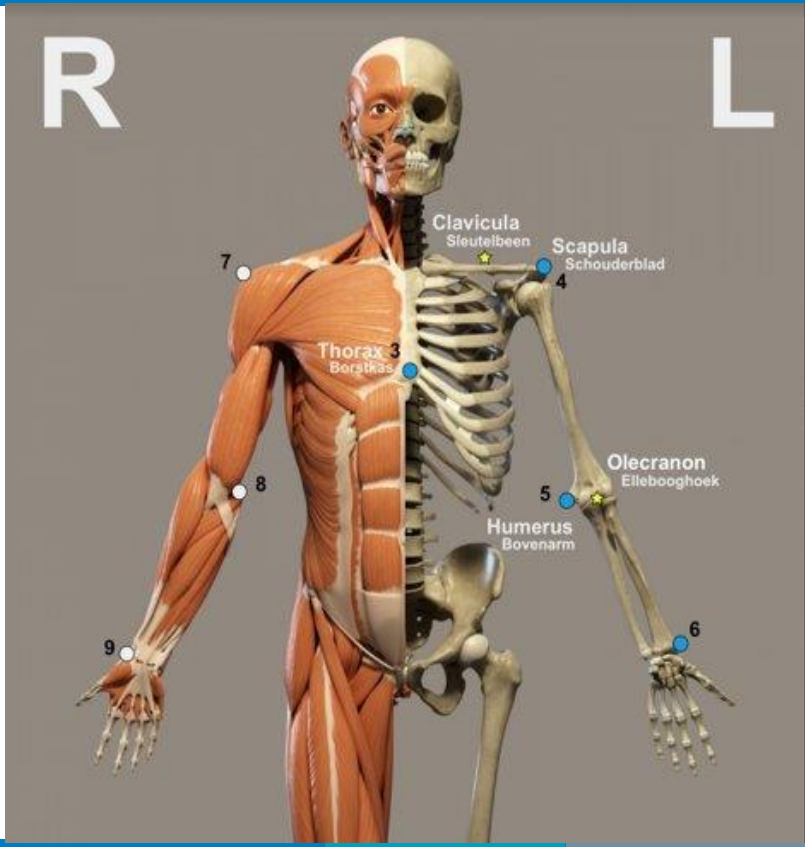

Leids Universitair
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Data processing

Hassan Ali

Data processing for Machine learning model

General Steps:

- How did we get 650 columns?
- Read in a csv file
- Read in patient folder with multiple exercises and save path of all exercises
- Read in one category folder ,multiple exercises
- folder with multiple categories and saving data
- cross joining exercises and creating 650 columns.

The data

Category_folder

Catagory_1
Catagory_2
Catagory_3

Patientgroup

1
2
3
4
5
•
•
•
25
26
27
28
29
30

Patientfolder (csvfiles)

m
AB1
AB2
AF1
AF2
EH1
EH2
EL1
EL2
RF1
RF2

Read in a csv file: Class exercises

- Read data from csv files and save the data as a pandas Dataframe
  - data = pd.read_csv("filename.csv")
- Rename column names
  - data.rename(columns= colnames)
- Save data in numpy array
  - data = pd.read_csv("filename.csv")
- Getting metadata from exercises (exercises type, category, etc)
  - os.path.split(exercisepath)
  - ‘CODE\data2.0\Catagory_1\1\AB1.csv’

Get frames (5 rows only)

dataframe.shape = 100 raws by 27 columns
Dataframe.size = 100x27
Raws = dataframe.size/len(columns) => 2700/27 = 100
Frames = 5,
Length dataframe = raws,
Steps_between frames = $\frac{rows}{Frames}$

$Formula =$ Steps_between frames * step_number

Voorbeeld: size = 96x27, get frames (1-5):

Steps_between frames = $\frac{96}{5}$ = 19

Voorbeeld get frames

Step: No:	Calculation	Frames
1	1*19	19
2	2*19	38
3	3*19	57
4	4*19	76
5	5*19	95

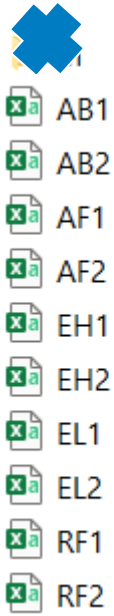
```python
def total_rows(self):
    return int(self.data.size / len(self.data.columns))

def get_frames(self):
    frames = []
    total_rows = self.total_rows() - 1
    for index in range(1, config.frames_counts + 1):
        frames.append(int((total_rows/ config.frames_counts) * index))
    return frames
```

dataframe_2 = dataframe.iloc[get_frames()]

Frames	thorax_r_x	thorax_r_y	thorax_r_z	.	humerus_l_y	humerus_l_z	ellebooghoek_l
19	4,281002	-4,902092	-3,568476	.	49,40454	1,703396	361,781
38	3,983373	-5,070366	-6,898982	.	140,0478	-14,25236	361,6263
57	7,701193	-4,54045	-7,870923	.	133,0988	-11,46238	369,8746
76	7,036899	-5,193945	-4,345288	.	43,63235	-7,319636	361,6309
95	7,796869	-3,205833	-0,6876775	.	15,97036	50,46438	403,7818

Patient

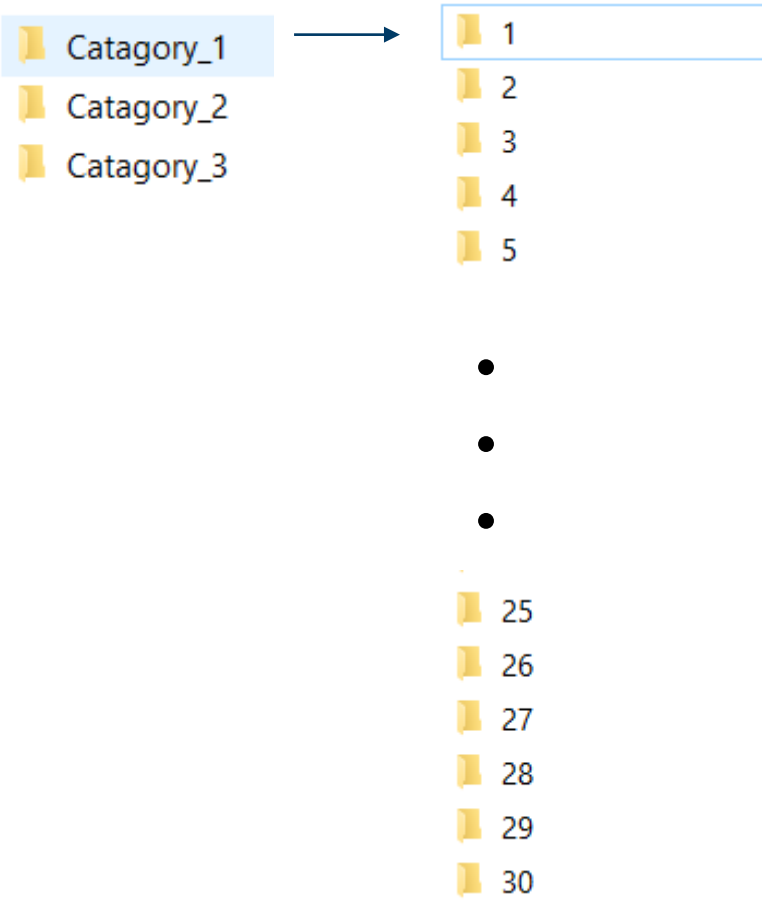
Patient Catagory_1\1



- Find if it's a csv file: endswith '.csv'
- csvfile = os.path.join(self.path, filename)
- Initiate class Exercises with path as csvfile.
- Create a list of reverences of all exercises with the path to an individual exercise

Patientgroup

Patientgroup



- Find name folder = os.listdir (path)
- Patientpath = os.path.join(self.path, name)
- Initiate class patient with path as Patientpath.
- Create a list of reverences of all patients from a category with the path to an individual patient

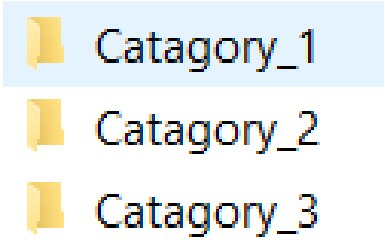
What do we have!

- ✓ Read in a csv of an exercise :- 5 frames
- ✓ A reference to all exercises of a patient
- ✓ A reference to all patients from a category

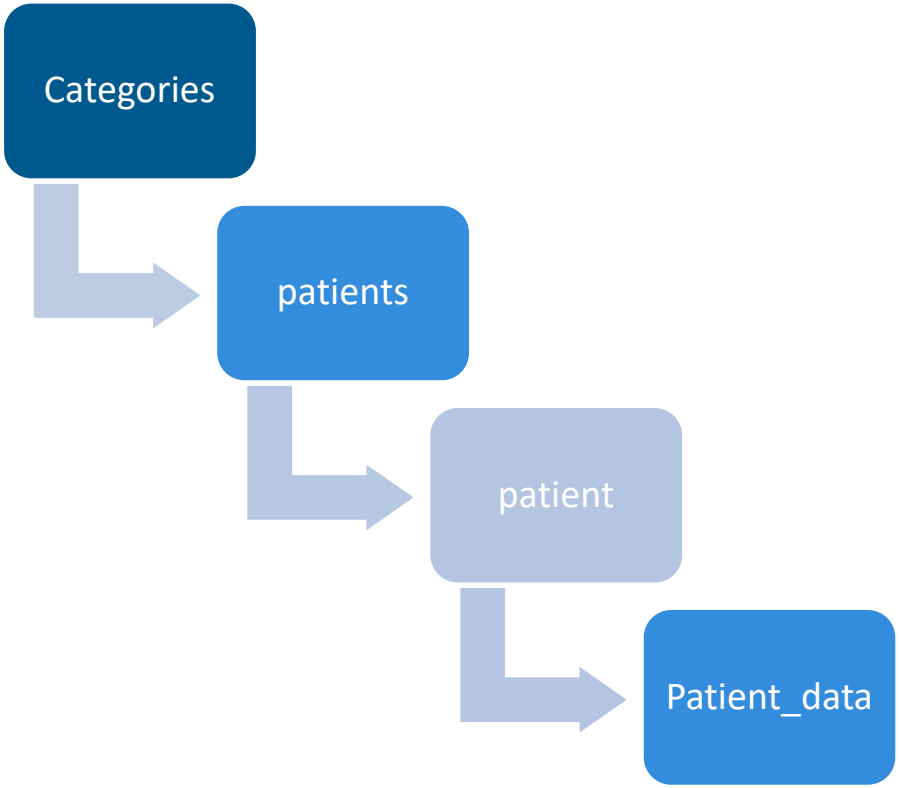
Patientgroups

- Create an empty list of patientgrougs
- Get grouppath by looping through folder containing patietgroups and get the groupID.
- Initiate class patientgroup with path as patientID.
- Create a list of reverences of all patientgroups with the path to an all patients
- To access an exercises is then as easy as:
  - patient_group[0].patients[0].exercises[0].dataframe

```
CODE\\data2.0\\Catagory_{groupid}
```



Create a patient data



- Loop through each and get the patient data and sort it out.
- Use the key exercise.exercisegroup to get the name of the exercise

AB1	**AB2**
AF1	**AF2**
EL1	**EL2**
RF1	**RF2**
EH1	**EH2**

Cross-joining exercises

- Generate more data by creating possible combinations for a patient.
- Example in test.py
- Patient_data

AB	AB1	AB2
AF	AF1	AF2

- Restults = list(itertools.product (patient_data[‘AB’], Patient_data[‘AF’]))
- [('AB1' 'AF1') ('AB1' 'AF2') ('AB2' 'AF1') ('AB2' 'AF2’)]

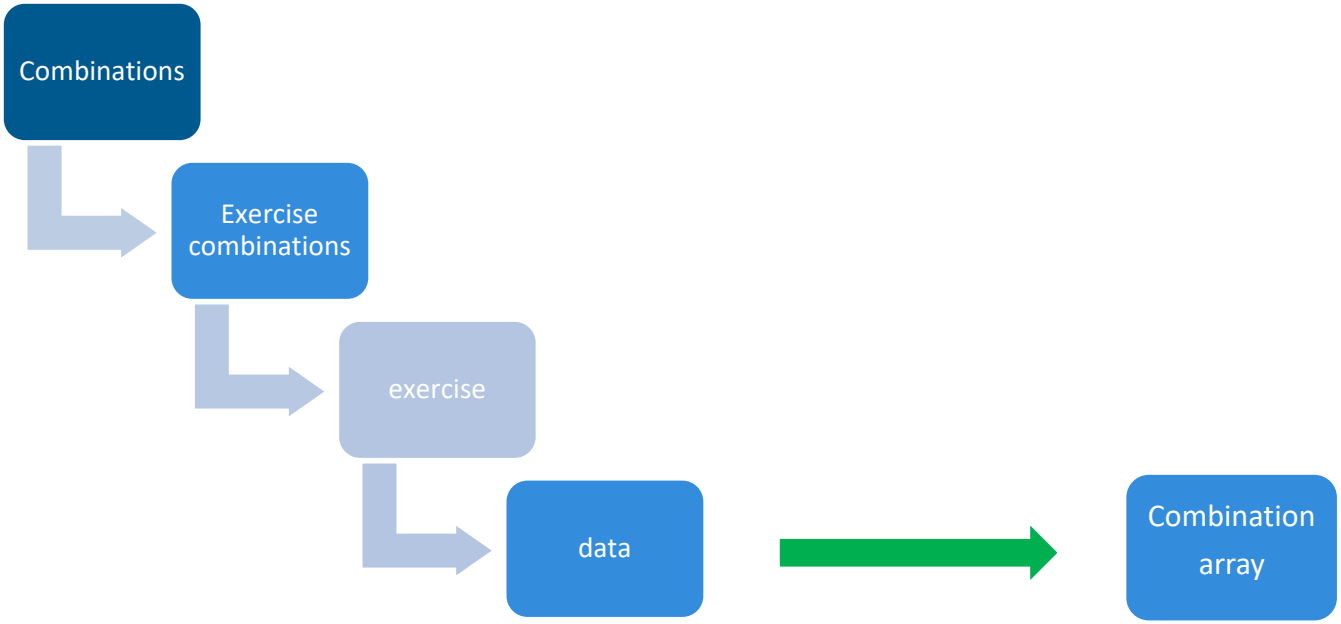
- Now results data is 2x more than the original patient_data
- Working with references to files instead of dataframes: see code

Splitting test & train data

- Randomly select patients by their id's for test in data
- If patient id is in test then it's patient_data from results goes to the test data
- Else it's a train data. See code

Getting the 650 columns!

- Loop through the patient data and get the data of each exercises => save this in an empty array
- Save the array in a combination_array with 650 columns => see code



Getting the group of each exercise combinations

Getting the group number:
This will be the answer for our model, de y

```
np_combination_array = np.vstack ([np_combination_array, data])
np_indicator_array = np.append(np_indicator_array, exercise_combination[0].patiengroup)
```

Questions & feedback moment