

# Project - Machine Learning

## Prediction Of Fracture Or Not

In this project, we will work with Fracture.csv dataset to develop a machine learning algorithm that predicts the fracture. A model like this would be very valuable to predict one's fracture using id,age,weight, height and bmd

### 4.1 Problem Statement

Develop a model that has the capacity of predicting fracture by making use of the information provided in fracture Dataset

### 4.2 Dataset

The dataset used in this project consists of 8 variables: „Gender“, 'Height', 'Weight', 'Index', „BMD“, „Medication“, „Waiting Time“ and „Age“. The main variable we are interested is 'fracture'. This variable predicts the fracture of the person based on the inputs given in dataset

- |                 |                        |
|-----------------|------------------------|
| 1. ID           | Enter the id number    |
| 2. Age          | Enter the age          |
| 3. Sex          | Enter the gender       |
| 4. Weight       | Enter the weight       |
| 5. Height       | Enter the height       |
| 6. Waiting time | Enter the waiting time |
| 7. BMD          | Enter the bmd          |

The overview of the original dataset is shown in figure with its original features:

ID	Age	Sex	Weight	Height	BMD	Medication	Waiting Time	Fracture
1	40	F	100	170	-0.001	0	0	0
2	45	F	105	175	-0.001	0	0	0
3	47	F	110	175	-0.001	0	0	0
4	48	F	115	175	-0.001	0	0	0
5	49	F	120	175	-0.001	0	0	0
6	50	F	125	175	-0.001	0	0	0
7	51	F	130	175	-0.001	0	0	0
8	52	F	135	175	-0.001	0	0	0
9	53	F	140	175	-0.001	0	0	0
10	54	F	145	175	-0.001	0	0	0
11	55	F	150	175	-0.001	0	0	0
12	56	F	155	175	-0.001	0	0	0
13	57	F	160	175	-0.001	0	0	0
14	58	F	165	175	-0.001	0	0	0
15	59	F	170	175	-0.001	0	0	0
16	60	F	175	175	-0.001	0	0	0
17	61	F	180	175	-0.001	0	0	0
18	62	F	185	175	-0.001	0	0	0
19	63	F	190	175	-0.001	0	0	0
20	64	F	195	175	-0.001	0	0	0
21	65	F	200	175	-0.001	0	0	0
22	66	F	205	175	-0.001	0	0	0
23	67	F	210	175	-0.001	0	0	0
24	68	F	215	175	-0.001	0	0	0
25	69	F	220	175	-0.001	0	0	0
26	70	F	225	175	-0.001	0	0	0
27	71	F	230	175	-0.001	0	0	0
28	72	F	235	175	-0.001	0	0	0
29	73	F	240	175	-0.001	0	0	0
30	74	F	245	175	-0.001	0	0	0
31	75	F	250	175	-0.001	0	0	0
32	76	F	255	175	-0.001	0	0	0
33	77	F	260	175	-0.001	0	0	0
34	78	F	265	175	-0.001	0	0	0
35	79	F	270	175	-0.001	0	0	0
36	80	F	275	175	-0.001	0	0	0
37	81	F	280	175	-0.001	0	0	0
38	82	F	285	175	-0.001	0	0	0
39	83	F	290	175	-0.001	0	0	0
40	84	F	295	175	-0.001	0	0	0
41	85	F	300	175	-0.001	0	0	0
42	86	F	305	175	-0.001	0	0	0
43	87	F	310	175	-0.001	0	0	0
44	88	F	315	175	-0.001	0	0	0
45	89	F	320	175	-0.001	0	0	0
46	90	F	325	175	-0.001	0	0	0
47	91	F	330	175	-0.001	0	0	0
48	92	F	335	175	-0.001	0	0	0
49	93	F	340	175	-0.001	0	0	0
50	94	F	345	175	-0.001	0	0	0
51	95	F	350	175	-0.001	0	0	0
52	96	F	355	175	-0.001	0	0	0
53	97	F	360	175	-0.001	0	0	0
54	98	F	365	175	-0.001	0	0	0
55	99	F	370	175	-0.001	0	0	0
56	100	F	375	175	-0.001	0	0	0
57	101	F	380	175	-0.001	0	0	0
58	102	F	385	175	-0.001	0	0	0
59	103	F	390	175	-0.001	0	0	0
60	104	F	395	175	-0.001	0	0	0
61	105	F	400	175	-0.001	0	0	0
62	106	F	405	175	-0.001	0	0	0
63	107	F	410	175	-0.001	0	0	0
64	108	F	415	175	-0.001	0	0	0
65	109	F	420	175	-0.001	0	0	0
66	110	F	425	175	-0.001	0	0	0
67	111	F	430	175	-0.001	0	0	0
68	112	F	435	175	-0.001	0	0	0
69	113	F	440	175	-0.001	0	0	0
70	114	F	445	175	-0.001	0	0	0
71	115	F	450	175	-0.001	0	0	0
72	116	F	455	175	-0.001	0	0	0
73	117	F	460	175	-0.001	0	0	0
74	118	F	465	175	-0.001	0	0	0
75	119	F	470	175	-0.001	0	0	0
76	120	F	475	175	-0.001	0	0	0
77	121	F	480	175	-0.001	0	0	0
78	122	F	485	175	-0.001	0	0	0
79	123	F	490	175	-0.001	0	0	0
80	124	F	495	175	-0.001	0	0	0
81	125	F	500	175	-0.001	0	0	0
82	126	F	505	175	-0.001	0	0	0
83	127	F	510	175	-0.001	0	0	0
84	128	F	515	175	-0.001	0	0	0
85	129	F	520	175	-0.001	0	0	0
86	130	F	525	175	-0.001	0	0	0
87	131	F	530	175	-0.001	0	0	0
88	132	F	535	175	-0.001	0	0	0
89	133	F	540	175	-0.001	0	0	0
90	134	F	545	175	-0.001	0	0	0
91	135	F	550	175	-0.001	0	0	0
92	136	F	555	175	-0.001	0	0	0
93	137	F	560	175	-0.001	0	0	0
94	138	F	565	175	-0.001	0	0	0
95	139	F	570	175	-0.001	0	0	0
96	140	F	575	175	-0.001	0	0	0
97	141	F	580	175	-0.001	0	0	0
98	142	F	585	175	-0.001	0	0	0
99	143	F	590	175	-0.001	0	0	0
100	144	F	595	175	-0.001	0	0	0

## 4.3 Algorithm –Navie Bayes Algorithm

It is a very simple python program to implement. Multiple regression is like linear regression, but with more than one independent value, meaning that we try to predict a value based on two or more variables. Navie Bayes algorithm is implemented using the GussianNB class from sklearn.linear\_model library.

## 4.4 Programming Steps

- This project requires us to predict the weight of a person based on the given input dataset.
- First, we read the given dataset using pandas function.
- Then we print the inputs and output from csv file.
- Label encoding is used for „Sex“ and „Medication“ column.
- We initialize the model i.e., Navie Bayes Algorithm.
- We further implement this using Django in order for better representation

### Code:

```
import pandas as pd

path="C:\\Users\\Sakshi\\Desktop\\Machine Learning\\Data\\Data\\bmd.csv"

data=pd.read_csv(path)

print(data)

print(data.info())


data['sex']=data['sex'].map({'M':1,'F':0})

print(data)


data['medication']=data['medication'].map({'Anticonvulsant':1,'No
medication':2,'Glucocorticoids':3})

print(data)


#data['fracture']=data['fracture'].map({'fracture':1,'no fracture':0})

#print(data)
```

```
inputs=data.drop('fracture','columns')

output=data.drop(['id','age','sex','weight_kg','height_cm','medication','waiting_time','bmd'],'columns')

import sklearn

from sklearn.model_selection import train_test_split

x_train,x_test,y_train,y_test=train_test_split(inputs,output,train_size=0.8)

print(x_train)

print(x_test)

print(y_train)

print(y_test)


from sklearn.naive_bayes import GaussianNB

model=GaussianNB()

model.fit(x_train,y_train)

y_pred=model.predict(x_test)

print(y_pred)

print(y_test)

pclass=int(input("Enter the id of the person:"))

age=float(input("Enter the age of the person:"))

sex=int(input("Enter the sex 0--F 1--M:"))

weight_kg=int(input("Enter the weight of the person in kg's:"))

height_cm=float(input("Enter the height of the person in cm's:"))

medication=int(input("Enter the medication 1--Anticonvulsant 2--No medication 3--Glucocorticoids:"))

waiting_time=int(input("Enter the waiting time:"))
```

```
bmd=float(input("Enter the bmd:"))
```

```
result=model.predict([[pclass,age,sex,weight_kg,height_cm,medication,waiting_time,bmd]])
```

```
print(result)
```

```
if result==1:
```

```
    print("The person have Fracture")
```

```
else:
```

```
    print("The person have no fracture")
```

```
import seaborn as sns
```

```
import matplotlib.pyplot as plt
```

```
sns.countplot(data.fracture)
```

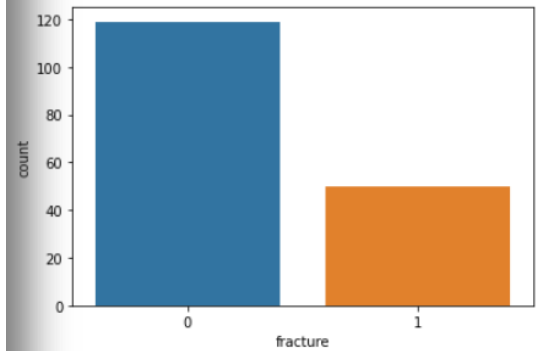
```
plt.show()
```

## OUTPUT:

```
id      age sex fracture weight_kg height_cm medication \
0      469 57.052768 F no fracture 64.0      155.5 Anticonvulsant
1      8724 75.741225 F no fracture 78.0      162.0 No medication
2      6736 70.778900 M no fracture 73.0      170.5 No medication
3      24180 78.247175 F no fracture 60.0      148.0 No medication
4      17072 54.191877 M no fracture 55.0      161.0 No medication
..      ... ..
164 21892 77.982543 M fracture 74.0      164.0 No medication
165 24140 50.285303 F fracture 59.0      161.0 No medication
166 6969 46.359721 M fracture 67.0      169.0 No medication
167 5505 54.788368 M fracture 70.0      166.0 No medication
168 71 69.994822 F fracture 68.5      165.0 No medication

waiting_time  bmd
0           18  0.8793
1           56  0.7946
2           10  0.9067
3           14  0.7112
4           20  0.7909
```

```
Enter the id of the person:582
Enter the age of the person:56.42
Enter the sex 0--F 1--M:1
Enter the weight of the person in kg's:23
Enter the height of the person in cm's:12.36
Enter the medication 1--Anticonvulsant 2--No medication 3--Glucocorticoids:2
Enter the waiting time:23
Enter the bmd:0.159
[1]
```



**PREDICT FRACTURE OR NOT**

ID: 6736

AGE: 57.05277

SEX(1--Male and 0--female): 1

WEIGHT: 87

HEIGHT: 155.5

MEDICATION( 1--Anticonvulsant 2--No medication 3--Glucocorticoids): 1

WAITING TIME: 18

BMD: 0.8793

**Predict**

**['fracture']**

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