MACHINE LEARNING

*Example 1

Linear regression modelling using sklearn

In this example we will model data of handball players in attempt to predict the relation between players height and the goal

Here, it is used the fallowing data from 2018 team of IFTC

1. handball players heights of a team
2. number of total scored goal in the season for each player

In [1]:

```python
import matplotlib.pyplot as plt
import numpy as np
from sklearn import datasets, linear_model

# datasets for an handball team

Size = [170 , 177, 185, 188, 166, 192, 181, 207, 188, 185, 173, 189, 194, 199 ]
Goals = [12,20, 33, 39, 15, 45, 55, 50, 61, 58, 37, 29, 59, 45 ]

print ("number of field players = ", len(Goals))
# reshape the input of independent variable


SizeR = np.array(Size).reshape((-1,1))  # this generates a list of lists where each row
as only one item in it
print (" \n Reshaped variable format:\n",  SizeR )
```

```
number of field players =  14

 Reshaped variable format:
 [[170]
 [177]
 [185]
 [188]
 [166]
 [192]
 [181]
 [207]
 [188]
 [185]
 [173]
 [189]
 [194]
 [199]]
```

In [2]:

```python
# Fitting the linear regression model to data

reg = linear_model.LinearRegression()
reg.fit(SizeR, Goals)
print ("Coeficients: n\ ", reg.coef_  )
print ("Intercept: n\ ", reg.intercept_)
```
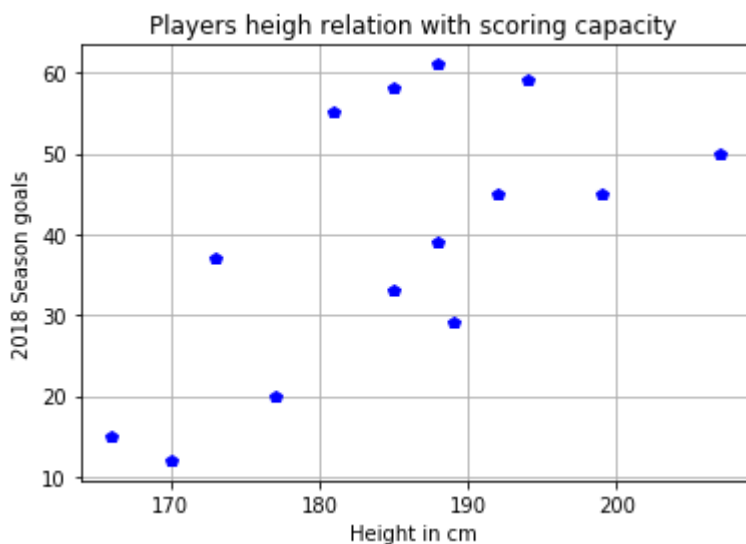
```
Coeficients: n\  [0.93388073]
Intercept: n\  -133.17761452031107
```

In [3]:

```python
# Ploting initial data
plt.xlabel('Height in cm ')
plt.ylabel('2018 Season goals')
plt.title("Players heigh relation with scoring capacity ")
plt.grid(True)
plt.plot(Size, Goals, "bp")
```

Out[3]:

```
[<matplotlib.lines.Line2D at 0x18d05c77128>]
```


In [4]:

```python
# making a prediction based on liner regression model
Size_new = 197
GOALS = (Size_new*reg.coef_) + reg.intercept_
print ("Predicted goals = " , int(round(GOALS[0], 0) ) )
```

```
Predicted goals =  51
```

In [5]:

```python
# Alternative way of making a prediction based on liner regression model
GOALS2 = reg.predict ([[Size_new]])
print ("Predicted goals = " , int(round(GOALS2[0], 0) ) )
```
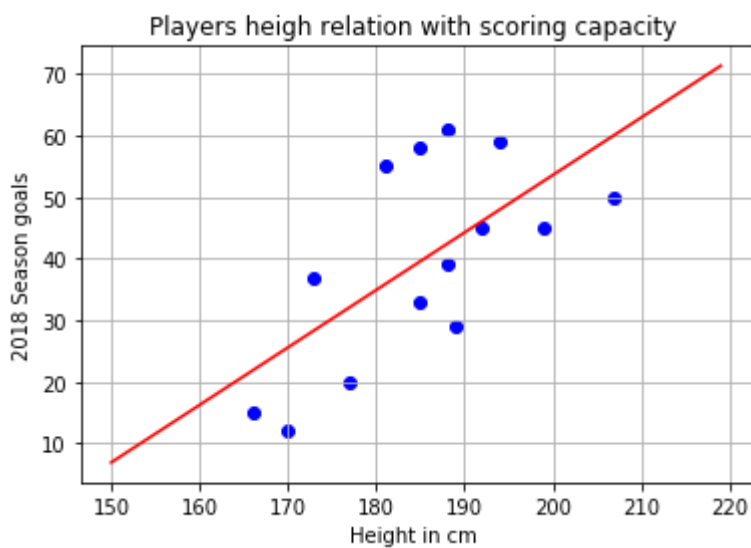
```
Predicted goals =  51
```

In [6]:

```python
# Implement the linear model in a function for training the model

def Lmodel(formula, xRange):
    x = np.array(xRange)
    y = eval(formula)
    plt.plot(x, y, 'r')

# ploting the prediction on the data

Lmodel('reg.coef_*x + reg.intercept_', range(150, 220))
plt.scatter(Size, Goals, color = 'blue')
plt.xlabel('Height in cm ')
plt.ylabel('2018 Season goals')
plt.title("Players heigh relation with scoring capacity ")
plt.grid(True)
plt.show()
```


In [ ]: