# PYTHON PROJECT

**PROJECT NAME :** WEIGHT PREDICTION

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# Abstract of Project

Project Title : WEIGHT PREDICTION

Lists estimates the weight determined by percentage of Bodyfat and various body circumference measurements for 252 men.

 The motivation is to:

* Visualize and understand the data
* Creating EDA for the dataset
* Creating prediction model to predict Weight

# Project Summary

Project Title : WEIGHT PREDICTION

* Definitions of the column names:

BodyFat: Percent body fat from Siri's (1956) equation

Age: (years)

Weight: (lbs)

Height: (inches)

Neck circumference: (cm)

Chest circumference: (cm)

Abdomen circumference: (cm)

Hip circumference: (cm)

Thigh circumference: (cm)

Knee circumference: (cm)

Ankle circumference: (cm)

Biceps (extended) circumference: (cm)

Forearm circumference: (cm)

Wrist circumference: (cm)

* **Density** - Density refers to the amount of mass per unit volume of a substance. It is a physical property that can be used to identify and characterize materials.
* **Age** - Age is the length of time a person or organism has existed since birth or creation. It is often used as a measure of the maturity, experience, or chronological progression of an individual or entity.
* **Weight** - In the context of physical objects, weight refers to the measure of the amount of force exerted on an object due to gravity. It is typically measured in units such as pounds or kilograms.
* **Height** - Height is the measurement of how tall or high something is`, usually relative to the ground or a reference point. It is commonly expressed in units such as feet, meters, or centimeters.
* **Neck** - Neck circumference is the measurement of the circumference of the neck taken at a point just below the larynx (Adam's apple) with the head held in a neutral position. It is used as a simple and non-invasive indicator of obesity and metabolic syndrome.
* **Chest** -Chest circumference refers to the measurement of the chest at its widest point. It is commonly used in the fashion industry to determine clothing sizes, as well as in medical settings to monitor changes in chest size.
* **Abdomen** - Abdomen circumference refers to the measurement around the widest part of the abdomen, typically at the level of the belly button. It is often used as an indicator of abdominal obesity and associated health risks.
* **Hip** - Hip circumference refers to the measurement around the widest part of the hips, typically at the level of the greater trochanters. It is used as an anthropometric measurement to assess body composition and health risks.
* **Thigh** - Thigh circumference refers to the measurement of the circumference of the thigh, typically taken at the widest point. It is often used as an indicator of overall body composition and can be used to track changes in muscle or fat mass.
* **Knee** - Knee circumference refers to the measurement taken around the knee joint at its widest point. It is commonly used in medical and fitness assessments to track changes in knee size and to determine appropriate clothing or brace sizes.
* **Biceps** - Biceps circumference refers to the measurement of the circumference of the upper arm at the point where the biceps muscle is most prominent. This measurement is commonly used to track changes in muscle size and strength during exercise or rehabilitation programs.
* **Forearm** - Forearm circumference refers to the measurement around the widest part of the forearm, typically at the level of the maximum muscular bulk. It is commonly used as a measure of upper body strength and muscle mass.
* **Wrist** - Wrist circumference is the measurement of the distance around the wrist. It is commonly used in healthcare and fitness settings to assess body composition and to select appropriately sized equipment or apparel.
* **Linear Regression:-**

Linear regression is a statistical method used to model the relationship between a dependent variable and one or more independent variables. It assumes a linear relationship between the variables and tries to find the line of best fit that minimizes the sum of the squared errors. The resulting equation can be used to predict the value of the dependent variable for a given set of independent variables.

# Objectives Of Project

# The main agenda of the project is to estimate the weight of the person by machine learning model.

# Based on our weight ,we have to maintain our diet.

# .If the person is obese, he need to exercise a lot to get fit and maintain protein rich food with less fat content.

# If the person is underweight , he need to take more nutritious food to improve his weight.

# If the person have correct weight according to his personality ,he need to maintain the same diet.

# Measurements of all other body part will influence the weight of the person like Height ,Age, Circumferences of neck ,wrist ,chest ,Knee ,ankle etc.

# Maintaining the correct body weight will help you to have more flexibility ,fitness and provides immunity and a healthy life.

# Details of project developed

* It is a type of a software used to interact with humans in different languages through different mobile apps, websites, messages , etc.
* The standard form of the bot is “Build-operate-transfer”.
* There are seven steps to design the chatbot project. They are scope & requirement, Identify the input , understand UI elements , craft first interaction , build conversation , testing.
* The first step to designing a chatbot is to know the scope and requirements like why chatbot ,platform to launch chatbots and it’s limitations.
* The second step is to identify the inputs from users in the form of text .
* The third step is to understand the UI elements.
* UI elements are of five types : Command Line (CL), Graphical User Interface(GUI), Menu-Driven Interface(MDI), Form Based Interface(FBI), and Natural Language Interface(NLI).
* After understanding user interface element, the next step is to craft the first interaction and build a conversion.
* The final step of chatbot design process is testing , which is done on mobile and websites to know how it’s working.

Give the input

Understand UI element

Craft first interaction

Build Conversation

Scope and Requirements

Fig. Details of Project Developed

Predicting



# System Requirement Used

1. Windows 10 pro
2. Python 3
3. Jupyter Notebook
4. Command prompt

**Algorithm**

**Step 1:-** First we will load the dataset into a variable bf using pandas.

**Step 2:-**To get the directory of the dataset, we use dir(bf).

**Step 3:-** To get the information of the dataset, we use bf.info().

**Step 4:-** To get the entire description of the dataset (Count,Mean,Standard deviation,Minimum and maximum value,25%,50%,75% of each measurement ),we use bf,describe().

**Step 5:-**Now we use isnull().sum() to find the sum of null values in each coloumn.

**Step 6:-** To get the shape of the dataset , we use bf.shape().

**Step 7:-**Density coloumn is removed using drop() and later we find the datatype of remaining coloumns using dtpes().

**Step 8:-**Now import mathplotlib and scatter Age vs Weight and Height vs Weight with orange color.Label them according to the axis using scatter().

**Step 9:-**Import seaborn library and pairplot the dataset using pairplot().

**Step 10:-**To get the heatmap of the dataset , we use heatmap including corr() .

**Step 11:-**Now we need to train the data.So first,we need to split the data into train and test by importing train\_test\_split class in model\_selection library of sklearn.Change datatype of the Age coloumn to float.Now,assign independent variable to x(Using drop()) and dependent variable(Weight) to y.

**Step 12:-**Split the data into train and test by giving the size of the test data as 20% and check the length of train and test data using len().

**Step 13:-**Before creating the model import Linear regression from sklearn .Now,fit the model.

**Step 14:-**Check the accuracy of the model using score(). (To gat best model,make sure the model should have atleast 0.90 as its score) and now, test the data and it predicts the Weight.

**Step 15:-**Finally,deploy the machine learning model using pickle library and streamlit method .Check the output of the model.

# References:

* + [www.wikipedia.com](http://www.wikipedia.com/)
  + [www.pycharm.com](http://www.pycharm.com/)
  + [www.chrome.com](http://www.chrome.com/)