Guided Project

Data Analysis in Python: Using Numpy for Analysis

Estimated Time

50 minutes

Instructor:

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How Guided Projects work

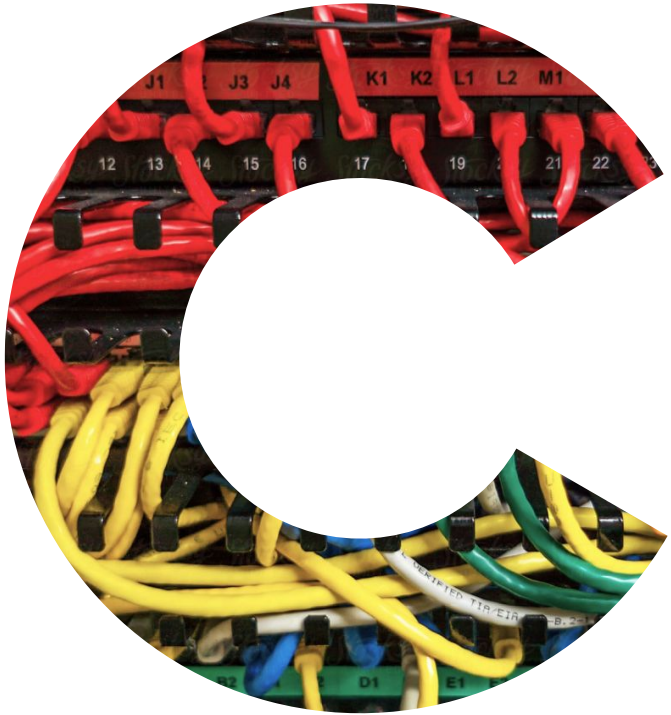
Your workspace is a cloud desktop right in your browser, no download required

In a split-screen video, your instructor guides you step-by-step

Scenario

Your Role

Given a Python list of heights (in inches) and weights (in pounds) of the starting line up of the Lakers basketball team, we will compute their BMIs and check if their BMIs are in the suggested ranges of their heights. In this project, we will leverage Numpy, apply transformations and aggregations to accomplish this.



Project Goal

Leverage Numpy to transform, perform arithmetic and aggregate Laker’s starting team’s height and weight to calculate their BMIs.

Task 1

Import Python Libraries and Lakers data.

In this task, we're going to be importing the libraries and data we have installed and start building our project.

Task Summary

Task Goal

Importing all the necessary python libraries and data of the Lakers starting point weights and heights

Key Takeaways

- Key information learners will note: how to import numpy to use in a python project, a brief description of numpy and how to set 1 dimensional and 2 dimensional data structures variables.

Task 2

Transform the Lakers' starting team's data to numpy arrays.

In this task, we're going to change a python list and Python Dictionary to a Numpy array.

Task Summary

Task Goal

In this task, we're going to change a python list to a Numpy array.

Key Takeaways

- Converting lists into numpy arrays
- The advantages of using Numpy arrays over data structures like lists and dictionaries.

Task 3

Perform basic arithmetic operations on Lakers team numpy array data.

In this task, we're going to perform the basic arithmetic Numpy operation of multiplication to convert the player's weights from pounds to kilograms and the player's heights from inches to centimeters.

Task Summary

Task Goal

In this task, we're going to perform the basic arithmetic Numpy operations.

Key Takeaways

- Learn how to convert pounds to kilograms and inches to centimeters using numpy multiplication.

Task 4

Calculate the Lakers players BMI with the numpy array data.

In this task, we're going to be finally calculating the BMIs of the Lakers team with the pounds and inches and also with the kilograms and centimeters.

Task Summary

Task Goal

In this task, we're going to perform the Numpy aggregation operations.

Key Takeaways

- Learn how to write a function that performs BMI calculations.

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Practice Activity

Practice Task

1. Convert the Gold State Warriors starting team data into a numpy array.
2. Apply arithmetic operation to calculate the BMI of the team.

Things to Note

- The data for the Golden State Warriors weight and height are in the data.json file on the Desktop of the workspace.
- Converting pounds to kilograms - (pounds x 0.454)
- Converting inches to cm - (inch x 2.54cm)
- BMI formula -
  (weight (lb) / (height (in)^2))x 703.
  weight (kg) / (height (m)^2)

Pro Tip

- If you're stuck on a particular Numpy method, you can check out the Numpy documentation: https://numpy.org/doc/stable/user/absolute_beginners.html
- Also be sure to review Task 4 if you're stuck.

(Pause the video to complete the task and unpause to see the solution once the task is complete)

Task 5

Calculate the Lakers player efficiency rates with numpy.

In this task, we're going to calculate the efficiency of the players with numpy .

(EFF) = (PTS + REB + AST + STL + BLK – Missed FG – Missed FT – TO)

Where:

- “PTS” is the number of points scored by the player.
- “REB” is the number of rebounds by the player.
- “AST” is the number of assists by the player.
- “STL” is the number of steals by the player.
- “BLK” is the number of blocks by the player.
- “Missed FG” is the number of field goals (shot on basket that are not a free throw) missed by the player.
- “Missed FT” is the number of free throws missed by the player.
- “TO” is the number of turnovers the player has allowed.

Task Summary

Task Goal

In this task, we're going to perform mathematical operations with Numpy.

Key Takeaways

- Learn how to write a function that calculates the efficiency rate of the players.

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Practice Activity

Practice Task

1. Calculate the player efficiency rates of the Golden State Warriors starting team.

Things to Note

- Formula - (EFF) = (PTS + REB + AST + STL + BLK – Missed FG – Missed FT – TO)

  “PTS” is the number of points scored by the player.
  “REB” is the number of rebounds by the player.
  “AST” is the number of assists by the player.
  “STL” is the number of steals by the player.
  “BLK” is the number of blocks by the player.
  “Missed FG” is the number of field goals (shot on basket that are not a free throw) missed by the player.
  “Missed FT” is the number of free throws missed by the player.
  “TO” is the number of turnovers the player has allowed.

Pro Tip

- Also be sure to review Task 5 if you’re stuck.

(Pause the video to complete the task and unpause to see the solution once the task is complete)

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Cumulative Challenge

This challenge is optional and ungraded.
The goal is to build your confidence.

Scenario/ Challenge

In this capstone project, the learner will use the knowledge of Numpy to calculate the BMI and player efficiency of the top 10 highest paid NBA players in the league.

Your Task

1. Apply arithmetic operation to calculate the BMI of the team.
2. Apply arithmetic operations to calculate the players efficiency rate.