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# Purdue University Global
#
# IN402 - Modeling and Predictive Analysis
#
# Unit 3 Assignment / Module 3 Part 1 Competency Assessment
#
# Predicting Gender-Based Salary Gap
#
# PyCharm Code
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# Data import and wrangling using multiple tools:

# Import all necessary initial libraries

# For ignoring warning

import sys

# Ignoring warnings

if not sys.warnoptions:
    import warnings

warnings.simplefilter("ignore")

import pandas as pd

# Output Header

print('Unit 3 Assignment / Module 3 Part 1 Competency Assessment Output\n')

from datetime import datetime

print(datetime.now().strftime("%m/%d/%Y %H:%M:%S"), '\n')

# Import and explore the quality of the dataset. What do you notice about the data?

df = pd.read_csv('/home/codio/workspace/data/IN402/data.csv')

print(df.dtypes)

# In the paper, describe the data source and how are you going to use the libraries

# Conduct exploratory data analysis.

# Examine the quality of the data

# What does the data look like? Use .head() method to explore first few rows

print(df.head())

# What does the data look like? Use .tail() method to explore last few rows

print(df.tail())

# Check the structure/datatypes of each variable; are there any missing values?

# Identify using .info() method and remove (if any) using .dropna() method

# Are there any duplicate values? to detect use .duplicated() method

df[df.duplicated(keep=False)]

# Check the descriptive statistics on numeric variables using .describe() method

print(df.describe())

# Based on the initial observation, generate a Null hypothesis.

# Wrangle the data

# Create dummy variable for gender to allow the usage in the regression (1 for male and 0 for female)

df = pd.get_dummies(df, columns=['gender', 'edu'])

print(df.head())

# Group ages into 5 age groups

# Create new variable for natural log rate of base pay

# In the paper, describe the initial state of the data, its quality, the wrangling techniques
# you've applied to transform the data, and why you needed to do that.

# Run the multiple regression

# Import all necessary libraries to run the regression, including statsmodel, sklearn.

import statsmodels.formula.api as sm

# Write a code for the model

model = sm.ols(data=df, formula = "basePay ~ gender_Female + gender_Male +age+ seniority")

# Fit the model into the data

result = model.fit()

print(result.summary())
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