

Backslash

Python Project

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Problem Statement

To design a python application which will be able to open up 2 Excel files. These files will both be data tables laid out in a similar format as the below mentioned examples.

States	Gender	2016	2017	2018	2019
Kerala	Male	89	92.1	94	98
Kerala	Female	86	86.5	88	92
Maharashtra	Male	88	91.6	93	96.6
Maharashtra	Female	56	89	93	95
Andhra Pradesh	Male	91.3	92	95	88
Andhra Pradesh	Female	85	87	90	92
West Bengal	Male	80	85	45	90
West Bengal	Female	78	82	83	90
Rajasthan	Male	75	78	80	60
Rajasthan	Female	60	75	82	85

Fig 1 : Table 1 for comparison

States	Gender	2016	2017	2018	2019
Kerala	Male	89	92.1	94	98
Kerala	Female	86	86.5	88	92
Maharashtra	Male	88	91.6	95	96.6
Maharashtra	Female	86.8	89	93	95
Andhra Pradesh	Male	91.3	92	95	96
Andhra Pradesh	Female	85	87	90	92
West Bengal	Male	80	85	87	90
West Bengal	Female	78	82	85	90
Rajasthan	Male	75	78	80	85
Rajasthan	Female	70	75	82	85

Fig 2 : Table 2 for comparison

It should be able to tell for each ID what Data Point what has changed with respect to each other. We will be highlighting all the updated rows and columns using a special formatting (in this case the color changes to red).

States	Gender	2016	2017	2018	2019
Kerala	Male	0	0	0	0
Kerala	Female	0	0	0	0
Maharashtra	Male	0	0	-2	0
Maharashtra	Female	-30.8	0	0	0
Andhra Pradesh	Male	0	0	0	-8
Andhra Pradesh	Female	0	0	0	0
West Bengal	Male	0	0	-42	0
West Bengal	Female	0	0	-2	0
Rajasthan	Male	0	0	0	-25
Rajasthan	Female	-10	0	0	0

Fig 3 : Comparison Table

Technologies Used

The project base and structure will be revolving around **Python 3** and will be implemented using two libraries i.e

1. **Pandas** - an open source, BSD-licensed library providing high-performance, easy-to-use data structures and data analysis tools for the Python programming
2. **OpenPYXL** - is a Python library to read/write Excel 2010 xlsx/xlsm/xltx/xltn files. It was born from lack of existing library to read/write natively from Python

Scope of the Project

The project will revolve around comparing two excel files and highlighting out the differences to compare values in multiple scenarios, and making a real world application out of it.

Source Code

1. Implementation using Pandas

a) Import

```
#importing excel to DataFrame
df1=pd.read_excel('excel_file_old.xlsx') #Df1 will represent the old file
df2=pd.read_excel('excel_file_new.xlsx') #Df2 will represent the new file
```

- b) A boolean matrix is generated using the comparison in-built function between the two generated DataFrames

```
[ True True True True True True True True True]
[ True True False True True True True True True]
[ True True True True True False True True True]
[ True True True True True True True True True]
[False True True True True True True False True]
[ True True True True True True True True True]
[ True True True True True True True True True]
[ True True True True False True True True True]
[ True True True True True True True True True]
[ True False True True True True True True True]
[ True True True True True True False True False]
[ True True True True True True True True True]
[ True True True True True True True True True]
[ True True True True True True True True True]
```

Fig 4 : Boolean Matrix

- c) For different values the value is given as False and for similar values it is given as True
a. If value is True, we subtract the values and it becomes 0

```
rows,cols=np.where(comparison_values==True)
for item in zip(rows,cols):
    if (type(df1.iloc[item[0],item[1]])!= str):
        df3.iloc[item[0],item[1]]=df1.iloc[item[0],
```

- b. If value is False, we subtract the values and it returns a non Zero value

```
rows,cols=np.where(comparison_values==False)
for item in zip(rows,cols):
    df3.iloc[item[0],item[1]]=df1.iloc[item[0],item[1]]
```

- d) Finally the updates values are formatted for better clarity using color_negative_red()

```
def color_negative_red(val):
    """
    Takes a scalar and returns a string with
    the css property `color: red` for negative
    strings, black otherwise.
    """
    color = 'red' if (val != 0 and type(val) !=str) else 'black'
    return 'color: %s' % color
```

- e) It is exported into a new file

```
s.to_excel('./Excel_diff.xlsx',index=False,header=True)
```

2. Implementation using openpyxl

a) Setting FilePath for Three Excel Files (Comparison1, Comparison2, NewFile)

```
#set file path for the three excel files
filepath1="excel_file_old.xlsx"
filepath2="excel_file_new.xlsx"
filepath3="excel_file_diff.xlsx"
```

b) Activate All the Sheets in the File

```
#selecting the three excel sheets
sheet1=wb1.active
sheet2=wb2.active
sheet3=wb3.active
```

c) Will Evaluate Maximum number of rows and columns to generate operation size

```
#evaluating the maximum rows and columns
max_row1=sheet1.max_row
max_column1=sheet1.max_column
```

d) Will print the header(title) of each excel File

```
for i in range(1,2):
    for j in range(1,max_column1+1):
        cell_obj1=sheet1.cell(row=i,column=j)
        sheet3.cell(row=i, column=j).value = cell_obj1.v
            alue
        wb3.save(filepath3)
```

e) Will compare cell by cell for all the rows and columns and update accordingly

```
for i in range(2,max_row1+1):
    for j in range(1,max_column1+1):
        cell_obj1=sheet1.cell(row=i,column=j)
        cell_obj2=sheet2.cell(row=i,column=j)
        if type(cell_obj1.value) == str and type(cell_ob
            j2.value) == str :
            sheet3.cell(row=i, column=j).value = cell_o
                bj1.value
        else:
            temp=cell_obj1.value-cell_obj2.value
            sheet3.cell(row=i, column=j).value = temp
```

f) Now we will format the updated values with openpyxl.styles

```
if temp!=0:
```

```
sheet3.cell(row=i, column=j).font = Font(color=colors.RED)
```

Screenshots

States	Gender	2016	2017	2018	2019
Kerala	Male	89	92.1	94	98
Kerala	Female	86	86.5	88	92
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Andhra Pradesh	Female	85	87	90	92
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West Bengal	Female	78	82	83	90
Rajasthan	Male	75	78	80	60
Rajasthan	Female	60	75	82	85

Fig 5 : excel_file_new.xlsx

States	Gender	2016	2017	2018	2019
Kerala	Male	89	92.1	94	98
Kerala	Female	86	86.5	88	92
Maharashtra	Male	88	91.6	95	96.6
Maharashtra	Female	86.8	89	93	95
Andhra Pradesh	Male	91.3	92	95	96
Andhra Pradesh	Female	85	87	90	92
West Bengal	Male	80	85	87	90
West Bengal	Female	78	82	85	90
Rajasthan	Male	75	78	80	85
Rajasthan	Female	70	75	82	85

Fig 6 : excel_file_old.xlsx

States	Gender	2016	2017	2018	2019
Kerala	Male	0	0	0	0
Kerala	Female	0	0	0	0
Maharashtra	Male	0	0	-2	0
Maharashtra	Female	-30.8	0	0	0
Andhra Pradesh	Male	0	0	0	-8
Andhra Pradesh	Female	0	0	0	0
West Bengal	Male	0	0	-42	0
West Bengal	Female	0	0	-2	0
Rajasthan	Male	0	0	0	-25
Rajasthan	Female	-10	0	0	0

Fig 7 : excel_file_diff.xlsx

Result

The files have been compared using execution of two technologies and a new file has been generated in all instances.

Libraries and Functions Used :

1. Pandas –

- `read_excel()`** - Read an Excel file into a pandas DataFrame.
- `iloc()`** - Purely integer-location based indexing for selection by position.
- `style()`** – to apply conditional formatting
 - `applymap()`** - Apply a function to a Dataframe elementwise
- `to_excel()`** - Write object to an Excel sheet.

2. Numpy –

- `where()`** - Return elements chosen from *x* or *y* depending on *condition*.

3. Python –

- `copy()`** - This module provides generic shallow and deep copy operations
- `zip()`** - Make an iterator that aggregates elements from each of the iterables.
- `type()`** - With one argument, return the type of an *object*.
- `range()`** - Rather than being a function, range is actually an immutable sequence type

4. User-defined Functions –

- `color_negative_red()`** – adds red colour to the font.

5. openpyxl

- a. **Workbook** - A workbook is always created with at least one worksheet.
- b. **Load_Workbook** – Loading a workbook into an object for i/o operations
- c. **Styles()** - Styles are used to change the look of your data while displayed on screen.
 - i. **Fill** - fill to set a pattern or color gradient
 - ii. **Font** - font to set font size, color, underlining, etc.
 - iii. **Color** – to import colour codes
 - iv. **Colors** – to import colour codes
- d. **Save()** - The simplest and safest way to save a workbook
- e. **Active()** – To activate a workbook
- f. **Max_row** – count maximum rows in a worksheet
- g. **Max_column** – count maximum columns in a worksheet
- h. **Cell(row,column)** – returns cell in the actual excel sheet