Ternary Overlay in Python

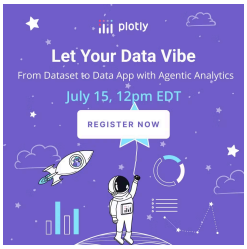
How to make a scatter plot overlaid on ternary contour in Python with Plotly.

Load and Process Data Files

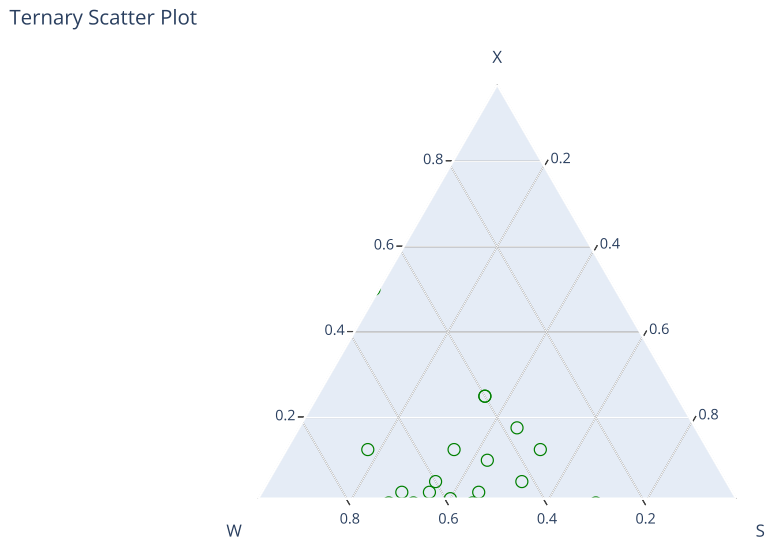
```
import json
import pandas as pd

contour_raw_data = pd.read_json('https://raw.githubusercontent.com/plotly/datasets/master/contour_data.json')
scatter_raw_data = pd.read_json('https://raw.githubusercontent.com/plotly/datasets/master/scatter_data.json')

scatter_data =  scatter_raw_data['Data']

def clean_data(data_in):
    """
    Cleans data in a format which can be conveniently
    used for drawing traces. Takes a dictionary as the
    input, and returns a list in the following format:

    input = {'key': ['a b c']}
    output = [key, [a, b, c]]
    """
    key = list(data_in.keys())[0]
    data_out = [key]
    for i in data_in[key]:
        data_out.append(list(map(float, i.split(' '))))

    return data_out


#Example:
print(clean_data({'L1': ['.03 0.5 0.47','0.4 0.5 0.1']}))
```

```
['L1', [0.03, 0.5, 0.47], [0.4, 0.5, 0.1]]
```

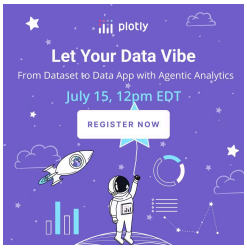
Create Ternary Scatter Plot:



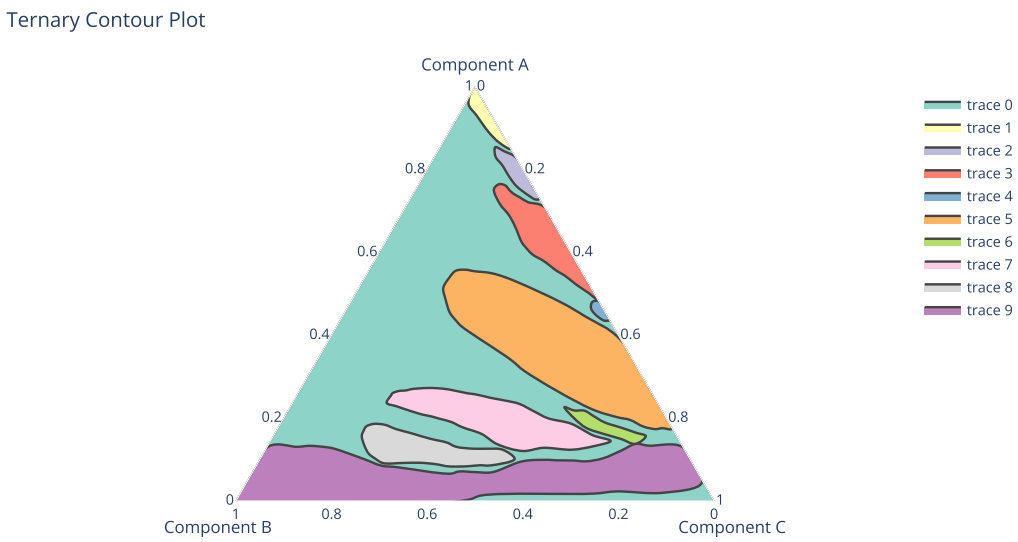
```
import plotly.graph_objects as go

a_list = []
b_list = []
c_list = []
text = []

for raw_data in scatter_data:
    data = clean_data(raw_data)
    text.append(data[0])
    c_list.append(data[1][0])
    a_list.append(data[1][1])
    b_list.append(data[1][2])

fig = go.Figure(go.Scatterternary(
  text=text,
  a=a_list,
  b=b_list,
  c=c_list,
  mode='markers',
  marker={'symbol': 100,
          'color': 'green',
          'size': 10},
))

fig.update_layout({
    'title': 'Ternary Scatter Plot',
    'ternary':
        {
        'sum':1,
        'aaxis':{'title': 'X', 'min': 0.01, 'linewidth':2, 'ticks':'outside' },
        'baxis':{'title': 'W', 'min': 0.01, 'linewidth':2, 'ticks':'outside' },
        'caxis':{'title': 'S', 'min': 0.01, 'linewidth':2, 'ticks':'outside' }
    },
    'showlegend': False
})

fig.show()
```



Create Ternary Contour Plot:



```
import plotly.graph_objects as go


contour_dict = contour_raw_data['Data']

# Defining a colormap:
colors = ['#8dd3c7','#ffffb3','#bebada',
          '#fb8072','#80b1d3','#fdb462',
          '#b3de69','#fccde5','#d9d9d9',
          '#bc80bd']
colors_iterator = iter(colors)

fig = go.Figure()

for raw_data in contour_dict:
    data = clean_data(raw_data)

    a = [inner_data[0] for inner_data in data[1:]]
    a.append(data[1][0]) # Closing the loop

    b = [inner_data[1] for inner_data in data[1:]]
    b.append(data[1][1]) # Closing the loop

    c = [inner_data[2] for inner_data in data[1:]]
    c.append(data[1][2]) # Closing the loop

    fig.add_trace(go.Scatterternary(
        text = data[0],
        a=a, b=b, c=c, mode='lines',
        line=dict(color='#444', shape='spline'),
        fill='toself',
        fillcolor = colors_iterator.__next__()
    ))

fig.update_layout(title = 'Ternary Contour Plot')
fig.show()
```



What About Dash?

Dash (https://dash.plot.ly/) is an open-source framework for building analytical applications, with no Javascript required, and it is tightly integrated with the Plotly graphing library.

Learn about how to install Dash at https://dash.plot.ly/installation (https://dash.plot.ly/installation).

Everywhere in this page that you see fig.show(), you can display the same figure in a Dash application by passing it to the figure argument of the Graph component (https://dash.plot.ly/dash-core-components/graph) from the built-in dash_core_components package like this:

```
import plotly.graph_objects as go # or plotly.express as px
fig = go.Figure() # or any Plotly Express function e.g. px.bar(...)
# fig.add_trace( ... )
# fig.update_layout( ... )

from dash import Dash, dcc, html

app = Dash()
app.layout = html.Div([
    dcc.Graph(figure=fig)
])

app.run(debug=True, use_reloader=False)  # Turn off reloader if inside Jupyter
```