Tree-plots in Python

How to make interactive tree-plot in Python with Plotly. An examples of a tree-plot in Plotly.

Set Up Tree with igraph (http://igraph.org/python/)

Install igraph with `pip install igraph`.

```
!pip install igraph
```

```
Collecting igraph
  Downloading igraph-0.11.9-cp39-abi3-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (4.4 kB)
Collecting texttable>=1.6.2 (from igraph)
  Downloading texttable-1.7.0-py2.py3-none-any.whl.metadata (9.8 kB)
Downloading igraph-0.11.9-cp39-abi3-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (4.4 MB)
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Downloading texttable-1.7.0-py2.py3-none-any.whl (10 kB)
Installing collected packages: texttable, igraph
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 2/2 [igraph]
Successfully installed igraph-0.11.9 texttable-1.7.0
```
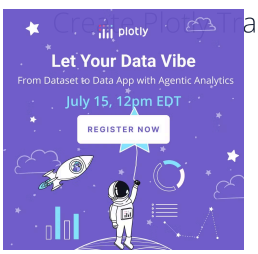
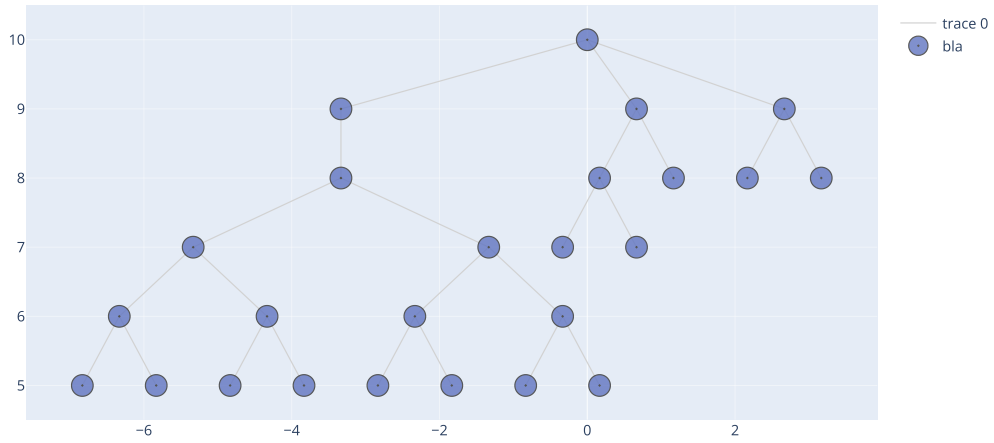

```
import igraph
from igraph import Graph, EdgeSeq
nr_vertices = 25
v_label = list(map(str, range(nr_vertices)))
G = Graph.Tree(nr_vertices, 2) # 2 stands for children number
lay = G.layout('rt')

position = {k: lay[k] for k in range(nr_vertices)}
Y = [lay[k][1] for k in range(nr_vertices)]
M = max(Y)

es = EdgeSeq(G) # sequence of edges
E = [e.tuple for e in G.es] # list of edges

L = len(position)
Xn = [position[k][0] for k in range(L)]
Yn = [2*M-position[k][1] for k in range(L)]
Xe = []
Ye = []
for edge in E:
    Xe+=[position[edge[0]][0],position[edge[1]][0], None]
    Ye+=[2*M-position[edge[0]][1],2*M-position[edge[1]][1], None]

labels = v_label
```

Create Plots Faces



```
import plotly.graph_objects as go
fig = go.Figure()
fig.add_trace(go.Scatter(x=Xe,
                   y=Ye,
                   mode='lines',
                   line=dict(color='rgb(210,210,210)', width=1),
                   hoverinfo='none'
                   ))
fig.add_trace(go.Scatter(x=Xn,
                  y=Yn,
                  mode='markers',
                  name='bla',
                  marker=dict(symbol='circle-dot',
                              size=18,
                              color='#6175c1',    #'#DB4551',
                              line=dict(color='rgb(50,50,50)', width=1)
                              ),
                  text=labels,
                  hoverinfo='text',
                  opacity=0.8
                  ))
```



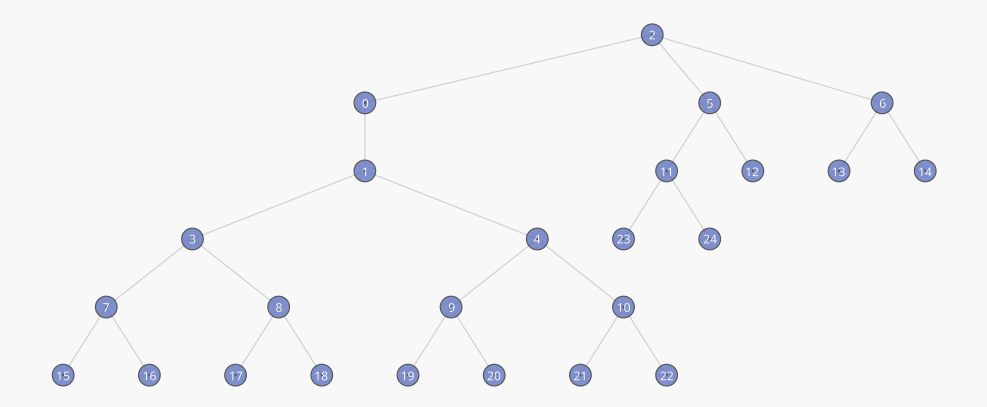
Create Text Inside the Circle via Annotations

```
def make_annotations(pos, text, font_size=10, font_color='rgb(250,250,250)'):
    L=len(pos)
    if len(text)!=L:
        raise ValueError('The lists pos and text must have the same len')
    annotations = []
    for k in range(L):
        annotations.append(
            dict(
                text=labels[k], # or replace labels with a different list for the text within the circle
                x=pos[k][0], y=2*M-position[k][1],
                xref='x1', yref='y1',
                font=dict(color=font_color, size=font_size),
                showarrow=False)
        )
    return annotations
```


Add Annotation Specifications and Create the Layout

```
axis = dict(showline=False, # hide axis line, grid, ticklabels and  title
            zeroline=False,
            showgrid=False,
            showticklabels=False,
            )

fig.update_layout(title= 'Tree with Reingold-Tilford Layout',
              annotations=make_annotations(position, v_label),
              font_size=12,
              showlegend=False,
              xaxis=axis,
              yaxis=axis,
              margin=dict(l=40, r=40, b=85, t=100),
              hovermode='closest',
              plot_bgcolor='rgb(248,248,248)'
              )
fig.show()
```

Tree with Reingold-Tilford Layout



Reference

See https://plotly.com/python/reference/ (https://plotly.com/python/reference/) for more information and chart attribute options and http://igraph.org/python/ (http://igraph.org/python/) for more information about the igraph package!

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:

notations
the

```
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
```