

js_pythreejs

September 26, 2022

1 pythreejs

[pythreejs](#) allows 3D interactive graphs in a notebook.
[documentation](#) [source](#) [installation](#) [tutorial](#) [gallery](#)

```
[1]: from jupyterlab_widgets import add_notebook_menu
      add_notebook_menu()
```

```
[1]: <IPython.core.display.HTML object>
```

1.1 Installation

pythreejs requires local installation.

```
pip install pythreejs
jupyter nbextension enable --py pythreejs
```

1.2 example

```
[2]: from pythreejs import *
      import numpy as np
      from IPython.display import display
      from ipywidgets import HTML, Text
      from traitlets import link, dlink
```

```
[3]: ball = Mesh(geometry=SphereGeometry(radius=1),
      ↪material=MeshLambertMaterial(color='red'), position=[2,1,0])
      scene = Scene(children=[ball, AmbientLight(color='#777777'), make_text('Hello World!',
      ↪height=.6)])
      c = PerspectiveCamera(position=[0, 5, 5],
      ↪up=[0, 0, 1],
      ↪children=[DirectionalLight(color='white', position=[3, 5, 1],
      ↪intensity=0.5)])
      renderer = Renderer(camera=c, scene=scene, controls=[OrbitControls(controlling=c)])
      display(renderer)
```

```

Renderer(camera=PerspectiveCamera(children=(DirectionalLight(color='white', intensity=0.
↳5, position=(3.0, 5.0, 1.0), quaternion=(0.0, 0.0, 0.0, 1.0), scale=(1.0, 1.0, 1.0),
↳up=(0.0, 1.0, 0.0))), position=(0.0, 5.0, 5.0), quaternion=(0.0, 0.0, 0.0, 1.0),
↳scale=(1.0, 1.0, 1.0), up=(0.0, 0.0, 1.0)),
↳controls=[OrbitControls(controlling=PerspectiveCamera(children=(DirectionalLight(color='white',
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↳1.0, 1.0), up=(0.0, 1.0, 0.0))), position=(0.0, 5.0, 5.0), quaternion=(0.0, 0.0, 0.0,
↳1.0), scale=(1.0, 1.0, 1.0), up=(0.0, 0.0, 1.0)))]),
↳scene=Scene(children=(Mesh(geometry=SphereGeometry()),
↳material=MeshLambertMaterial(alphaMap=None, aoMap=None, color='red', emissiveMap=None,
↳envMap=None, lightMap=None, map=None, specularMap=None), position=(2.0, 1.0, 0.0),
↳quaternion=(0.0, 0.0, 0.0, 1.0), scale=(1.0, 1.0, 1.0), up=(0.0, 1.0, 0.0)),
↳AmbientLight(color='#777777', quaternion=(0.0, 0.0, 0.0, 1.0), scale=(1.0, 1.0, 1.0),
↳up=(0.0, 1.0, 0.0)), Sprite(center=(0.5, 0.5),
↳material=SpriteMaterial(map=Texture(repeat=(1.0, 1.0), size=100,
↳squareTexture=False, string='Hello World!')), quaternion=(0.0, 0.0, 0.0, 1.0),
↳scale=(1.0, 0.6, 1.0), up=(0.0, 1.0, 0.0))), fog=None, overrideMaterial=None,
↳quaternion=(0.0, 0.0, 0.0, 1.0), scale=(1.0, 1.0, 1.0), up=(0.0, 1.0, 0.0)),
↳shadowMap=WebGLShadowMap())

```

```

[4]: nx, ny = (20, 20)
xmax=1
x = np.linspace(-xmax, xmax, nx)
y = np.linspace(-xmax, xmax, ny)
xx, yy = np.meshgrid(x, y)
z = xx ** 2 - yy ** 2
#z[6,1] = float('nan')
surf_g = SurfaceGeometry(z=list(z[:, :-1].flat),
width=2 * xmax,
height=2 * xmax,
width_segments=nx - 1,
height_segments=ny - 1)

surf = Mesh(geometry=surf_g, material=MeshLambertMaterial(map=height_texture(z[:, :-1],
↳'YlGnBu_r'))))

surfgrid = SurfaceGrid(geometry=surf_g, material=LineBasicMaterial(color='black'))
hover_point = Mesh(geometry=SphereGeometry(radius=0.05),
↳material=MeshLambertMaterial(color='hotpink'))
scene = Scene(children=[surf, surfgrid, hover_point, AmbientLight(color='#777777')])
c = PerspectiveCamera(position=[0, 3, 3], up=[0, 0, 1],
children=[DirectionalLight(color='white', position=[3, 5, 1],
↳intensity=0.6)])

pickable_objects = Group()
pickable_objects.add(surf)

click_picker = Picker(controlling = pickable_objects, event='dblclick')
hover_picker = Picker(controlling = pickable_objects, event='mousemove')
renderer = Renderer(camera=c, scene = scene, controls=[OrbitControls(controlling=c),
↳click_picker, hover_picker])

```

```

def f(change):
    value = change['new']
    print('Clicked on %s' % value)
    point = Mesh(geometry=SphereGeometry(radius=0.05),
                  material=LambertMaterial(color='red'),
                  position=value)
    scene.children = list(scene.children) + [point]

click_picker.observe(f, names=['point'])

link((hover_point, 'position'), (hover_picker, 'point'))

h = HTML()
def g(change):
    h.value = 'Green point at (%.3f, %.3f, %.3f)' % tuple(change['new'])
g({'new': hover_point.position})
hover_picker.observe(g, names=['point'])
display(h)
display(renderer)

```

```
HTML(value='Green point at (0.000, 0.000, 0.000)')
```

```

Renderer(camera=PerspectiveCamera(children=(DirectionalLight(color='white', intensity=0.6, position=(3.0, 5.0, 1.0), quaternion=(0.0, 0.0, 0.0, 1.0), scale=(1.0, 1.0, 1.0), up=(0.0, 1.0, 0.0))), position=(0.0, 3.0, 3.0), quaternion=(0.0, 0.0, 0.0, 1.0), scale=(1.0, 1.0, 1.0), up=(0.0, 0.0, 1.0)), controls=[OrbitControls(controlling=PerspectiveCamera(children=(DirectionalLight(color='white', intensity=0.6, position=(3.0, 5.0, 1.0), quaternion=(0.0, 0.0, 0.0, 1.0), scale=(1.0, 1.0, 1.0), up=(0.0, 1.0, 0.0))), position=(0.0, 3.0, 3.0), quaternion=(0.0, 0.0, 0.0, 1.0), scale=(1.0, 1.0, 1.0), up=(0.0, 0.0, 1.0))), Picker(controlling=Group(children=(Mesh(geometry=SurfaceGeometry(attributes={'position': <BufferAttribute shape=(400, 3), dtype=float32>, 'index': <BufferAttribute shape=(2166,) dtype=uint16>, 'normal': <BufferAttribute shape=(400, 3), dtype=float32>, 'uv': <BufferAttribute shape=(400, 2), dtype=float32>})), material=MeshLambertMaterial(alphaMap=None, aoMap=None, emissiveMap=None, envMap=None, lightMap=None, map=DataTexture(data=array([[ 66, 182, 196, 255],
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[5] :