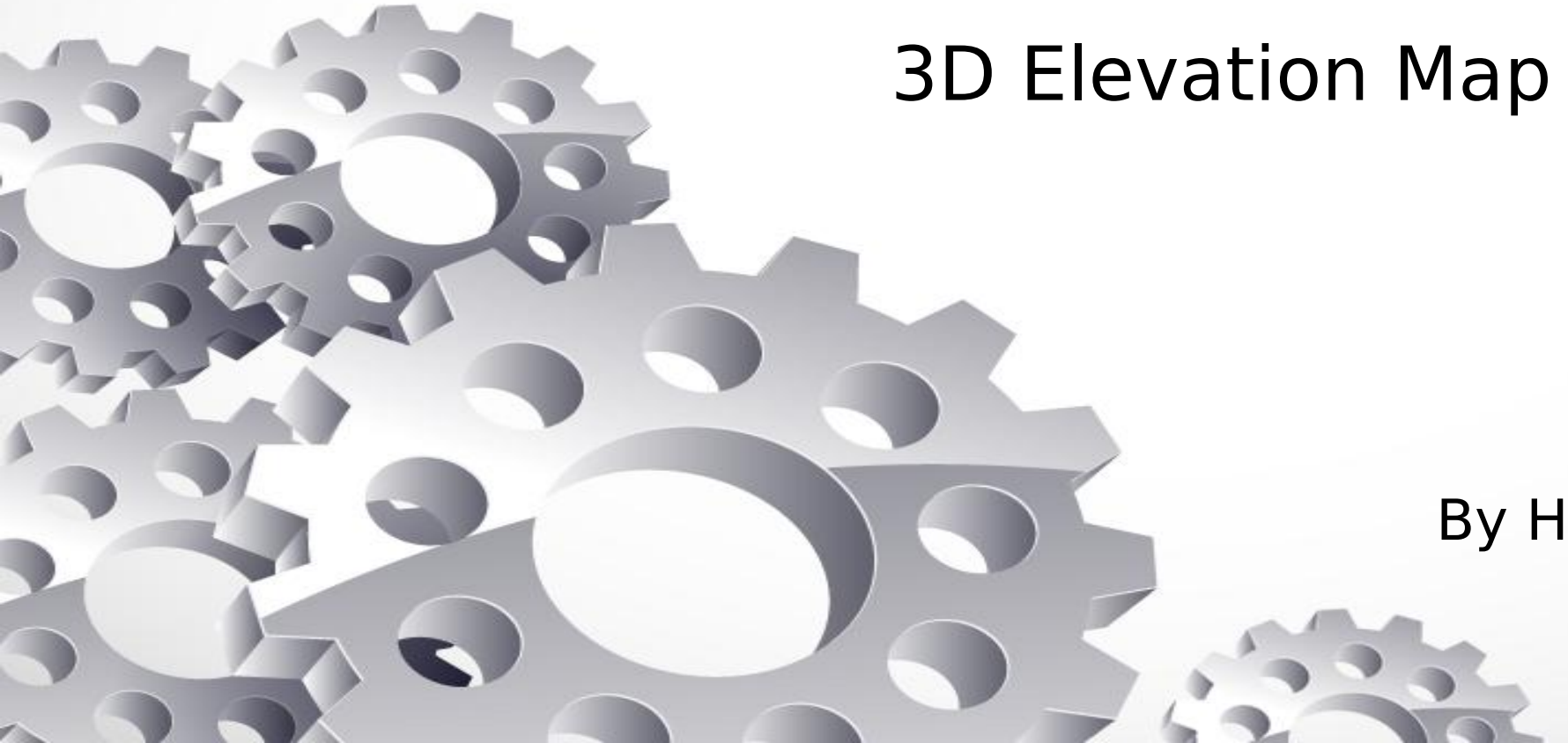
CS465-Challenging Project

3D Elevation Map



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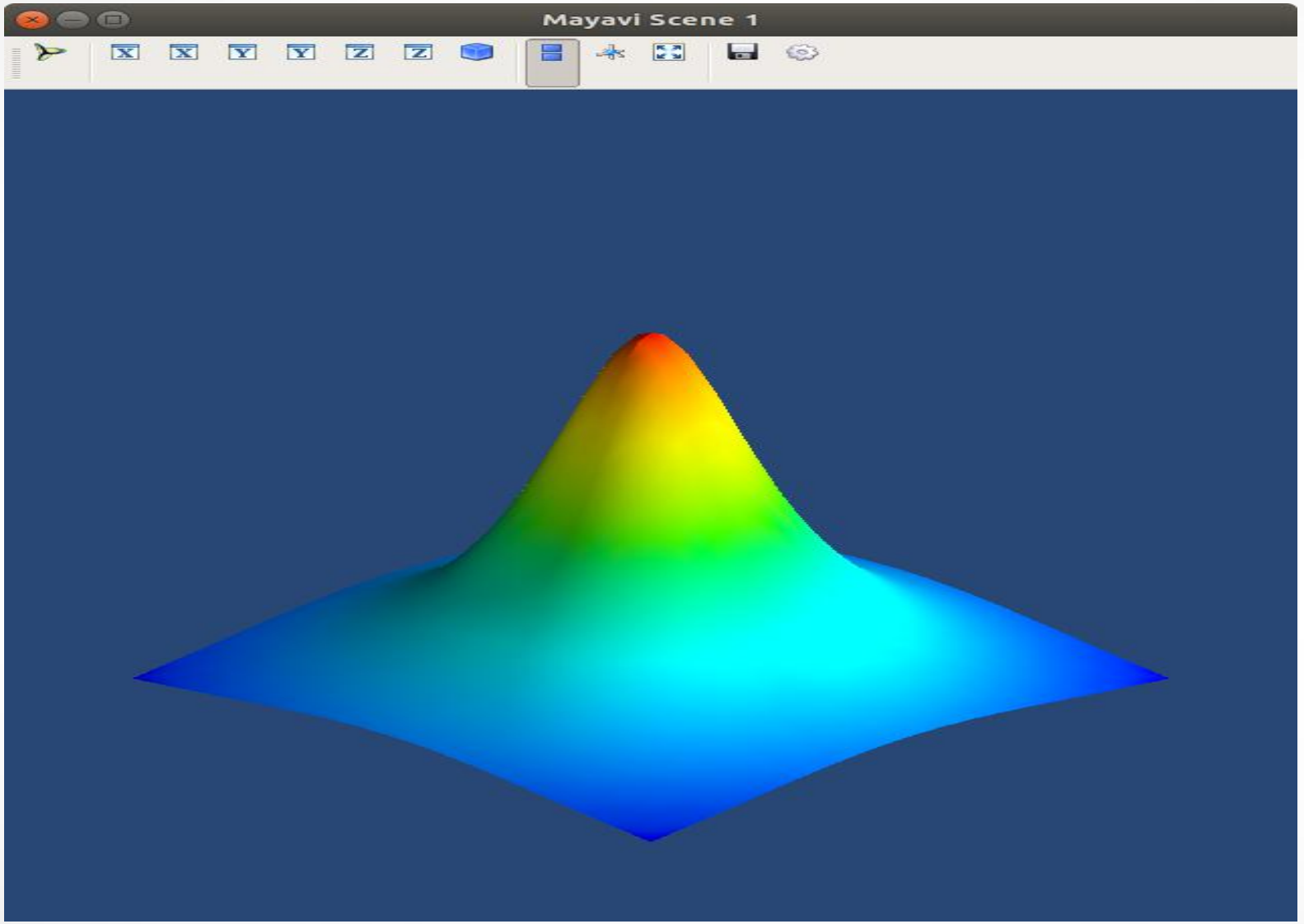
Introduction

The goal of the project was to simulate some sort of irregular surface and color it based on the elevation.

Tools

- Mayavi 4.5.0
- Python 2
- Numpy
- OsGeo
- Dem files (Downloaded from the internet)

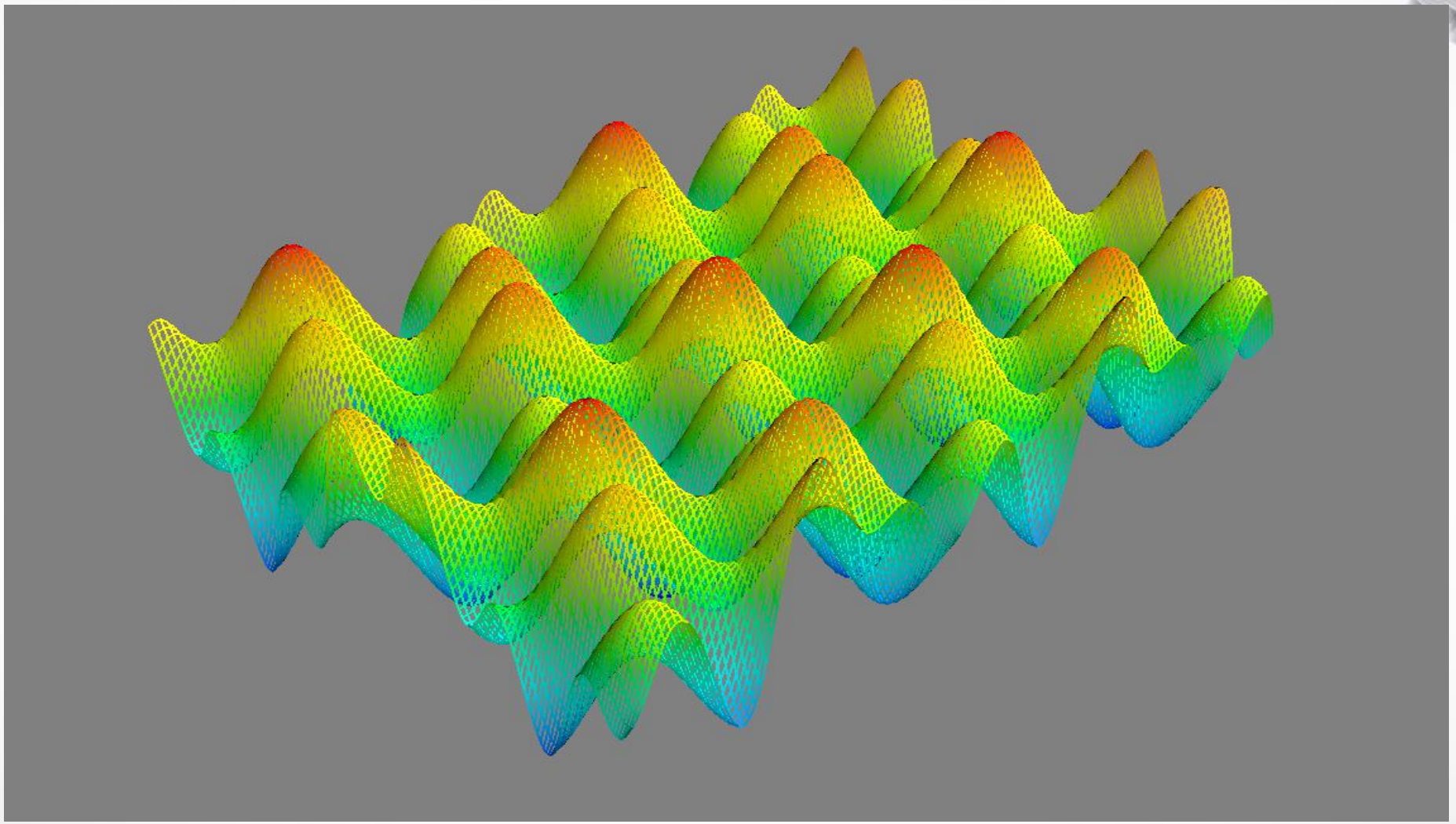
Application 1



Application1 (Code)

```
from mayavi import mlab
import numpy as np
h0 = 2277
R = 4
x = y = np.linspace(-10., 10., 41)
print x
xv, yv = np.meshgrid(x, y, indexing='ij', sparse=False)
hv = h0/(1 + (xv**2+yv**2)/(R**2))

mlab.figure(size=(640, 800), bgcolor=(0.16, 0.28, 0.46))

mlab.surf(xv, yv, hv, warp_scale=0.01)
mlab.show()
~
~
```

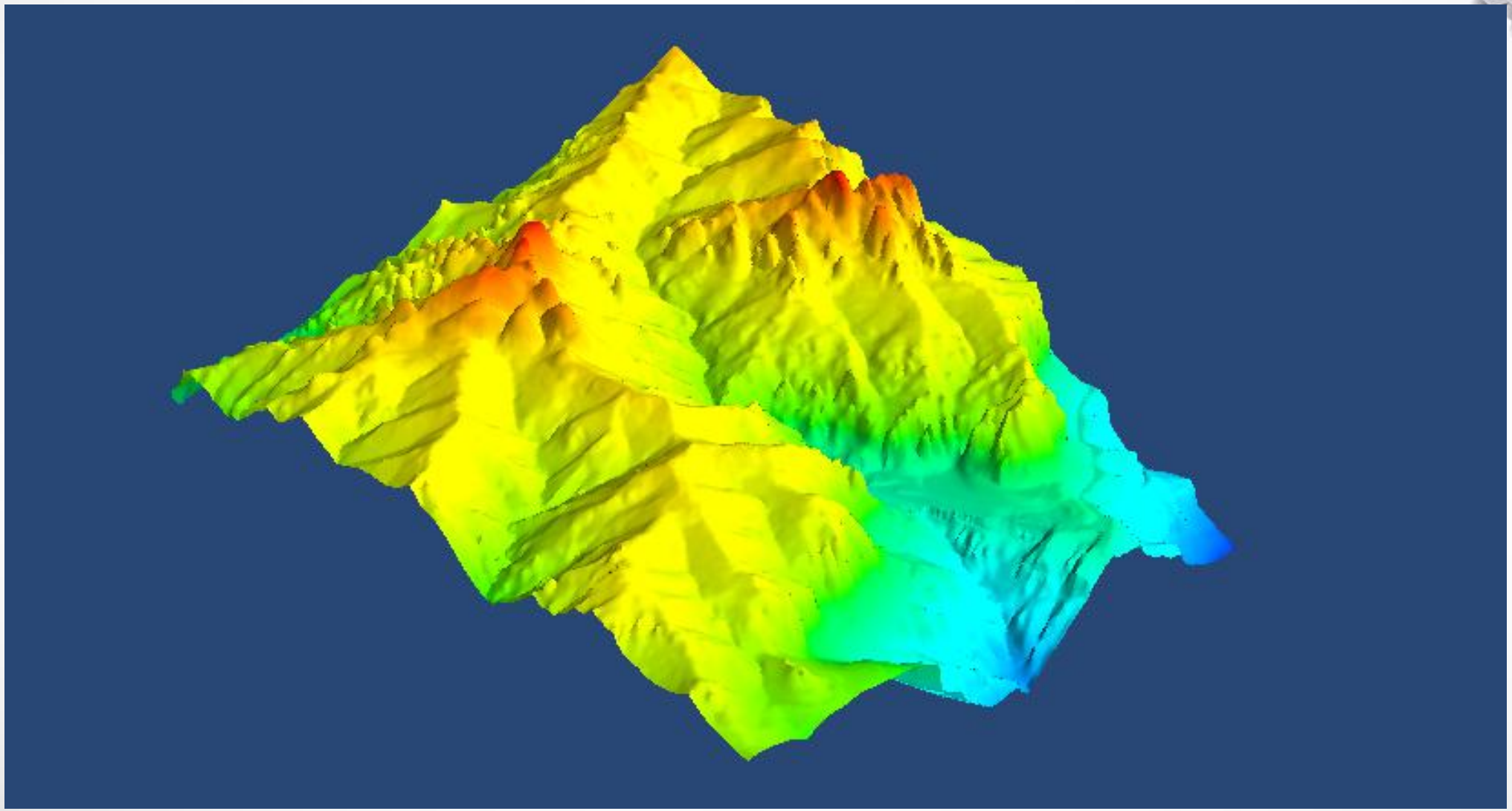
Application 2



Application2 (code)

```
import numpy as np
from mayavi import mlab
def surf():
    def f(x, y):
        sin, cos = np.sin, np.cos
        return sin(x + y) + sin(2 * x - y) + cos(3 * x + 4 * y)

    x, y = np.mgrid[-7.:7.05:0.1, -5.:5.05:0.05]
    s = mlab.surf(x, y, f, representation= 'wireframe')
    mlab.show()
surf()
```

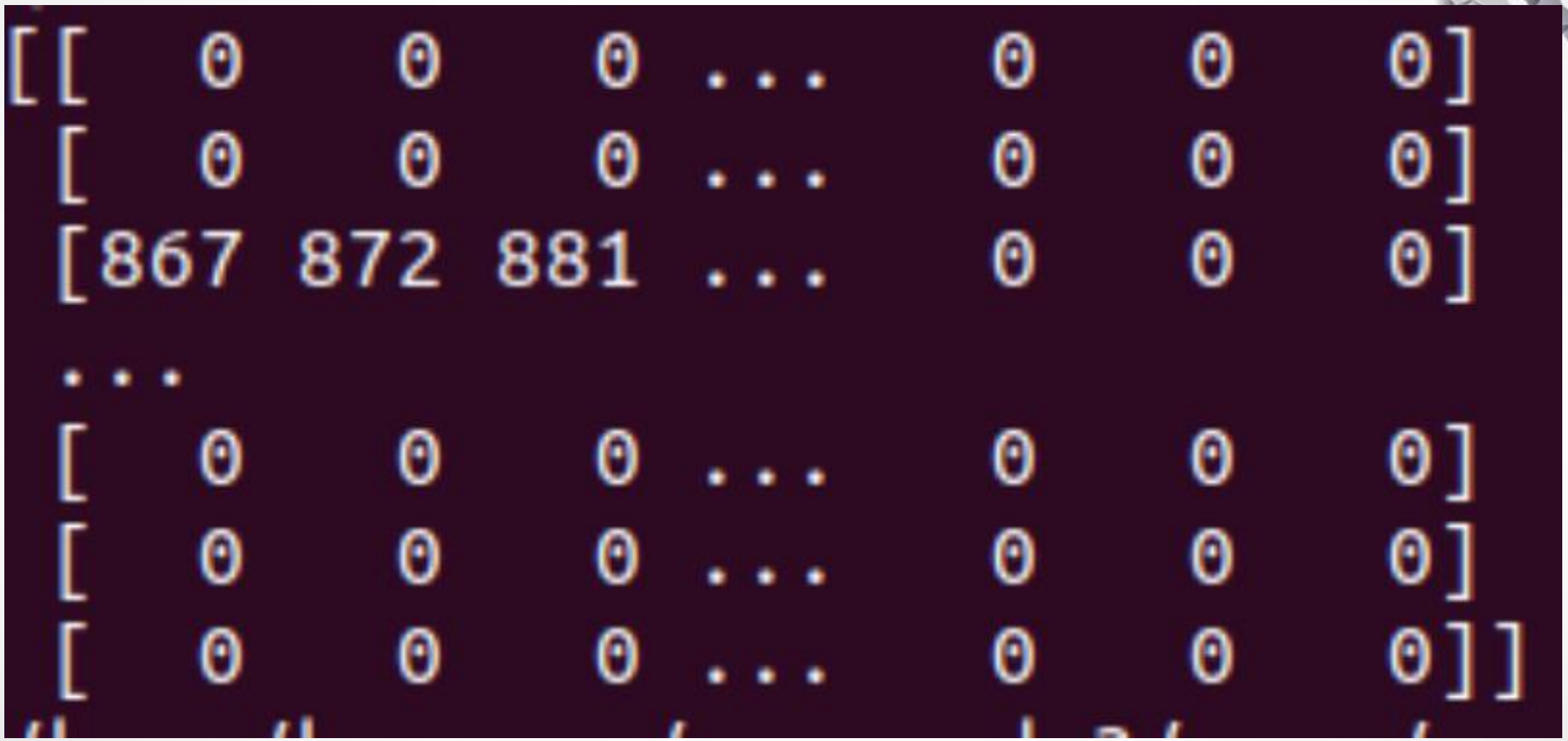
Application 3



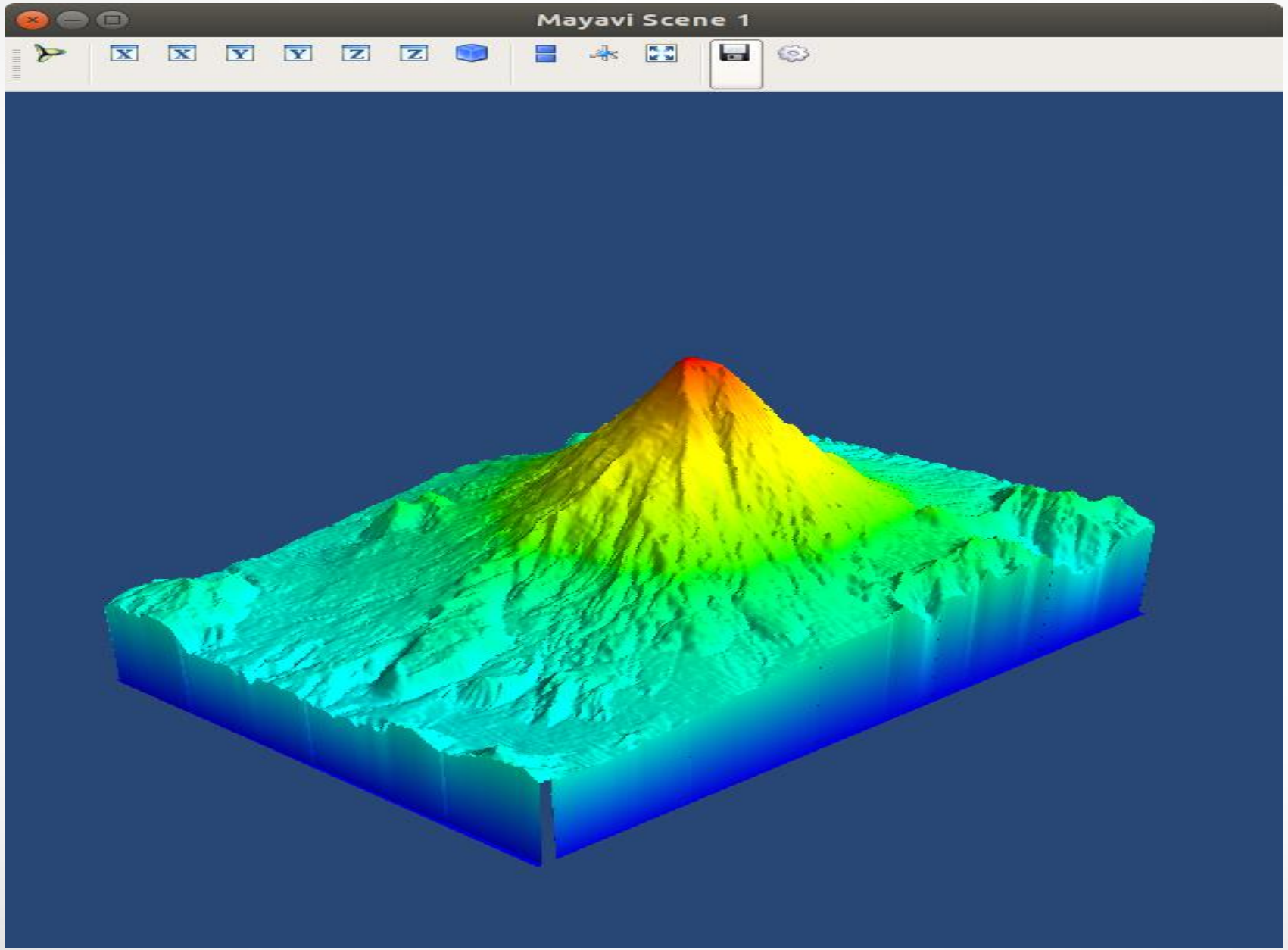
Application 3 (code)

```
from osgeo import gdal
from mayavi import mlab

ds = gdal.Open('dem.tiff')
data = ds.ReadAsArray()

mlab.figure(size=(640, 800), bgcolor=(0.16, 0.28, 0.46))

mlab.surf(data, warp_scale=0.2)
mlab.show()
~
```

Data table



Application 4 (Mt St. helens before the eruption)



Application 5 (Mt St. Helens after the eruption)