

CE712 MINI PROJECT REPORTS

Project Title: A case study to analyse the effect of the Australian Bush-fire on the its vegetation cover using landsat images

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1. Introduction

'A case study to analyse the effect of the Australian Bush-fire on the its vegetation cover using landsat images'

There is no doubt that Australia's last year was absolutely devastating. Fires across the country burnt through 186,000 square kilometres (72,000 square miles) of land, killing 34 people, while billions of animals were affected.

We aim to analyse the images before the bush-fire (sometime around 2018) and after it to compare the vegetation cover over an area and get an idea about the loss that happened around the area.

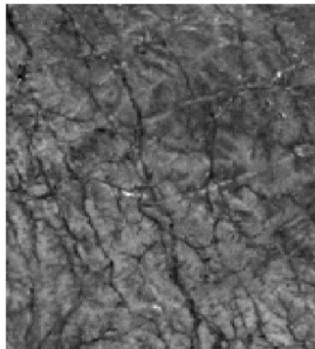
2. Data sets used

We take the landsat images from UGGS

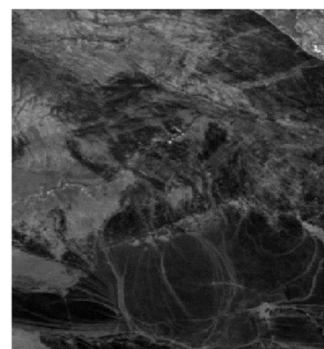
For 2018



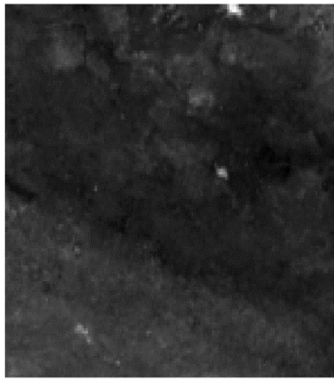
Band 3 Land



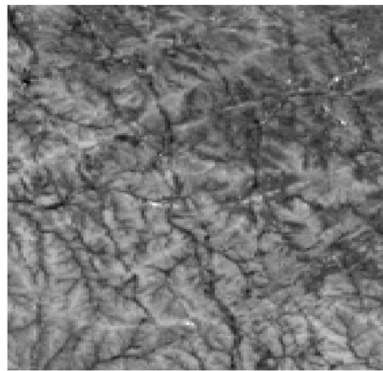
Band 3 Urban



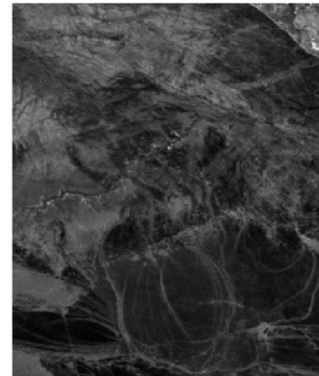
Band 3 Vegetation



Band 4 Land



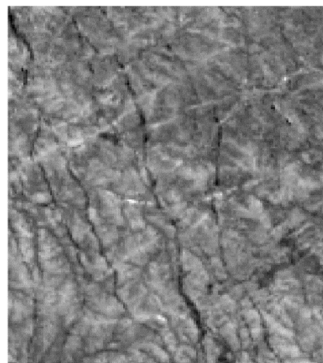
Band 4 Urban



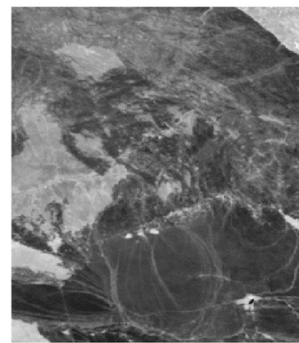
Band 4 Vegetation



Band 5 Land

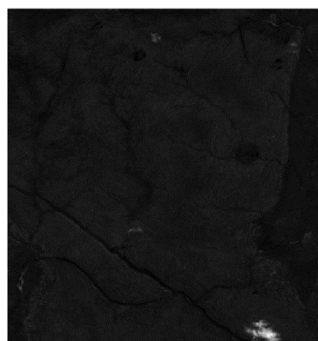


Band 5 Urban

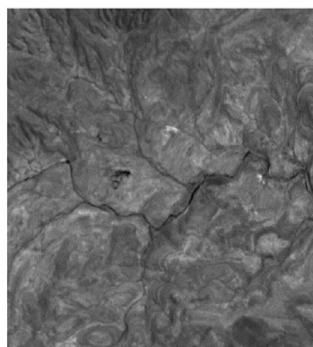


Band 5 Vegetation

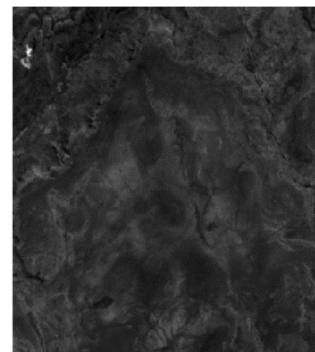
For 2019



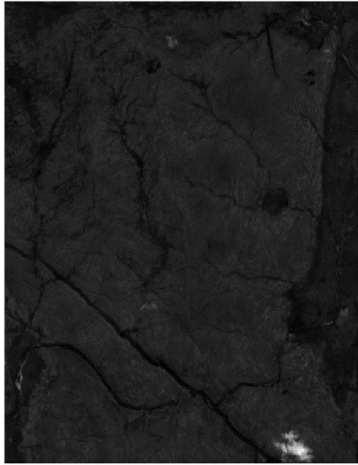
Band 3 Land



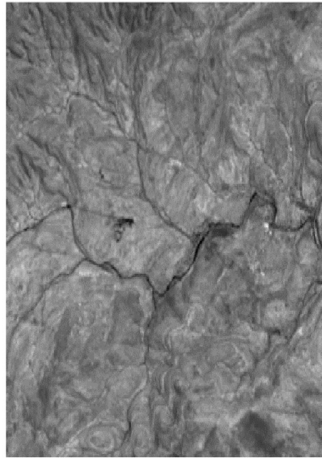
Band 3 Urban



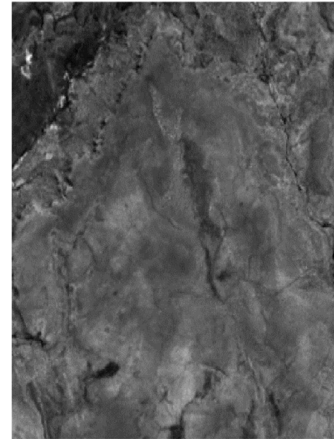
Band 3 Vegetation



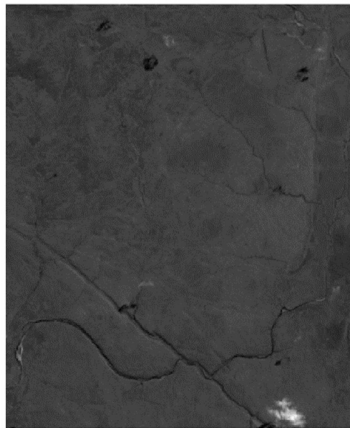
Band 4 Land



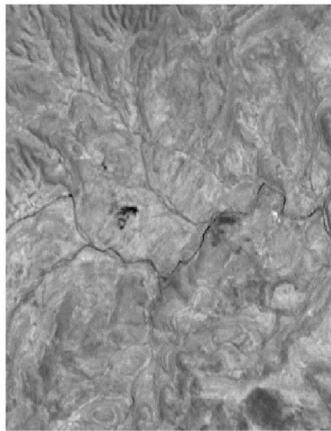
Band 4 Urban



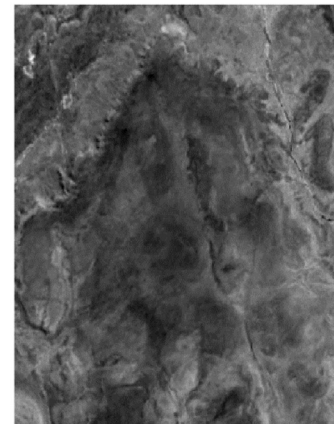
Band 4 Vegetation



Band 5 Land



Band 5 Urban



Band 5 Vegetation

3. Methodology Implemented in python

For 2018

```
In [1]: %matplotlib notebook
from mpl_toolkits.mplot3d import Axes3D
import matplotlib.pyplot as plt
import numpy as np
from PIL import Image
```

```
In [2]: veg3=Image.open('/home/srijan/Documents/CE712_Project/2018/3 VEG.tif')
land3=Image.open('/home/srijan/Documents/CE712_Project/2018/3 Land.tif')
urban3=Image.open('/home/srijan/Documents/CE712_Project/2018/3 Urban.tif')
veg4=Image.open('/home/srijan/Documents/CE712_Project/2018/4 VEG.tif')
land4=Image.open('/home/srijan/Documents/CE712_Project/2018/4 Land.tif')
urban4=Image.open('/home/srijan/Documents/CE712_Project/2018/4 Urban.tif')
veg5=Image.open('/home/srijan/Documents/CE712_Project/2018/5 VEG.tif')
land5=Image.open('/home/srijan/Documents/CE712_Project/2018/5 Land.tif')
urban5=Image.open('/home/srijan/Documents/CE712_Project/2018/5 Urban.tif')
```

```
In [3]: veg3=np.asarray(veg3)
land3=np.asarray(land3)
urban3=np.asarray(urban3)
veg4=np.asarray(veg4)
land4=np.asarray(land4)
urban4=np.asarray(urban4)
veg5=np.asarray(veg5)
land5=np.asarray(land5)
urban5=np.asarray(urban5)
```

```
In [4]: fig=plt.figure()
ax= fig.add_subplot(111, projection='3d')
scat1 =ax.scatter(veg3,veg4,veg5,c='green',alpha=0.9)
scat2 =ax.scatter (land3,land4,land5, c='brown', alpha=0.9)
scat3 =ax.scatter(urban3,urban4,urban5, c='pink', alpha=0.5)
ax. set_xlabel('Band3')
ax. set_ylabel('Band4')
ax.set_zlabel('Band5')
ax. legend([scat1, scat2,scat3],['Veg','land','Urban'])
```

<IPython.core.display.Javascript object>

For 2019

```
In [5]: veg3=Image.open('/home/srijan/Documents/CE712_Project/2019/3 VEG.tif')
land3=Image.open('/home/srijan/Documents/CE712_Project/2019/3 Land.tif')
urban3=Image.open('/home/srijan/Documents/CE712_Project/2019/3 Urban.tif')
veg4=Image.open('/home/srijan/Documents/CE712_Project/2019/4 VEG.tif')
land4=Image.open('/home/srijan/Documents/CE712_Project/2019/4 Land.tif')
urban4=Image.open('/home/srijan/Documents/CE712_Project/2019/4 Urban.tif')
veg5=Image.open('/home/srijan/Documents/CE712_Project/2019/5 VEG.tif')
land5=Image.open('/home/srijan/Documents/CE712_Project/2019/5 Land.tif')
urban5=Image.open('/home/srijan/Documents/CE712_Project/2019/5 Urban.tif')
```

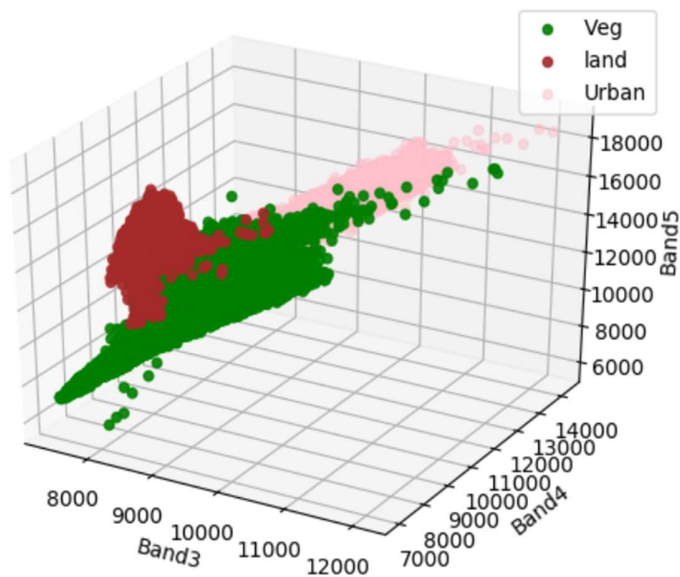
```
In [6]: veg3=np.asarray(veg3)
land3=np.asarray(land3)
urban3=np.asarray(urban3)
veg4=np.asarray(veg4)
land4=np.asarray(land4)
urban4=np.asarray(urban4)
veg5=np.asarray(veg5)
land5=np.asarray(land5)
urban5=np.asarray(urban5)
```

```
In [7]: fig=plt.figure()
ax= fig.add_subplot(111, projection='3d')
scat1 =ax.scatter(veg3,veg4,veg5,c='green',alpha=0.9)
scat2 =ax.scatter (land3,land4,land5, c='brown', alpha=0.9)
scat3 =ax.scatter(urban3,urban4,urban5, c='pink', alpha=0.5)
ax. set_xlabel('Band3')
ax. set_ylabel('Band4')
ax.set_zlabel('Band5')
ax. legend([scat1, scat2,scat3],['Veg','land','Urban'])
```

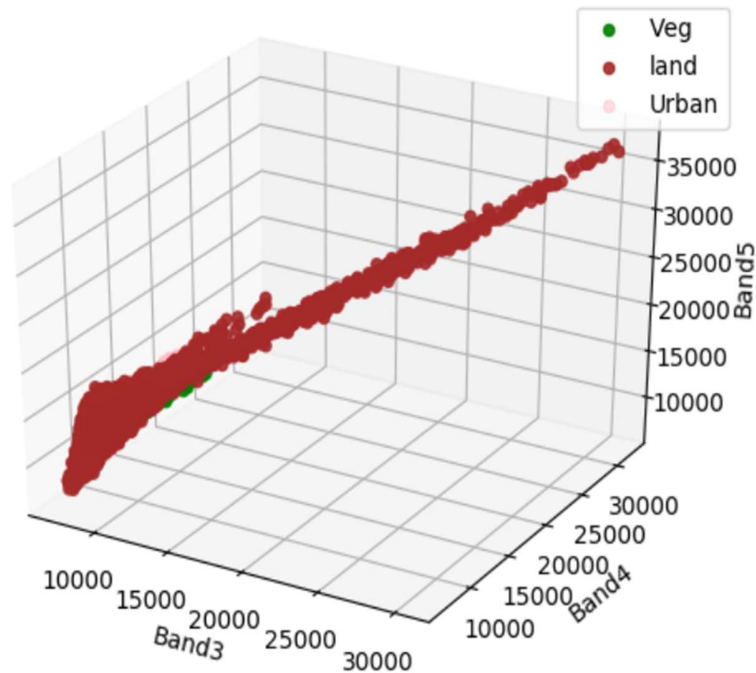
<IPython.core.display.Javascript object>

4. Results

For 2018



For 2019



5. Summary

Using the code shown above, we have obtained the scatter plot for two years at the same coordinates. As we can see in the scatter plot for 2018, there is an even distribution of vegetation cover over the area along with the land cover and the urban cover (shown with different colours on the graph), but in 2019, we observe that the scatter plot shows a substantial decrease in the vegetation cover and we can only see the land cover which is precisely the aim of this study i.e. we wanted to show how the Australian bushfire affected the vegetation cover in the Australian forests and we have taken a particular area and using the landsat 8 images we inferred that there is a sizeable decrease in vegetation for the area that we chose as our sample.