

# Exploring the Array Data Model of an Image

By the end of this activity, you will be able to:

- 1. Display an image
- 2. View the dimensions and pixel values in a image.

**Step 1. Open a terminal shell and activate your virtual environment.** Open your local terminal shell and go to your *big-data-2/* directory. Activate your virtual environment using the command that corresponds to your operating system (adjust the command if you named your virtual environment differently).

Windows:

```
1 .\big-data-2-env\Scripts\Activate
```

macOS:

```
1 source big-data-2-env/bin/activate
```

**Step 2. Go to image directory.** With you virtual environment activated go to your *image* directory.

PS C:\Users\ <redacted> \Desktop\coursera\big-data-2\image>

Run *ls* to see the image and scripts:

```
1 ls
```

Directory: C:\Users\ <redacted> \Desktop\coursera\big-data-2\image

Mode	LastWriteTime		Length	Name
----	-----	-----	-----	----
-a----	4/15/2016	2:07 PM	1846643	Australia.jpg
-a----	12/11/2023	11:57 AM	1061	dimensions.py
-a----	12/11/2023	12:01 PM	145	pixel.py

**Step 3. Display the image.** Display the image by opening it with your local system image viewer.



**Step 4. View the dimensions.** We can view the dimensions of the image by running:

```
1 python3 ./dimensions.py Australia.jpg
```

size = 5250 columns x 4320 rows  
mode = RGB 3x8-bit pixels, true colour

This says that the image has 5250 columns and 4320 rows, and each cell is comprised of three 8-bit pixels for Red, Green, and Blue.

**Step 5. View pixel values.** We can view pixel values at different locations in the image by running the pixel.py script. To view the pixel value at location 0, 0, run:

```
1 python3 ./pixel.py Australia.jpg 0 0
```

(11, 10, 50)

This says the values for Red = 11, Green = 10, and Blue = 50. The corners of the image are ocean, so we expect a high value for Blue, and low values for Red and Green.

To view the pixel value at another corner of the image, run:

```
1 python3 ./pixel.py Australia.jpg 5000 0
```

(11, 10, 50)

This is the same result since location 5000 0 is also ocean.

Now let's look at a pixel value of land near the middle of the image:

```
1 python3 ./pixel.py Australia.jpg 2000 2000
```

(118, 89, 57)

This says the values for Red = 118, Green = 89, and Blue = 57. The land is orange and yellow, so we expect higher values for Red and Green than Blue.

**Step 6. Deactivate your virtual environment.** Run *deactivate* to deactivate the virtual environment.

```
1 deactivate
```