Image Analysis Using Numpy ¶

In [30]:
```
import warnings
warnings.filterwarnings('ignore')
```

In [2]:
```
import numpy as np
import matplotlib.pyplot as plt
```

In [3]:
```
from PIL import Image  #(PIL Python Image Library)
```

In [4]:
```
img = Image.open(r"C:\Users\JANHAVI\Desktop\AI IMG.jpg")
```

In [5]:
```
img
```

Out[5]:

In [6]:
```
type(img)
```

Out[6]:
```
PIL.JpegImagePlugin.JpegImageFile
```

In [7]:
```
img_arr=np.asarray(img)
img_arr
```

Out[7]:
```
array([[[ 2, 46, 83],
        [ 2, 46, 83],
        [ 2, 46, 83],
        ...,
        [ 6, 34, 56],
        [ 6, 34, 56],
        [ 7, 35, 57]],

       [[ 2, 46, 83],
        [ 2, 46, 83],
        [ 2, 46, 83],
        ...,
        [ 5, 33, 55],
        [ 6, 34, 56],
        [ 7, 35, 57]],

       [[ 2, 46, 83],
        [ 2, 46, 83],
        [ 2, 46, 83],
        ...,
        [ 5, 33, 55],
        [ 5, 33, 55],
        [ 6, 34, 56]],

       ...,

       [[ 2, 50, 86],
        [ 2, 50, 86],
        [ 2, 50, 86],
        ...,
        [34, 28, 30],
        [34, 28, 30],
        [34, 28, 30]],

       [[ 2, 50, 86],
        [ 2, 50, 86],
        [ 2, 50, 86],
        ...,
        [34, 28, 30],
        [34, 28, 30],
        [34, 28, 30]],

       [[ 3, 51, 89],
        [ 3, 51, 89],
        [ 3, 51, 89],
        ...,
        [34, 28, 30],
        [34, 28, 30],
        [34, 28, 30]]], dtype=uint8)
```

In [8]:
```
type(img_arr)
```

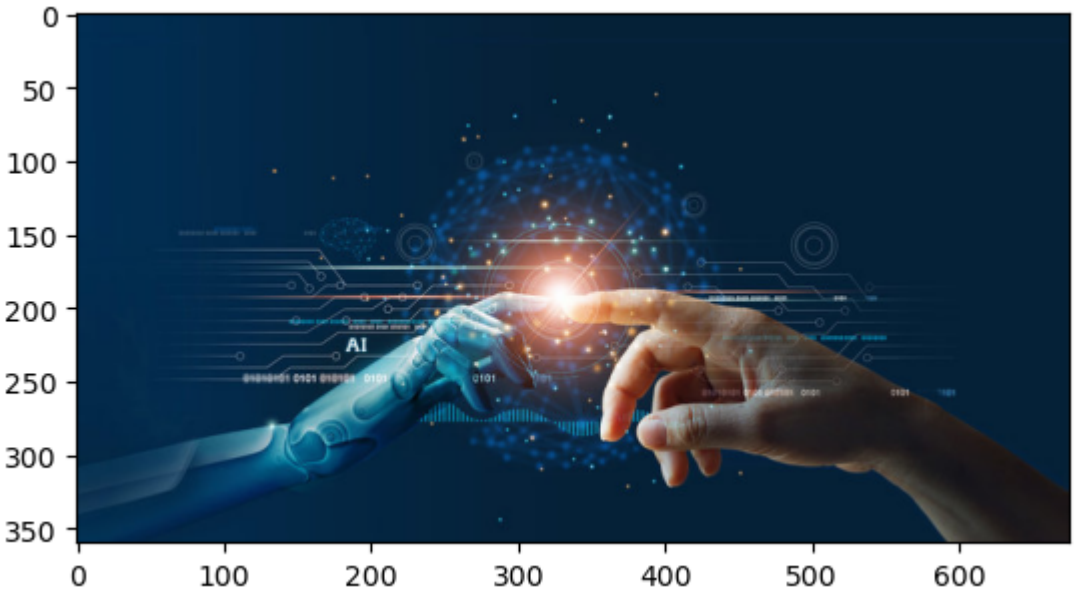
Out[8]:
```
numpy.ndarray
```

In [9]:
```
img_arr.shape
```

Out[9]:
```
(360, 676, 3)
```

In [10]:
```
plt.imshow(img_arr)
```

Out[10]:
```
<matplotlib.image.AxesImage at 0x25f274e7f50>
```



In [11]:
```
Ai=img_arr.copy()
Ai
```

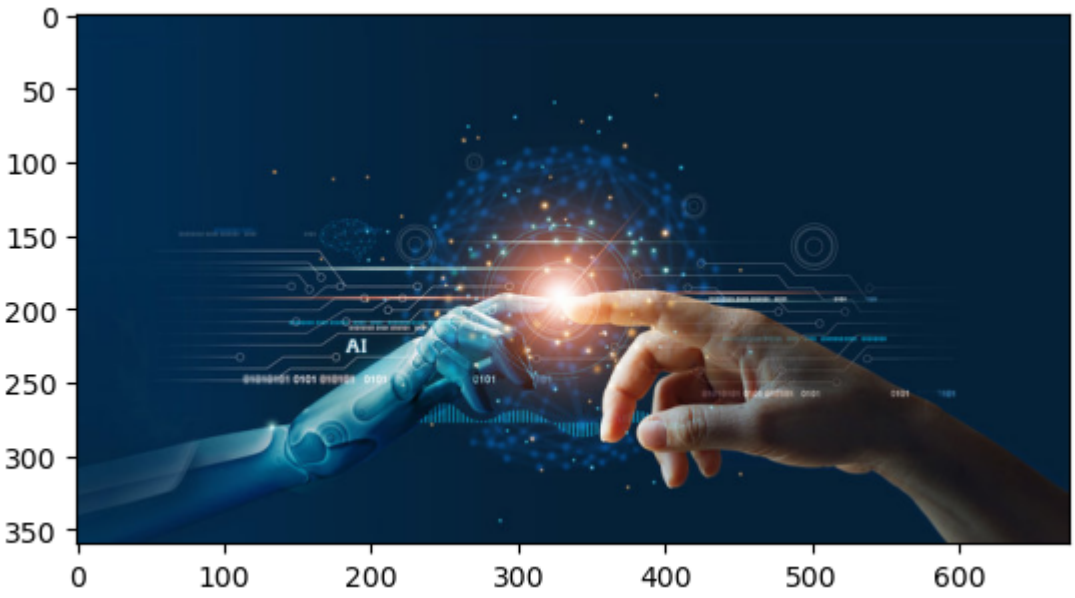
Out[11]:
```
array([[[ 2, 46, 83],
        [ 2, 46, 83],
        [ 2, 46, 83],
        ...,
        [ 6, 34, 56],
        [ 6, 34, 56],
        [ 7, 35, 57]],

       [[ 2, 46, 83],
        [ 2, 46, 83],
        [ 2, 46, 83],
        ...,
        [ 5, 33, 55],
        [ 6, 34, 56],
        [ 7, 35, 57]],

       [[ 2, 46, 83],
        [ 2, 46, 83],
        [ 2, 46, 83],
        ...,
        [ 5, 33, 55],
        [ 5, 33, 55],
        [ 6, 34, 56]],

       ...,

       [[ 2, 50, 86],
        [ 2, 50, 86],
        [ 2, 50, 86],
        ...,
        [34, 28, 30],
        [34, 28, 30],
        [34, 28, 30]],

       [[ 2, 50, 86],
        [ 2, 50, 86],
        [ 2, 50, 86],
        ...,
        [34, 28, 30],
        [34, 28, 30],
        [34, 28, 30]],

       [[ 3, 51, 89],
        [ 3, 51, 89],
        [ 3, 51, 89],
        ...,
        [34, 28, 30],
        [34, 28, 30],
        [34, 28, 30]]], dtype=uint8)
```

In [12]:
```
Ai==img_arr
```

Out[12]:
```
array([[[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]],

       [[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]],

       [[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]],

       ...,

       [[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]],

       [[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]],

       [[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]]])
```

In [13]:
```
plt.imshow(img_arr)
```

Out[13]:
```
<matplotlib.image.AxesImage at 0x25f27543ad0>
```

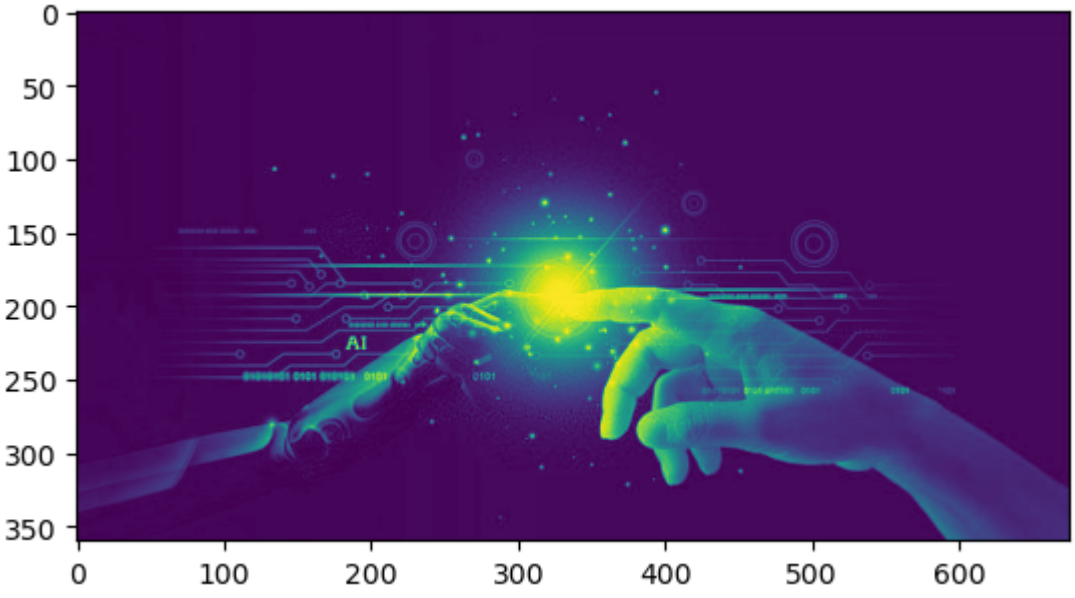


In [14]:
```
Ai.shape
```

Out[14]:
```
(360, 676, 3)
```

In [15]:
```
plt.imshow(Ai[:,:,0])
```

Out[15]:
```
<matplotlib.image.AxesImage at 0x25f285b1850>
```

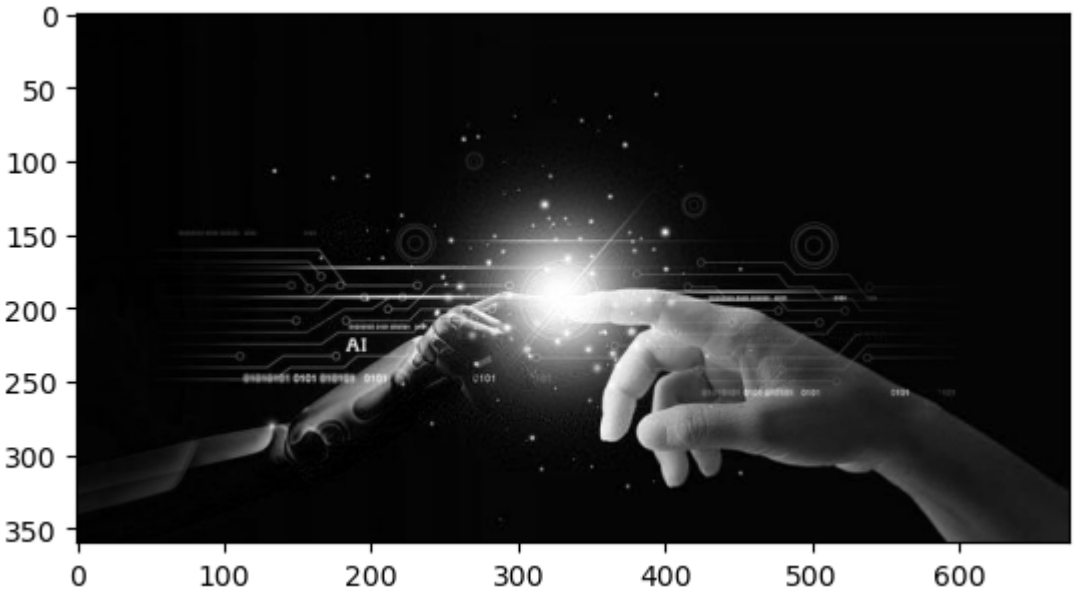


In [17]:
```
Ai[:,:,0]
```

Out[17]:
```
array([[ 2,  2,  2, ...,  6,  6,  7],
       [ 2,  2,  2, ...,  5,  6,  7],
       [ 2,  2,  2, ...,  5,  5,  6],
       ...,
       [ 2,  2,  2, ..., 34, 34, 34],
       [ 2,  2,  2, ..., 34, 34, 34],
       [ 3,  3,  3, ..., 34, 34, 34]], dtype=uint8)
```

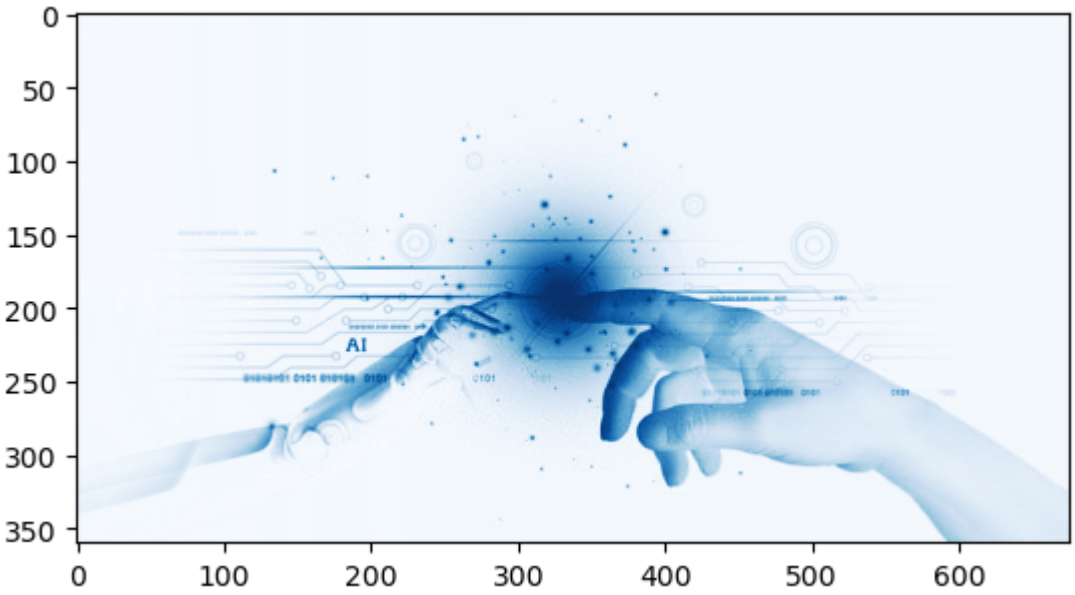
In [18]:
```
plt.imshow(Ai[:,:,0], cmap='gray')
```

Out[18]:
```
<matplotlib.image.AxesImage at 0x25f285c39d0>
```



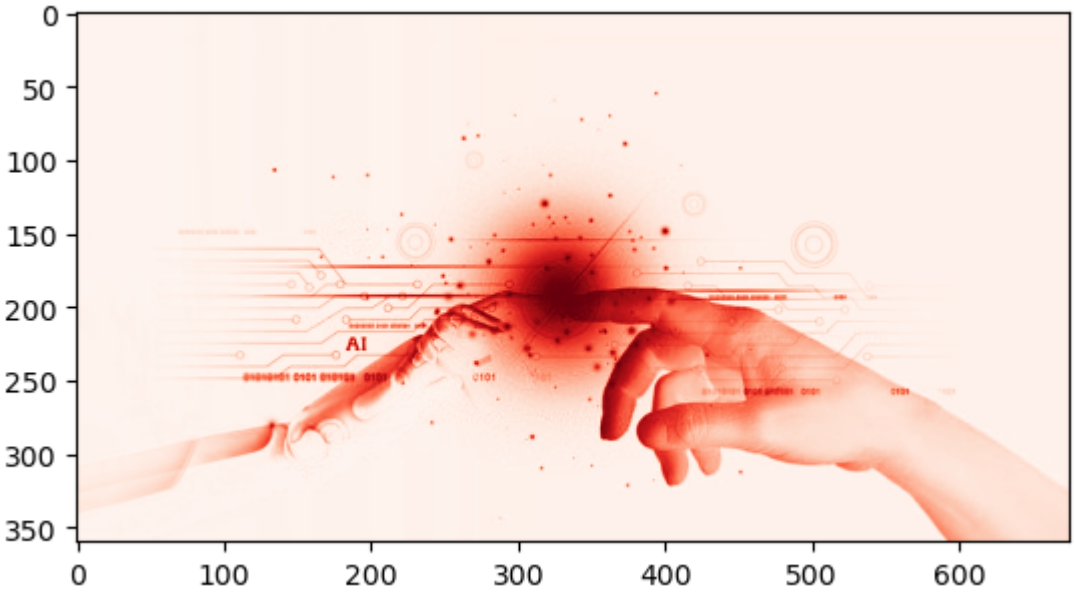
In [19]:
```
plt.imshow(Ai[:,:,0], cmap='Blues')
```

Out[19]:
```
<matplotlib.image.AxesImage at 0x25f2867dc10>
```



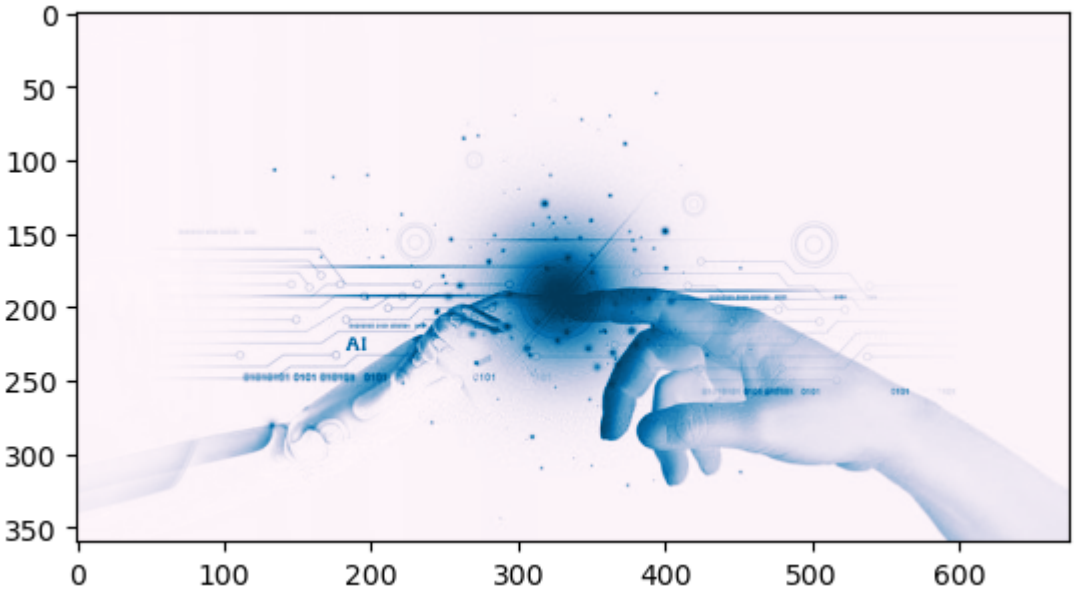
In [20]:
```
plt.imshow(Ai[:,:,0], cmap='Reds')
```

Out[20]:
```
<matplotlib.image.AxesImage at 0x25f2872bad0>
```



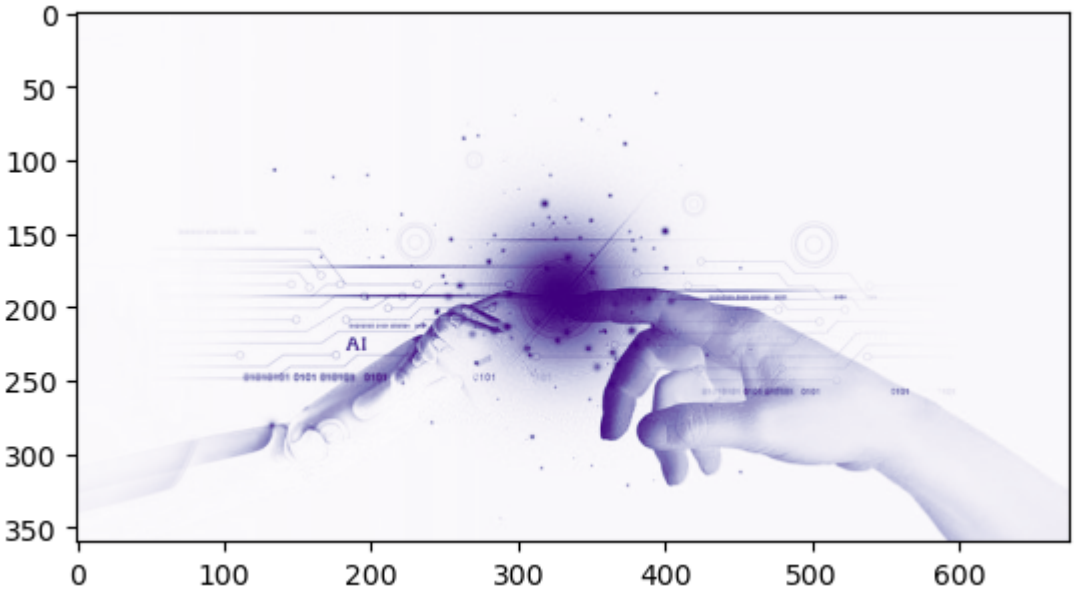
In [21]:
```
plt.imshow(Ai[:,:,0], cmap='PuBu')
```

Out[21]:
```
<matplotlib.image.AxesImage at 0x25f28781ed0>
```



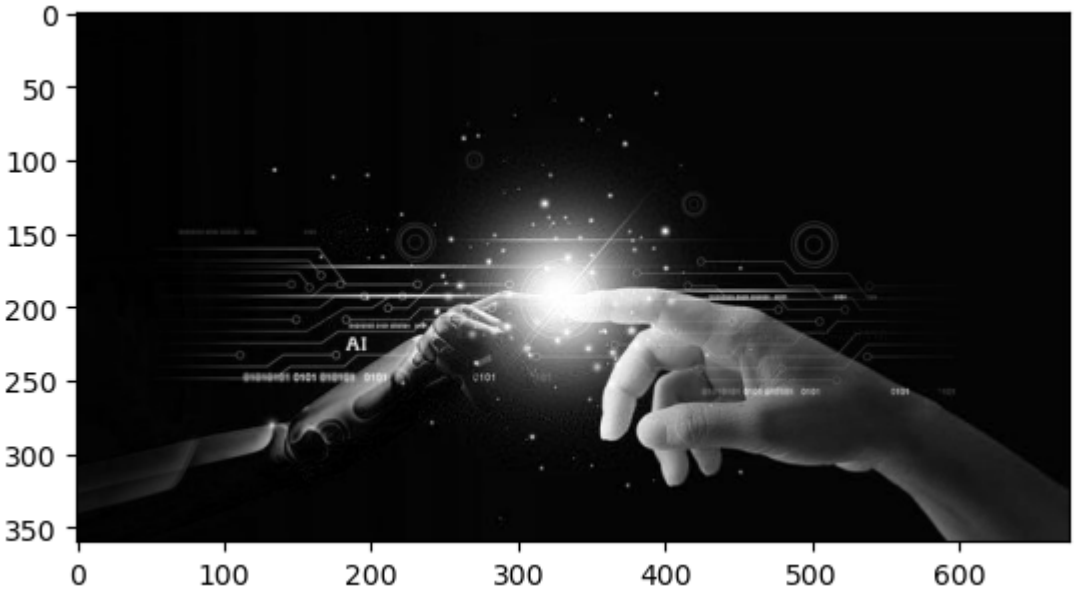
In [23]:
```
plt.imshow(Ai[:,:,0], cmap='Purples')
```

Out[23]:
```
<matplotlib.image.AxesImage at 0x25f2881bad0>
```



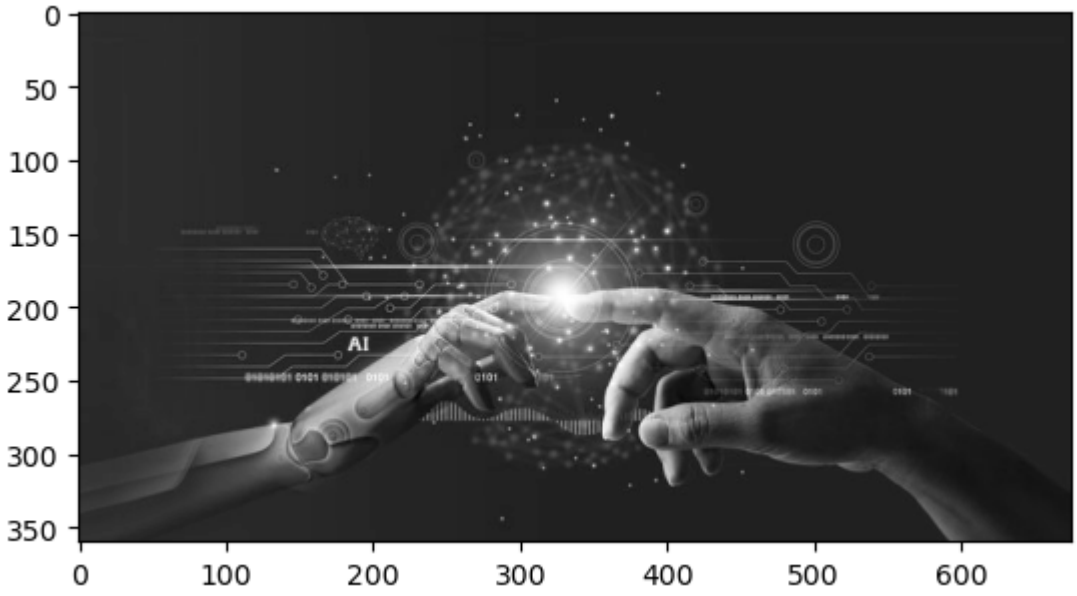
In [24]:
```
plt.imshow(Ai[:,:,0], cmap='gray')
```

Out[24]:
```
<matplotlib.image.AxesImage at 0x25f275afc50>
```



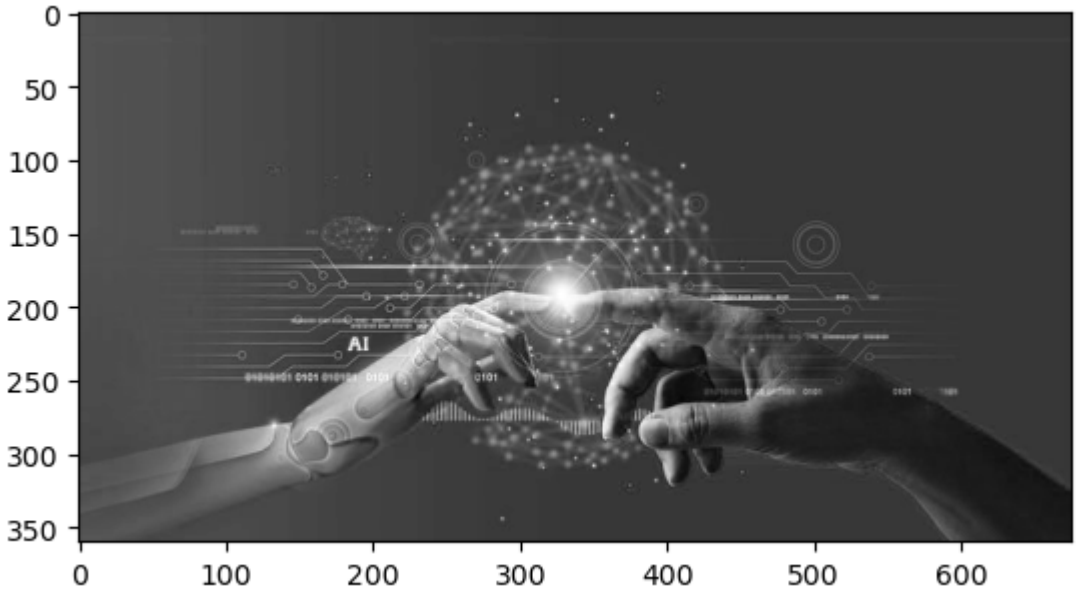
In [25]:
```
plt.imshow(Ai[:,:,1], cmap='gray')
```

Out[25]:
```
<matplotlib.image.AxesImage at 0x25f2891f3d0>
```



In [26]:
```
plt.imshow(Ai[:,:,2], cmap='gray')
```

Out[26]:
```
<matplotlib.image.AxesImage at 0x25f2891fc50>
```



In [27]:
```
Ai[:,:,0]
```

Out[27]:
```
array([[ 2,  2,  2, ...,  6,  6,  7],
       [ 2,  2,  2, ...,  5,  6,  7],
       [ 2,  2,  2, ...,  5,  5,  6],
       ...,
       [ 2,  2,  2, ..., 34, 34, 34],
       [ 2,  2,  2, ..., 34, 34, 34],
       [ 3,  3,  3, ..., 34, 34, 34]], dtype=uint8)
```

In [28]:
```
Ai[:,:,1]
```

Out[28]:
```
array([[46, 46, 46, ..., 34, 34, 35],
       [46, 46, 46, ..., 33, 34, 35],
       [46, 46, 46, ..., 33, 33, 34],
       ...,
       [50, 50, 50, ..., 28, 28, 28],
       [50, 50, 50, ..., 28, 28, 28],
       [51, 51, 51, ..., 28, 28, 28]], dtype=uint8)
```

In [29]:
```
Ai
```

Out[29]:
```
array([[[ 2, 46, 83],
        [ 2, 46, 83],
        [ 2, 46, 83],
        ...,
        [ 6, 34, 56],
        [ 6, 34, 56],
        [ 7, 35, 57]],

       [[ 2, 46, 83],
        [ 2, 46, 83],
        [ 2, 46, 83],
        ...,
        [ 5, 33, 55],
        [ 6, 34, 56],
        [ 7, 35, 57]],

       [[ 2, 46, 83],
        [ 2, 46, 83],
        [ 2, 46, 83],
        ...,
        [ 5, 33, 55],
        [ 5, 33, 55],
        [ 6, 34, 56]],

       ...,

       [[ 2, 50, 86],
        [ 2, 50, 86],
        [ 2, 50, 86],
        ...,
        [34, 28, 30],
        [34, 28, 30],
        [34, 28, 30]],

       [[ 2, 50, 86],
        [ 2, 50, 86],
        [ 2, 50, 86],
        ...,
        [34, 28, 30],
        [34, 28, 30],
        [34, 28, 30]],

       [[ 3, 51, 89],
        [ 3, 51, 89],
        [ 3, 51, 89],
        ...,
        [34, 28, 30],
        [34, 28, 30],
        [34, 28, 30]]], dtype=uint8)
```