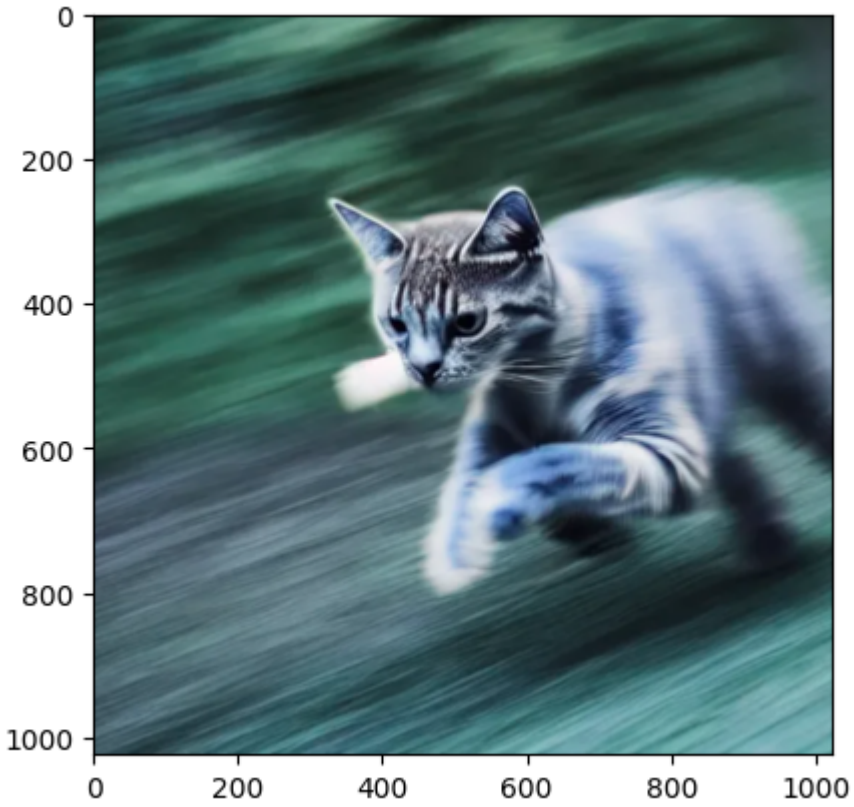
In [36]:
```
import cv2
import matplotlib.pyplot as plt
```

Original image

In [37]:
```
img = cv2.imread("cat.jpg")
```

In [38]:
```
plt.imshow(img)
plt.show()
```



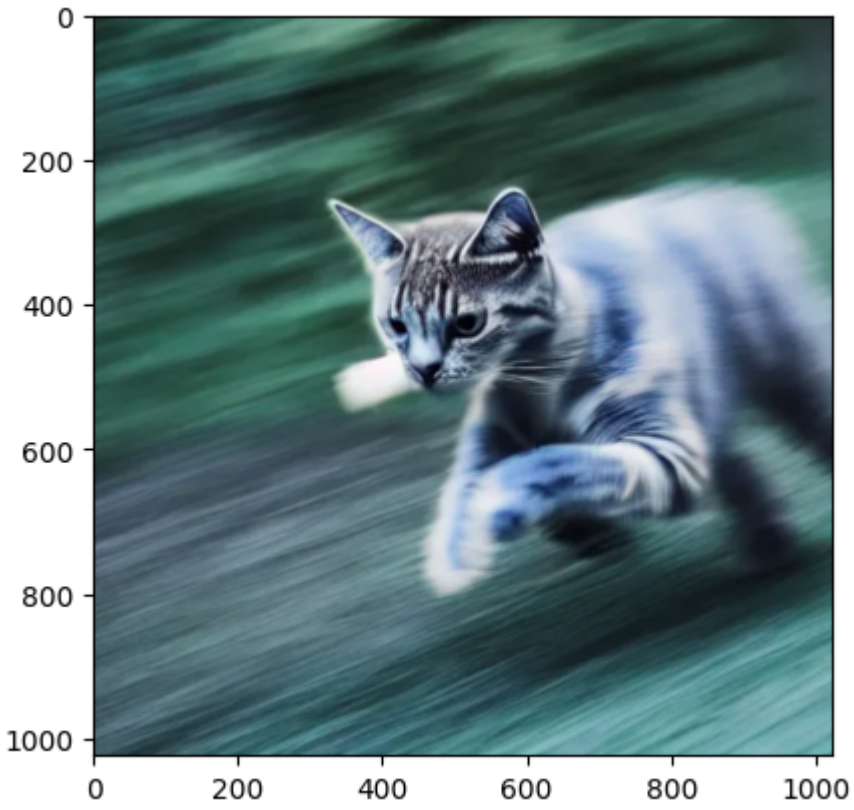
In [39]:
```
img.shape
```

Out[39]:
```
(1024, 1024, 3)
```

1024 * 1024 image

In [40]:
```
img_1024 = cv2.resize(img, (1024, 1024))
```

In [41]:
```
plt.imshow(img_1024)
plt.show()
```



In [42]:
```
img_1024.shape
```

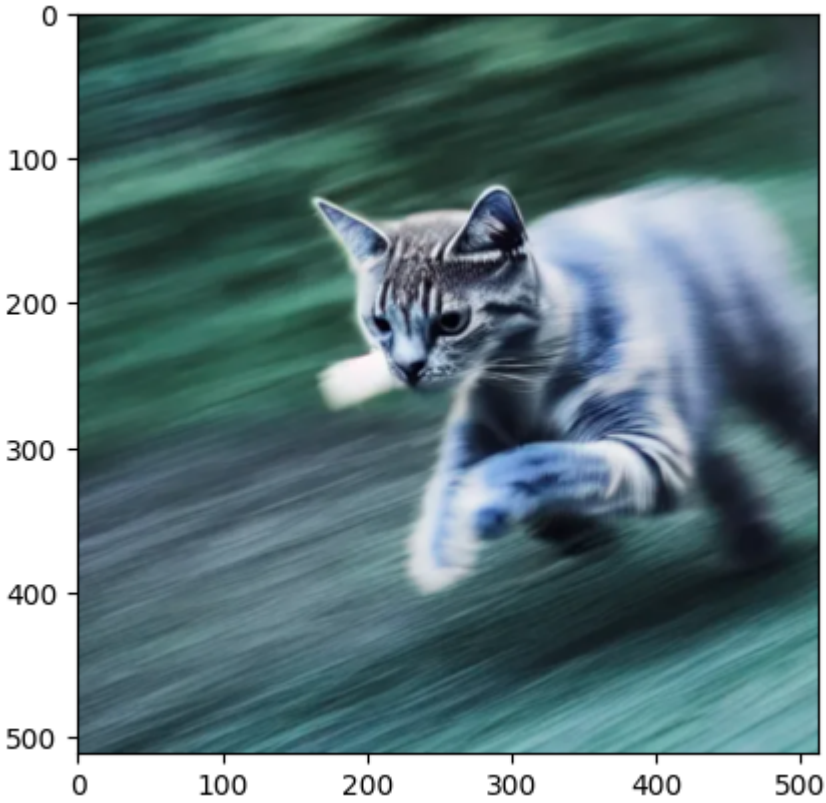
Out[42]: (1024, 1024, 3)

Subsampling

512 * 512 image

In [43]:
```
img_512 = cv2.resize(img, (512, 512))
```

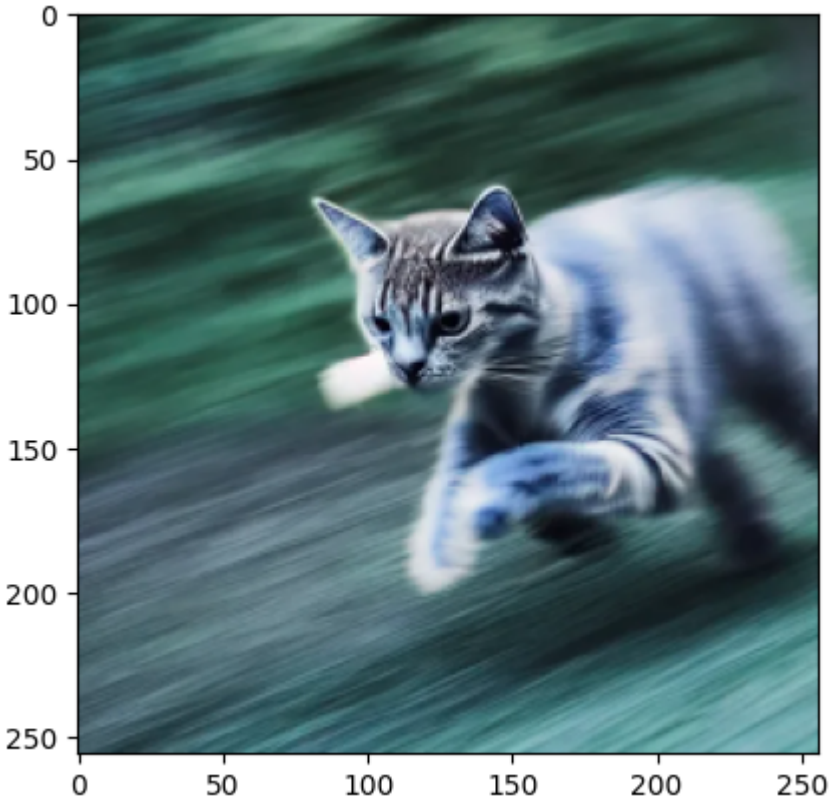
In [44]:
```
plt.imshow(img_512)
plt.show()
```



256 * 256 image

In [45]:
```
img_256 = cv2.resize(img, (256, 256))
```

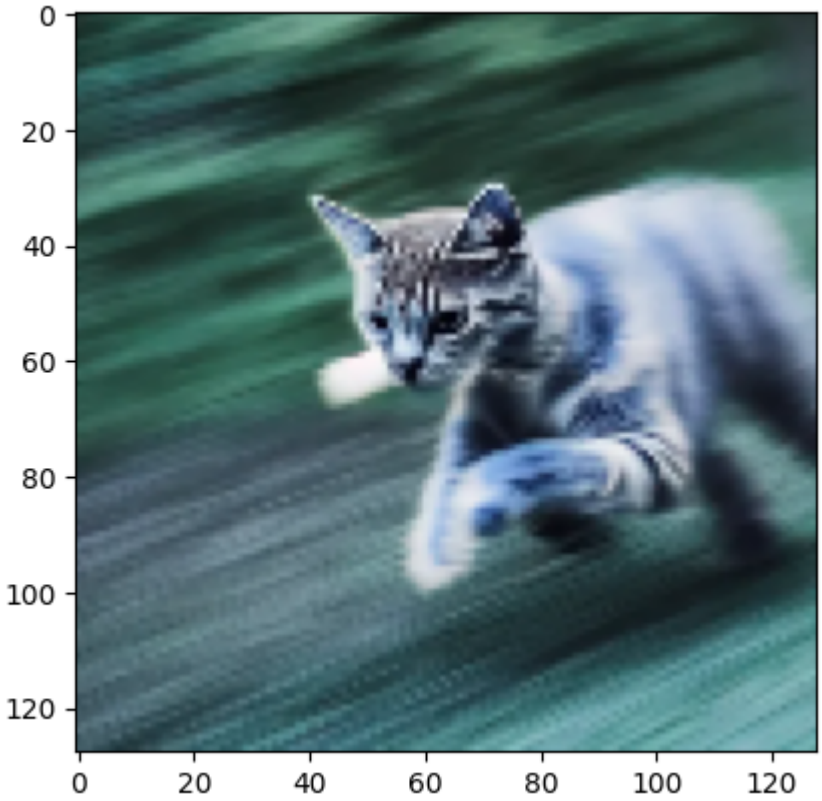
In [46]:
```
plt.imshow(img_256)
plt.show()
```



128 * 128 image

In [47]:
```
img_128 = cv2.resize(img, (128, 128))
```

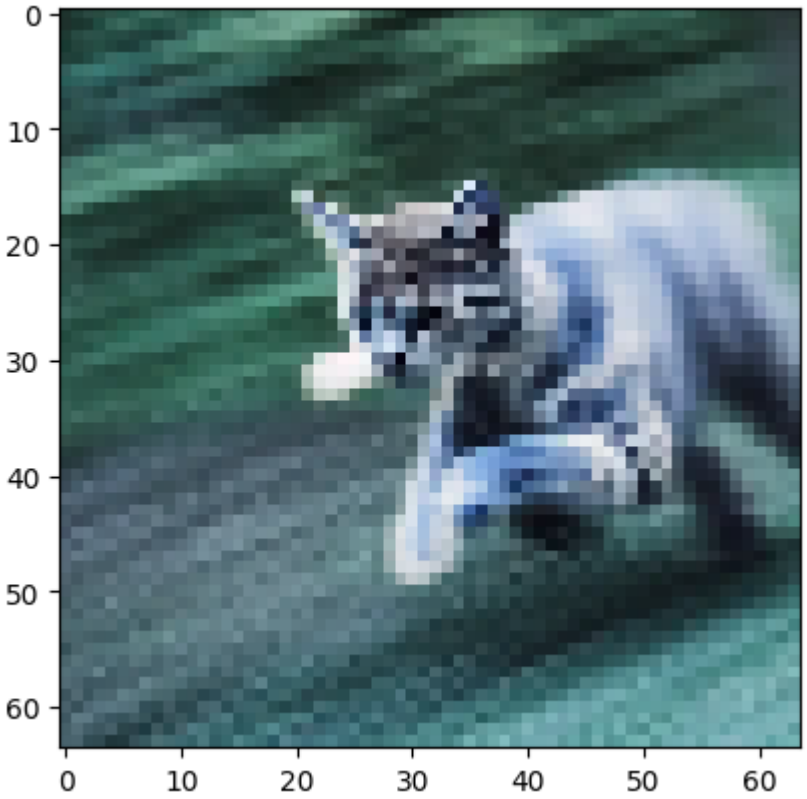
In [48]:
```
plt.imshow(img_128)
plt.show()
```



64 * 64 image

In [49]:
```
img_64 = cv2.resize(img, (64, 64))
```

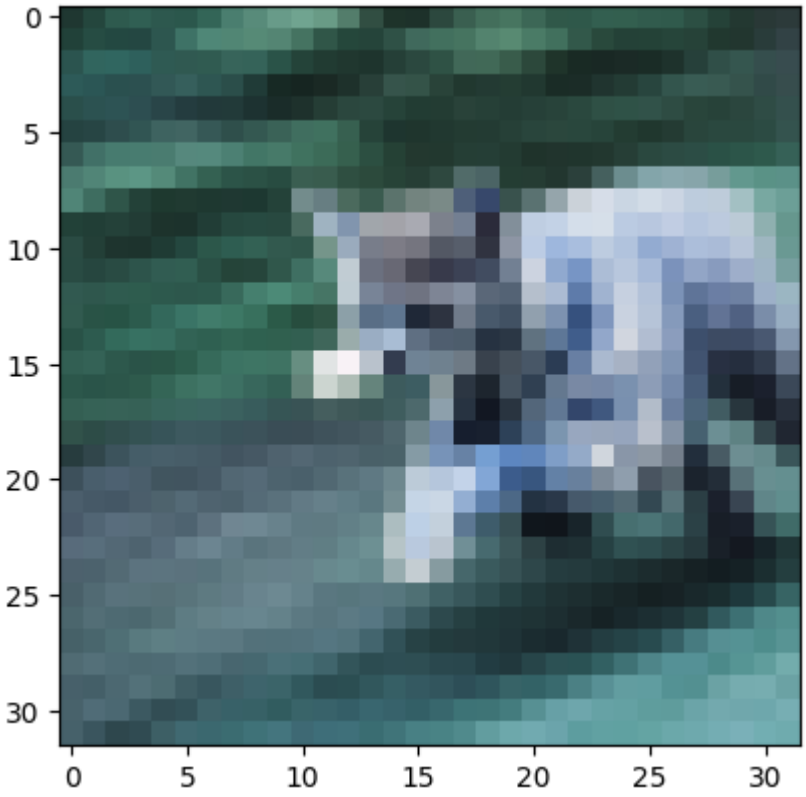
In [50]:
```
plt.imshow(img_64)
plt.show()
```



32 * 32 image

In [51]:
```
img_32 = cv2.resize(img, (32, 32), interpolation=cv2.INTER_AREA)
```

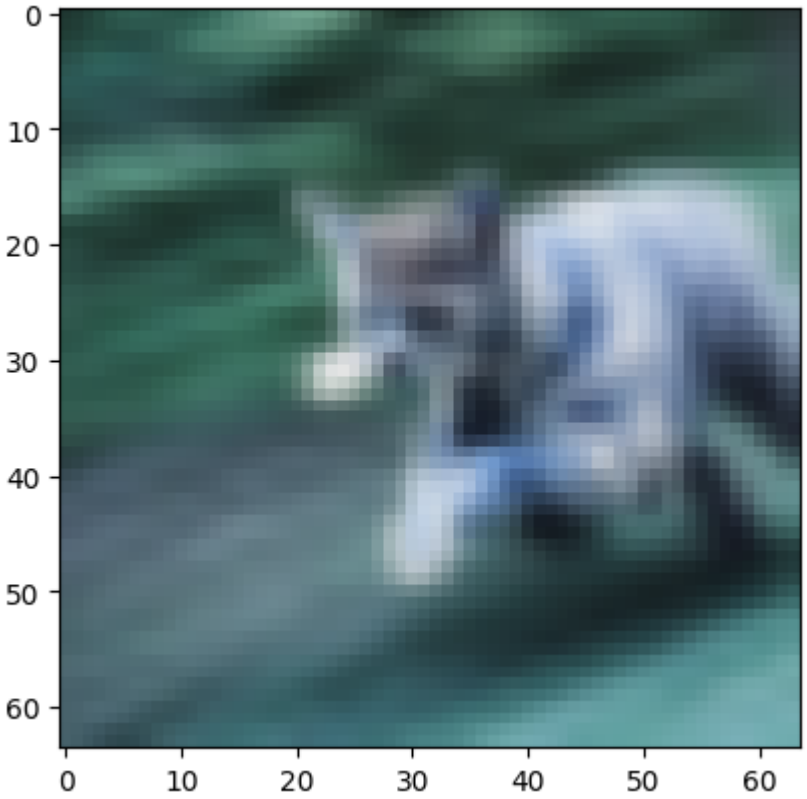
In [52]:
```
plt.imshow(img_32)
plt.show()
```



Resampling

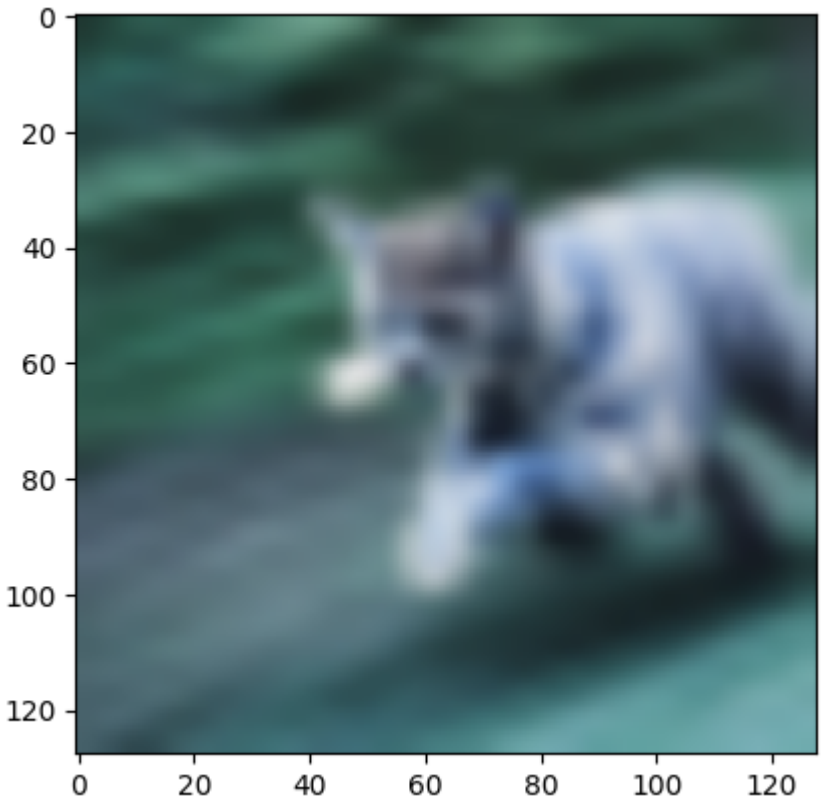
32 * 32 image

In [53]:
```
img_64_resampled = cv2.resize(img_32, (64, 64))
plt.imshow(img_64_resampled)
plt.show()
```



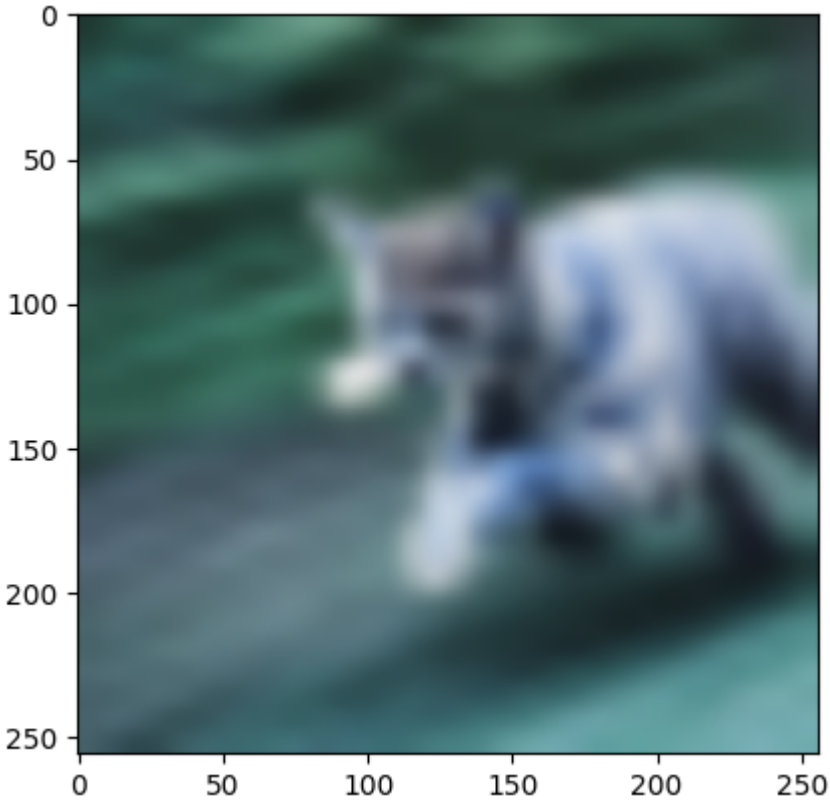
64 * 64 image

In [54]:
```
img_128_resampled = cv2.resize(img_64_resampled, (128, 128))
plt.imshow(img_128_resampled)
plt.show()
```



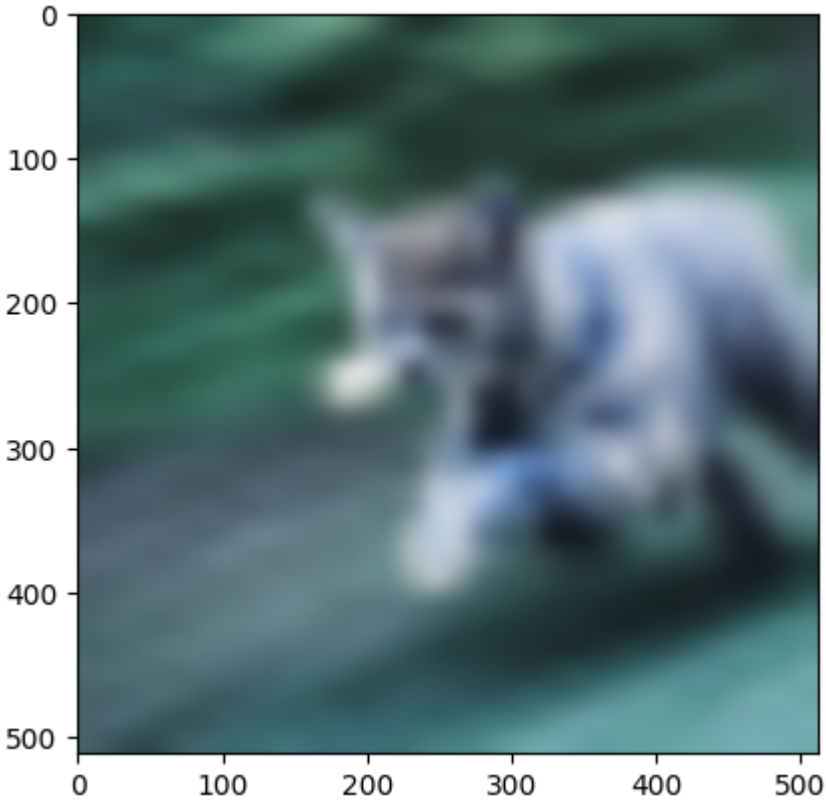
128 * 128 image

In [55]:
```
img_256_resampled = cv2.resize(img_128_resampled, (256, 256))
plt.imshow(img_256_resampled)
plt.show()
```



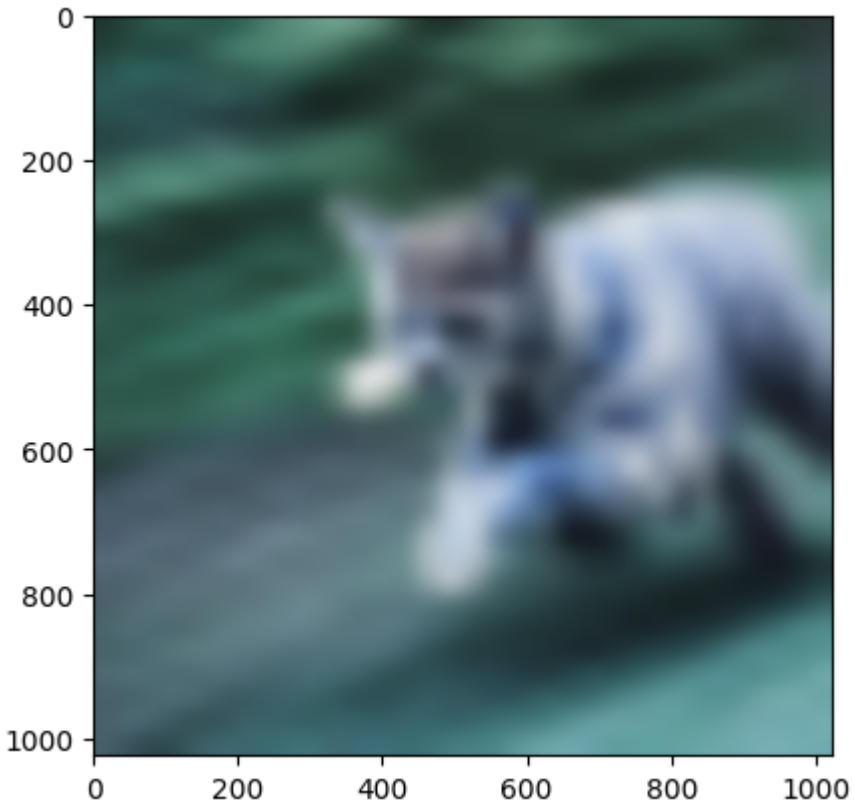
256 * 256 image

In [56]:
```
img_512_resampled = cv2.resize(img_256_resampled, (512, 512))
plt.imshow(img_512_resampled)
plt.show()
```



512 * 512 image

In [57]:
```
img_1024_resampled = cv2.resize(img_512_resampled, (1024, 1024))
plt.imshow(img_1024_resampled)
plt.show()
```



Modular code

In [58]:
```python
def sample_image(image, size, interpolation=None):
    if interpolation is not None:
        subsampled_image = cv2.resize(image, size, interpolation)
    else:
        subsampled_image = cv2.resize(image, size)
    return subsampled_image
```

In [59]:
```python
# subsampling
sizes = [1024, 512, 256, 128, 64, 32]

for index, size in enumerate(sizes):
    img = cv2.imread("cat.jpg")
    subsampled_img = sample_image(img, (size, size))
    plt.subplot(1, 6,index+1)
    plt.title(str(size) + "*" + str(size))
    plt.axis('off')
    plt.imshow(subsampled_img)
```

In [60]:
```python
# resampling
sizes = [32, 64, 128, 256, 512, 1024]

for index, size in enumerate(sizes):
    if size == 32:
        sampled_img = sample_image(img, (32, 32))
        plt.subplot(1, 6,index+1)
        plt.title(str(size) + "*" + str(size))
        plt.axis('off')
        plt.imshow(sampled_img)
        continue
    plt.subplot(1, 6,index+1)
    plt.title(str(size) + "*" + str(size))
    plt.axis('off')
    plt.imshow(sampled_img)
    sampled_img = sample_image(sampled_img, (size, size))
```