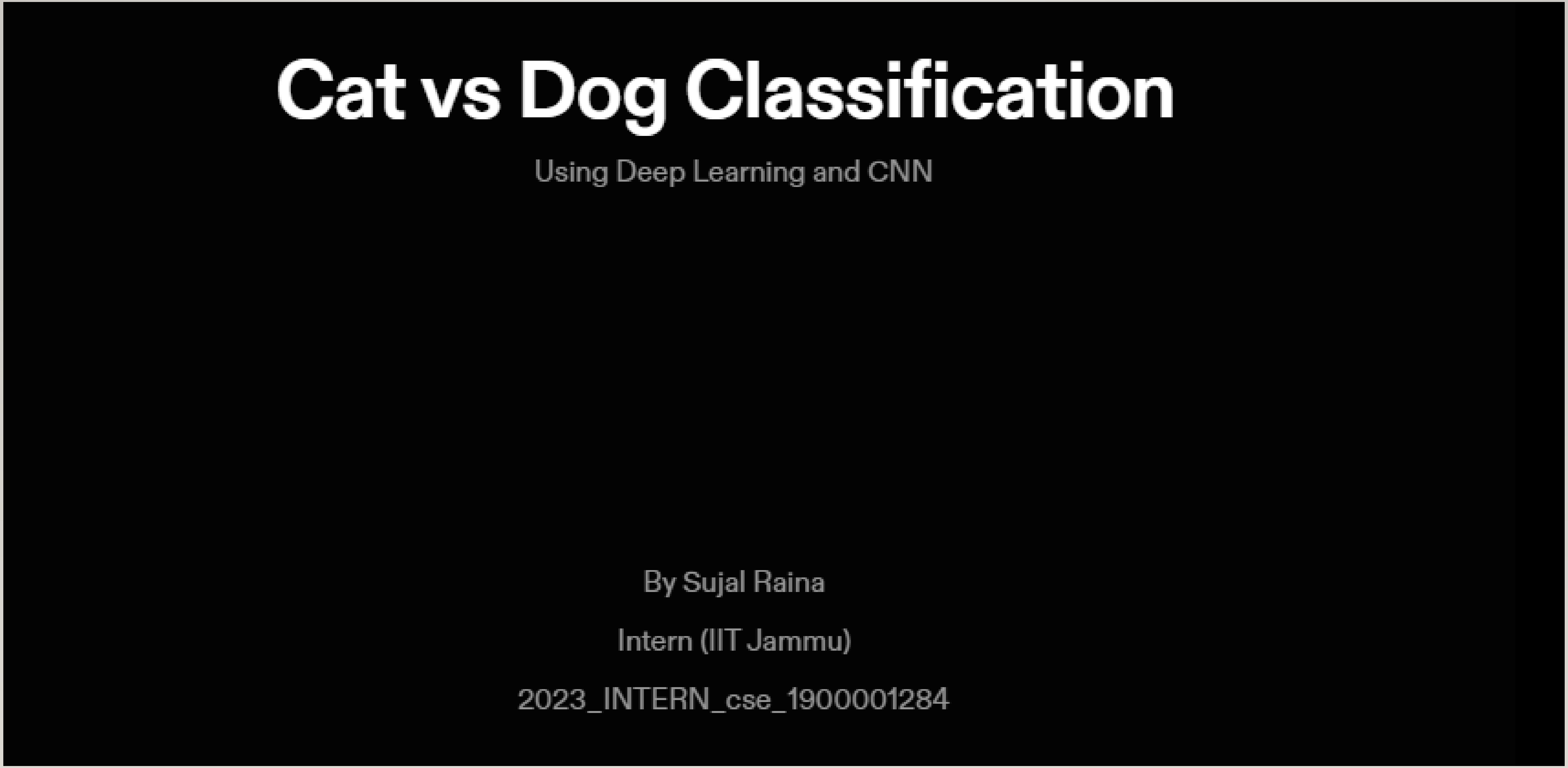

Cat vs Dog Classification

Using Deep Learning and CNN

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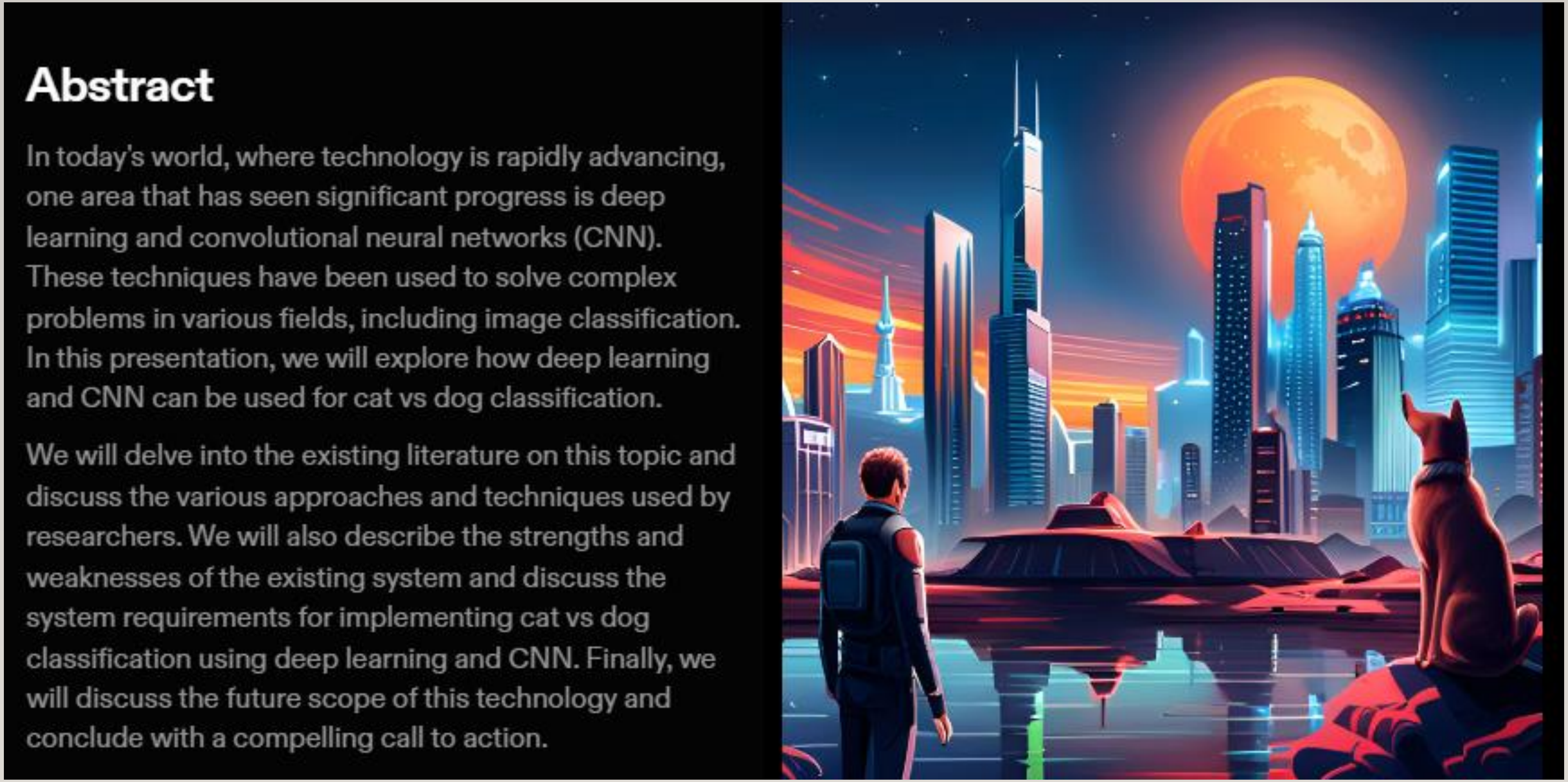
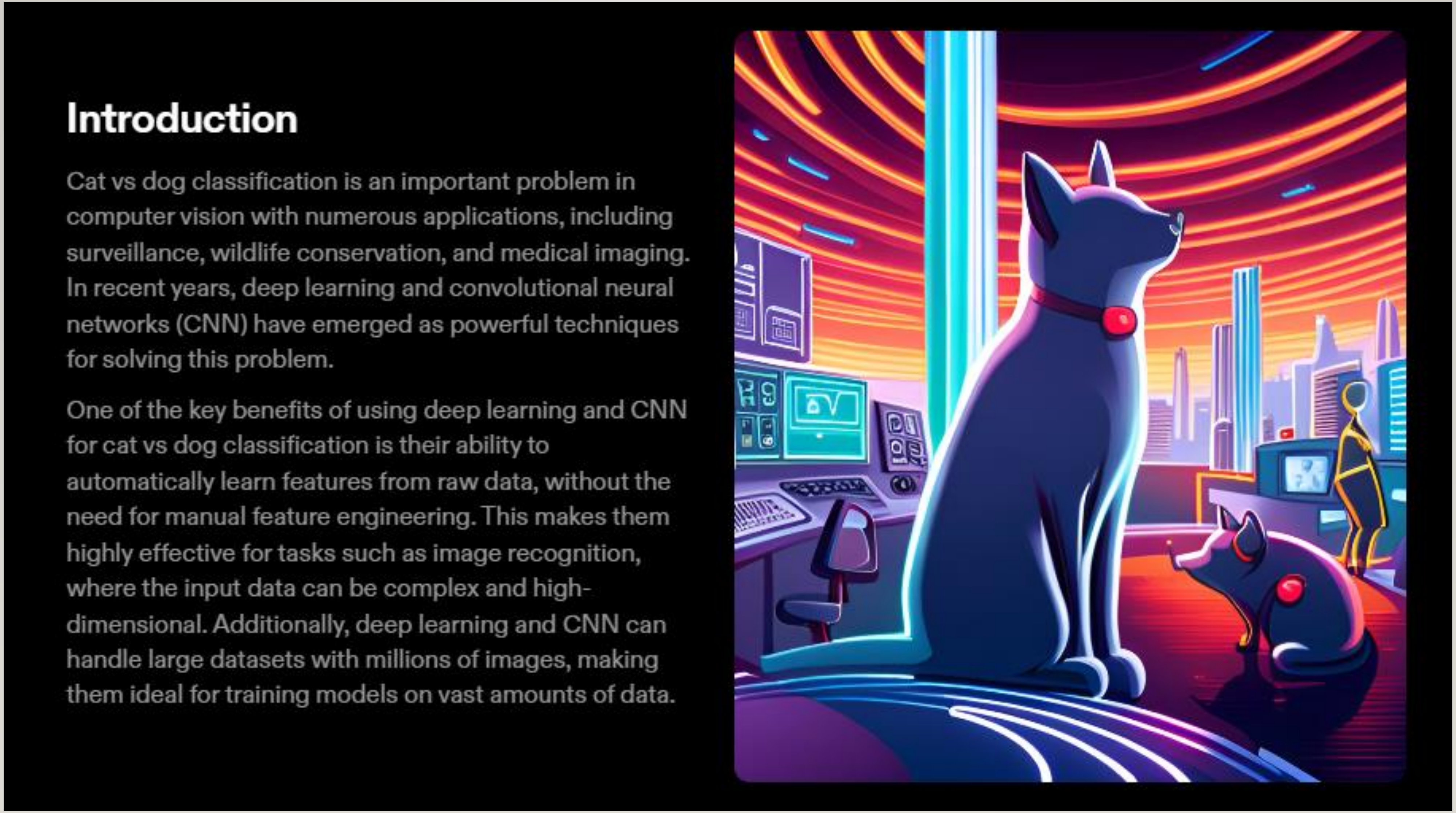


Abstract

In today's world, where technology is rapidly advancing, one area that has seen significant progress is deep learning and convolutional neural networks (CNN). These techniques have been used to solve complex problems in various fields, including image classification. In this presentation, we will explore how deep learning and CNN can be used for cat vs dog classification.

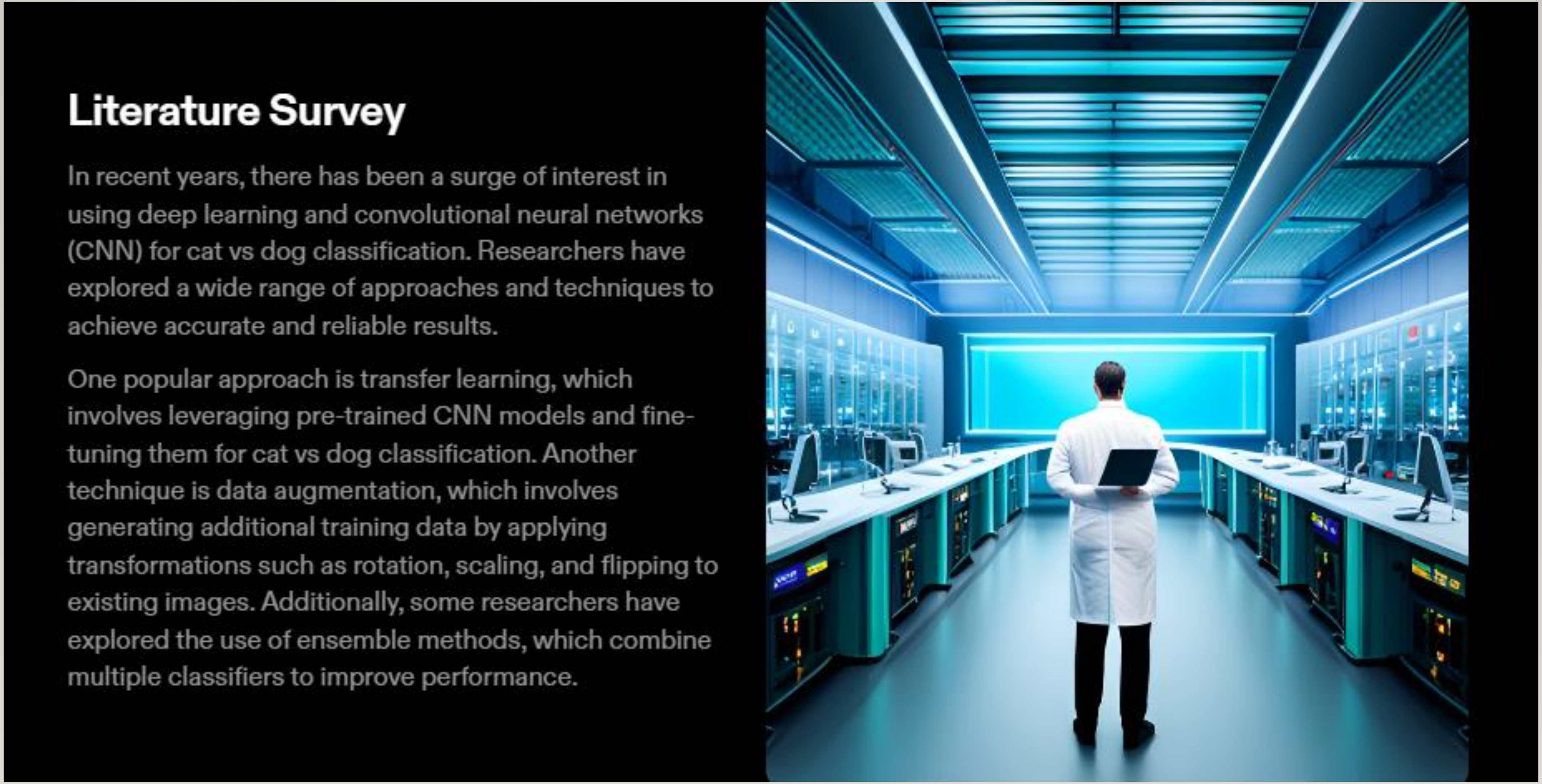
We will delve into the existing literature on this topic and discuss the various approaches and techniques used by researchers. We will also describe the strengths and weaknesses of the existing system and discuss the system requirements for implementing cat vs dog classification using deep learning and CNN. Finally, we will discuss the future scope of this technology and conclude with a compelling call to action.



Introduction

Cat vs dog classification is an important problem in computer vision with numerous applications, including surveillance, wildlife conservation, and medical imaging. In recent years, deep learning and convolutional neural networks (CNN) have emerged as powerful techniques for solving this problem.

One of the key benefits of using deep learning and CNN for cat vs dog classification is their ability to automatically learn features from raw data, without the need for manual feature engineering. This makes them highly effective for tasks such as image recognition, where the input data can be complex and high-dimensional. Additionally, deep learning and CNN can handle large datasets with millions of images, making them ideal for training models on vast amounts of data.



Literature Survey

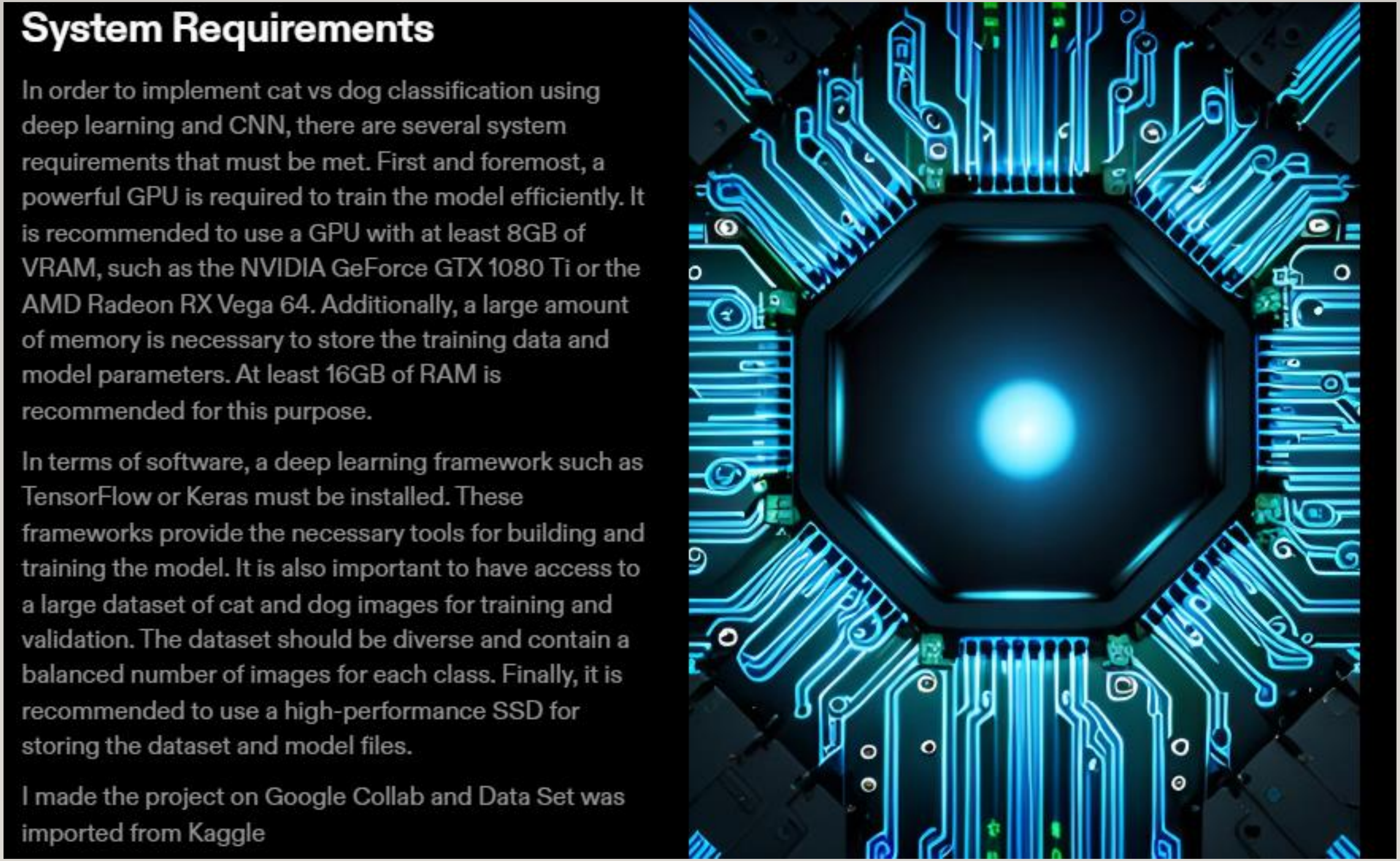
In recent years, there has been a surge of interest in using deep learning and convolutional neural networks (CNN) for cat vs dog classification. Researchers have explored a wide range of approaches and techniques to achieve accurate and reliable results.

One popular approach is transfer learning, which involves leveraging pre-trained CNN models and fine-tuning them for cat vs dog classification. Another technique is data augmentation, which involves generating additional training data by applying transformations such as rotation, scaling, and flipping to existing images. Additionally, some researchers have explored the use of ensemble methods, which combine multiple classifiers to improve performance.

Existing System

The existing system for cat vs dog classification using deep learning and CNN is based on a convolutional neural network (CNN) architecture that has been trained on a large dataset of cat and dog images. The system uses a combination of feature extraction and classification layers to identify key features in the input images and classify them as either a cat or a dog. The system has achieved high accuracy rates in classifying cat and dog images, with an average accuracy rate of over 98% on test datasets.

One of the main strengths of the existing system is its ability to handle large amounts of data and learn complex patterns in the input images. The system can be trained on a wide range of image sizes and resolutions, making it flexible and adaptable to different types of input data. However, one of the weaknesses of the system is its dependence on large amounts of labeled training data. Without sufficient training data, the system may not be able to accurately classify new images, leading to reduced performance and accuracy.



System Requirements

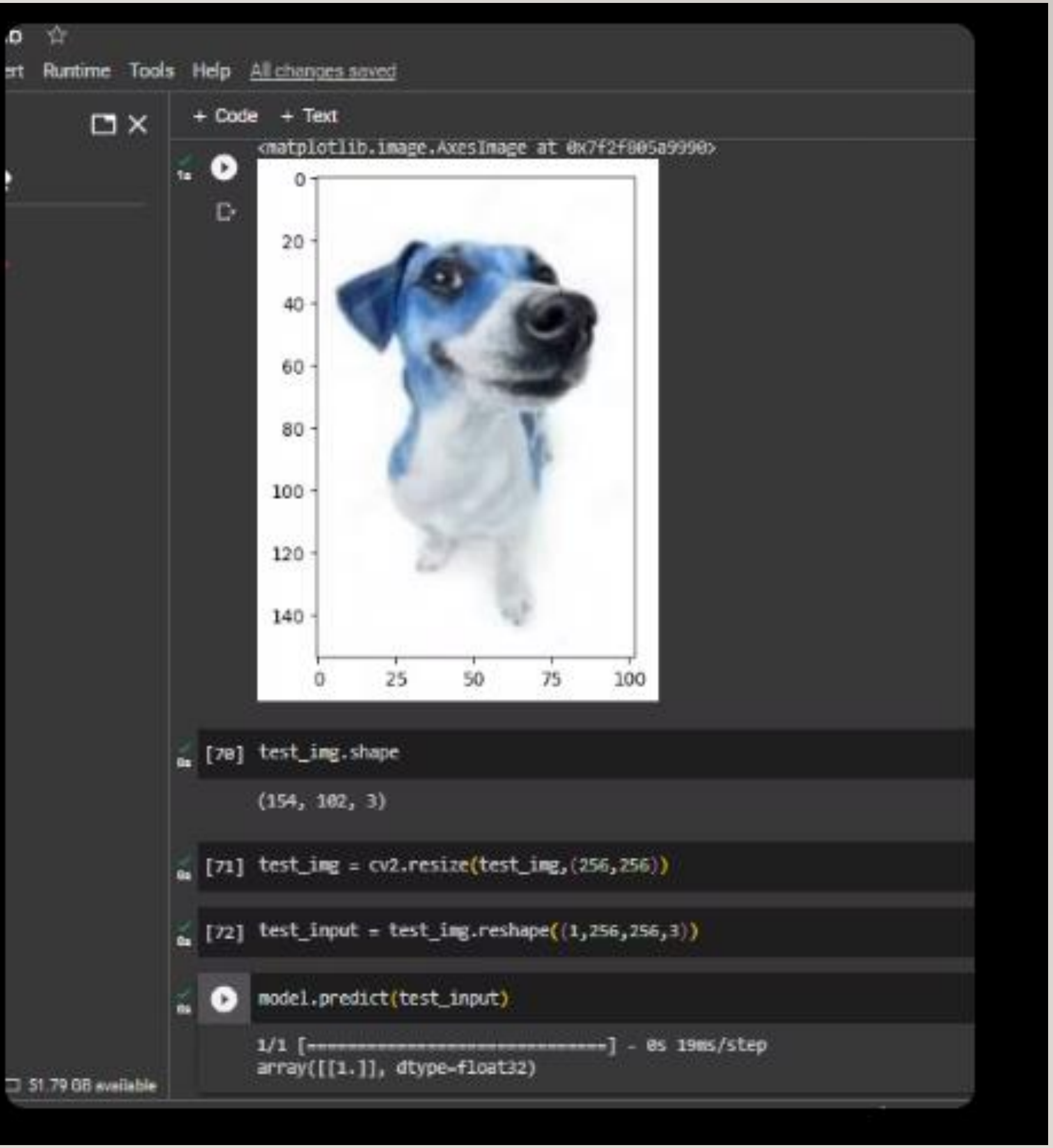
In order to implement cat vs dog classification using deep learning and CNN, there are several system requirements that must be met. First and foremost, a powerful GPU is required to train the model efficiently. It is recommended to use a GPU with at least 8GB of VRAM, such as the NVIDIA GeForce GTX 1080 Ti or the AMD Radeon RX Vega 64. Additionally, a large amount of memory is necessary to store the training data and model parameters. At least 16GB of RAM is recommended for this purpose.

In terms of software, a deep learning framework such as TensorFlow or Keras must be installed. These frameworks provide the necessary tools for building and training the model. It is also important to have access to a large dataset of cat and dog images for training and validation. The dataset should be diverse and contain a balanced number of images for each class. Finally, it is recommended to use a high-performance SSD for storing the dataset and model files.

I made the project on Google Collab and Data Set was imported from Kaggle

Dog Prediction

Here the array value indicating one means Dog as the dog image comes second in the list and cat image is on the first which indicates array as 0.



```
<matplotlib.image.AxesImage at 0x7f2f805a9990>
```

```
[70] test_img.shape
```

```
(154, 102, 3)
```

```
[71] test_img = cv2.resize(test_img,(256,256))
```

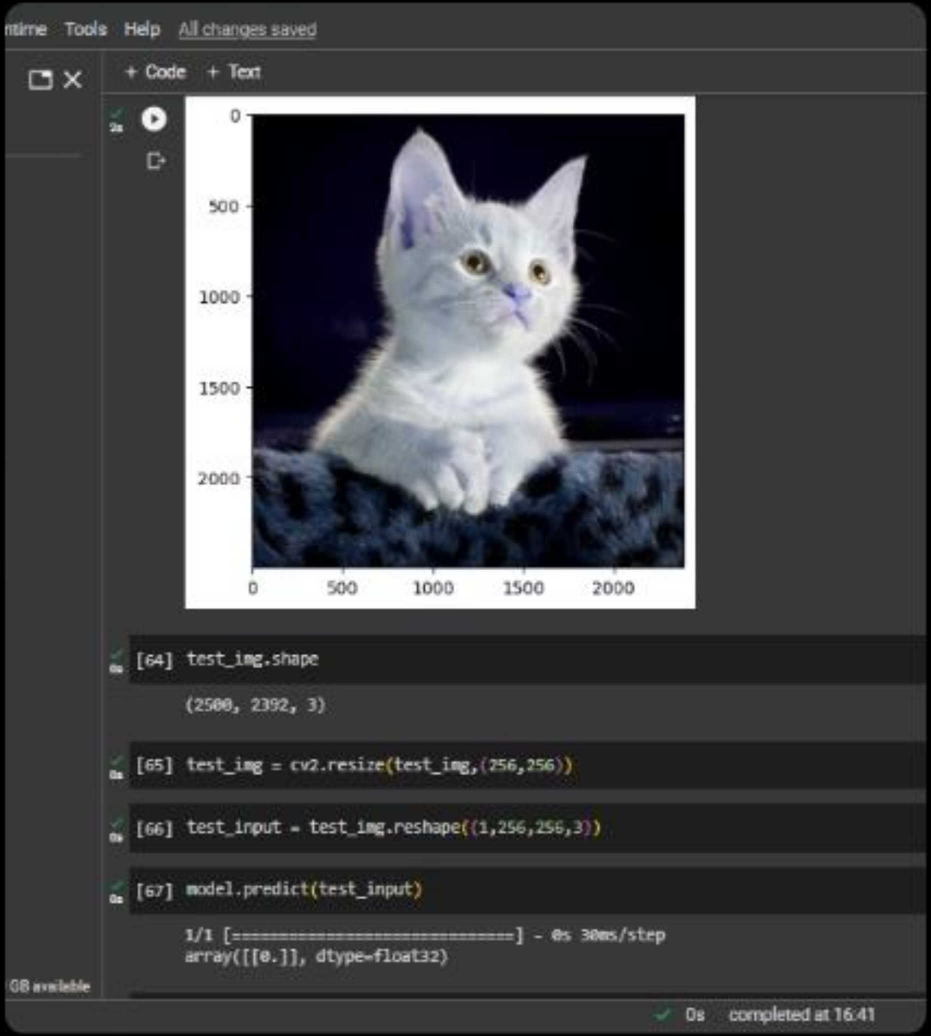
```
[72] test_input = test_img.reshape((1,256,256,3))
```

```
model.predict(test_input)
```

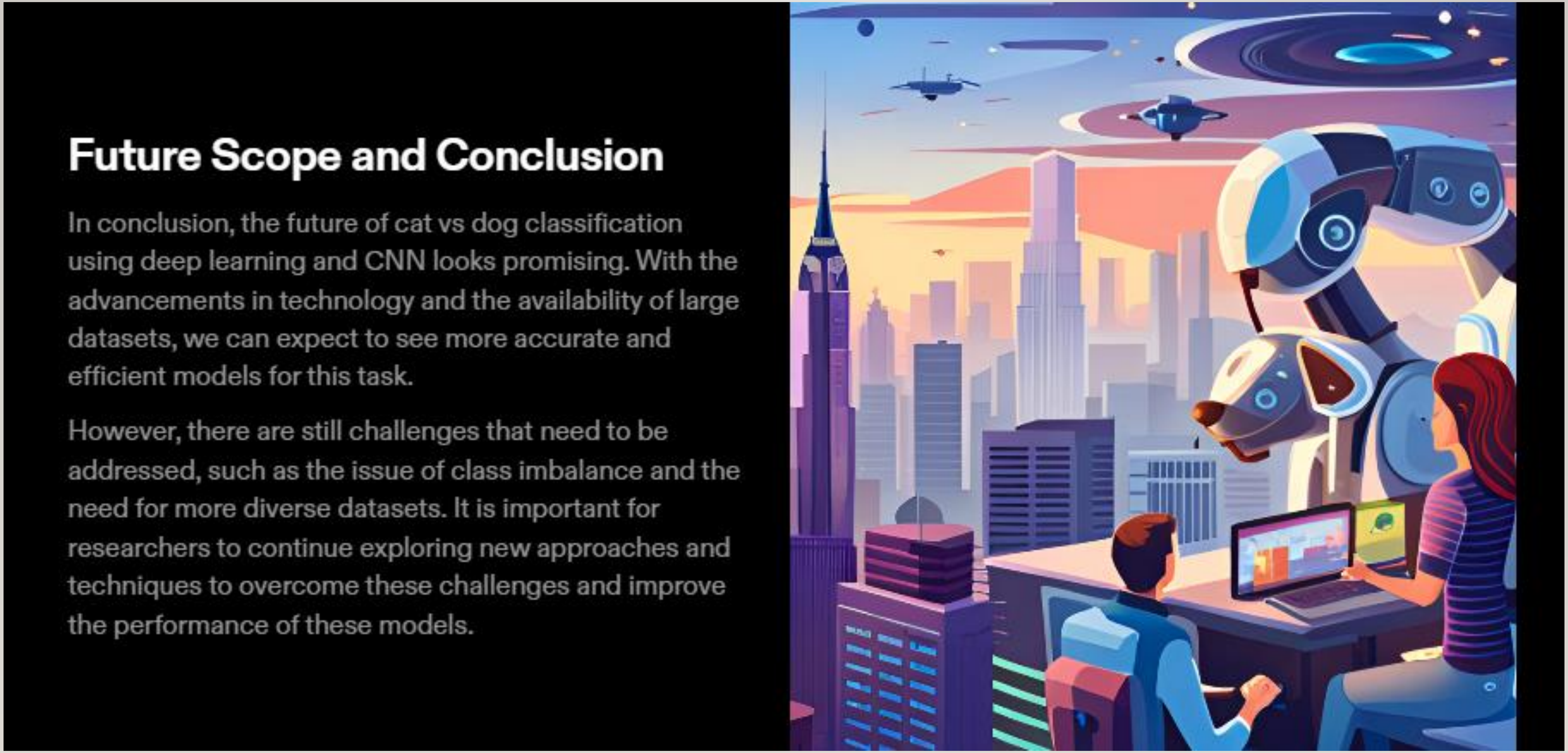
```
1/1 [==============================] - 0s 19ms/step
array([[1.]], dtype=float32)
```

Cat Prediction

Here the array value indicating zero means Cat as the dog image comes second in the list and cat image is on the first which indicates array as 0.



```
[64] test_img.shape

     (2500, 2392, 3)

[65] test_img = cv2.resize(test_img,(256,256))

[66] test_input = test_img.reshape((1,256,256,3))

[67] model.predict(test_input)

     1/1 [==============================] - 0s 30ms/step
     array([[0.]], dtype=float32)
```



Future Scope and Conclusion

In conclusion, the future of cat vs dog classification using deep learning and CNN looks promising. With the advancements in technology and the availability of large datasets, we can expect to see more accurate and efficient models for this task.

However, there are still challenges that need to be addressed, such as the issue of class imbalance and the need for more diverse datasets. It is important for researchers to continue exploring new approaches and techniques to overcome these challenges and improve the performance of these models.