

**2Deep2Learn**

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**Exploring Deep Learning**

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### **Reflective Journal on the VGG16 Model Lab**

#### **Introduction:**

**Brief Overview:** The lab on VGG16 model introduced me to the basics of deep learning, focusing on a pretrained model for image classification that did not require extensive coding.

**Purpose:** This reflection aims to analyze my experience in interacting with the VGG16 model, including data preprocessing, making predictions and interpreting the outputs. I will explore how this lab has deepened my understanding of deep learning concepts and the practical applications.

#### **Description of experience or Topic:**

**Background Information:** The VGG16 model is a deep convolutional neural network (CNN) pretrained on the ImageNet dataset, which includes over 1,000 classes. Renowned for its effectiveness in computer vision tasks, VGG16 excels in image classification and recognition. This lab emphasizes loading the model, preprocessing input images, and analyzing its predictions.

**Specific Details:** The lab was pretty easy to complete.

During the lab I was able to load the VGG16 model and review its architecture. It had 138,357,544 total params that were all trainable.

Then while attempting to preprocess the images to ensure compatibility with the model I received an error message that "Image path could not be found". I knew from previous experience that an image was missing so I went to Pexels.com to find an image and downloaded it and was able to then upload an image, copy the path and run the code smoothly.

Once the image was uploaded, I was able to receive predictions and decoded the results. The model showed me the top 3 most likely predictions which were, promontory, cliff or breakwater. The model was 29.5% confident that the image depicts a breakwater and 13.7% confident it was promontory and 11.9% confident it was a cliff.

#### **Personal Reflection:**

**Thoughts and Feelings:** I was initially excited about working with a deep learning model that required no coding, as it allowed me to focus on understanding the workflow. While I am familiar with the theoretical concepts, it was refreshing to see them applied in practice. Knowing this is an essential step toward building AI models, I hoped my prior knowledge would help if I

encountered any errors. When I did face an issue with the code, I was thrilled to successfully troubleshoot and resolve it.

**Analysis and Interpretation:** The hands-on experience provided valuable insight into the workflow of using pre-trained models. Despite the model's predictions having only 29% confidence, they were relatively accurate, which highlighted how deep learning models rely heavily on pattern recognition to make classifications.

**Connections to Theoretical Knowledge:** This lab reinforced my understanding of convolutional neural networks (CNNs) as feature extractors. The high number of parameters in VGG16 (138 million) exemplified the complexity of such models. I also recognized how transfer learning, using a pre-trained model like VGG16, saves time and resources compared to training from scratch.

**Critical Thinking:** An area of improvement could have been ensuring a more diverse set of test images to observe the model's behavior on various data. Using a more diverse set of test images would provide better insights into the model's behavior and robustness across different types of data. Also, understanding the top 3 predictions highlighted the model's limitations in scenarios where the input image did not fit into the 1,000 ImageNet classes.

### **Improvements and Learning:**

**Personal Growth:** This lab has boosted my confidence in applying machine learning techniques. It helped bridge the gap between theory and practice by helping me see how pretrained models can be in real world applications.

### **Skills Developed:**

I was able to gain the skill of preprocessing data for deep learning models. I now have a better understanding and interpretations of model predictions.

**Future Application:** The knowledge gained from this lab can be applied to future projects involving computer vision. I now understand how to leverage pre-trained models for tasks such as object detection or image recognition, which can be valuable in both research and industry applications.

### **Conclusion:**

**Summary:** This lab provided a practical introduction to deep learning with the VGG16 model. It enhanced my understanding of preprocessing, model predictions, and how neural networks generalize input data.

**Final Thoughts:** Reflecting on this experience has deepened my appreciation for the complexities and capabilities of deep learning. Moving forward, I aim to explore more advanced models and experiment with fine tuning techniques to improve prediction accuracy.

### **References:**

Whitefield, Brennan “ **Beginner’s Guide to VGG16 Implementation in Keras**” 2024 March 12. BuiltIn <https://builtin.com/machine-learning/vgg16>