Overview

This assignment will help you get hands-on experience training convolutional neural networks in Keras and using them to make predictions. This will deepen your understanding of neural networks. You will then gain practice considering the ethical and legal implications of this type of technology. This will support your work in Project One, which is due in the next module.

Prompt

Access the Virtual Lab (Apporto) by using the link in the **Virtual Lab Access** module. It is recommended that you use the Chrome browser to access the Virtual Lab. If prompted to allow the Virtual Lab access to your clipboard, click "Yes", as this will allow you to copy text from your desktop into applications in the Virtual Lab environment.

1. Once in the Apporto environment, create a new Jupyter Notebook and **configure it using the following naming convention:**

   <YourLastName>_<YourFirstName>_Assignment3.ipynb

   Thus, if your name is Jane Doe, please name the submission file "Doe_Jane_Assignment3.ipynb".

   For information on how to navigate the Jupyter environment, review the Jupyter Notebook in Apporto (Virtual Lab) Tutorial.
2. Read through the "Recognizing CIFAR-10 images with deep learning" example on pages 84–94 of *Deep Learning with Keras*. Copy the code into your Jupyter Notebook, including the code for a deeper network and data augmentation in your model. Run the code to **build a convolutional neural network model that includes a deeper network and data augmentation**.

   Note: More information about the training and test data sets can be found in the CIFAR-10 and CIFAR-100 Datasets repository.
3. The algorithm you worked to train can be used to distinguish more realistic images than the hand-written digits example from the previous module. While distinguishing between animals or vehicles may not pose a serious ethical dilemma, it's important to consider what other types of images an algorithm such as this could be trained on. For example, could such an algorithm eventually be used to distinguish people's faces? If so, what are the ethical and privacy implications? Create a Markdown cell in your Jupyter Notebook after your code and its outputs. In this cell, **analyze the ethical and privacy implications** of the algorithm you just created. You are expected to include resources to support your answers, and must include **citations** for those resources.

Specifically, you must address the following rubric criteria:

- Configure the Jupyter Notebook correctly and use the proper naming convention.
- Build a convolutional neural network model using a deeper network and data augmentation for CIFAR-10 image data.
- Explain how this algorithm could result in ethical and privacy concerns if it were trained on different sets of images.

Guidelines for Submission

Please submit your completed IPYNB file. Make sure that your file is named as specified above, and that you have addressed all rubric criteria in your response.

Module Three Assignment Rubric

Criteria	Exemplary (100%)	Proficient (85%)	Needs Improvement (55%)	Not Evident (0%)	Value
Jupyter Notebook Configuration	Exceeds proficiency in an exceptionally clear, insightful, sophisticated, or	Configures notebook correctly and uses the proper naming convention	Shows progress toward proficiency, but with errors or omissions	Does not attempt criterion	15

	creative manner				
Build Convolutional Neural Network	Exceeds proficiency in an exceptionally clear, insightful, sophisticated, or creative manner	Builds a convolutional neural network model that includes a deeper network and data augmentation with working code	Shows progress toward proficiency, but with errors or omissions	Does not attempt criterion	30
Analyze Ethical and Privacy Implications	Exceeds proficiency in an exceptionally clear, insightful, sophisticated, or creative manner	Analyzes ethical and privacy implications of an AI algorithm	Shows progress toward proficiency, but with errors or omissions	Does not attempt criterion	45
Articulation of Response	Exceeds proficiency in an exceptionally clear, insightful, sophisticated, or creative manner	Clearly conveys meaning with correct grammar, sentence structure, and spelling, demonstrating an understanding of audience and purpose	Shows progress toward proficiency, but with errors in grammar, sentence structure, and spelling, negatively impacting readability	Submission has critical errors in grammar, sentence structure, and spelling, preventing understanding of ideas	5
Citations and Attributions	Uses citations for ideas requiring attribution, with few or no minor errors	Uses citations for ideas requiring attribution, with consistent minor errors	Uses citations for ideas requiring attribution, with major errors	Does not use citations for ideas requiring attribution	5
				Total:	100%