**CS 390 – FALL 2021**

**PURDUE UNIVERSITY**

**Lab 2**

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**Student Information**

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**Project Information**

* Git Repository: [Link](https://github.com/nalinahuja/CS390-NIP/tree/main/lab2)

**Resources****Used**

* CS 390-NIP Lecture Slides: [Lecture 5](https://docs.google.com/presentation/d/e/2PACX-1vQEEb5fOl9V6OmP__M2jDJCjevKhcyhNM-CX2_JK-8w3H5XhnMB0hHQFfE4OeGebSfuQZsBcrol-YHb/pub?start=false&loop=false&delayms=3000#slide=id.p), [Lecture 6](https://docs.google.com/presentation/d/e/2PACX-1vRiPhLmER7I6obbtf1mTkOUzEHJuABgLkoIe1GXkRtxNPDCw-W0H3szB7juHNu4G9lkGvfxS1B3S2ed/pub?start=false&loop=false&delayms=3000#slide=id.p)
* API Documentation: [Keras](https://keras.io/), [TensorFlow](https://www.tensorflow.org/)

**Lab Milestones**

* TensorFlow Artificial Neural Network [5]
  + Fully functioning artificial neural network using Keras and TensorFlow.
    - Can be added to pipeline when .
* TensorFlow Convolutional Neural Network [10]
  + Fully functioning convolutional neural network using Keras and TensorFlow.
    - Can be added to pipeline when .
* Accuracy [58]
  + Fully functioning convolutional neural network using Keras and TensorFlow.
    - Achieves 99.37% classification accuracy for mnist\_d dataset [10].
    - Achieves 92.11% classification accuracy for mnist\_f dataset [10].
    - Achieves 74.71% classification accuracy for cifar\_10 dataset [11].
    - Achieves 55.21% classification accuracy for cifar\_100\_c dataset [12].
    - Achieves 41.97% classification accuracy for cifar\_100\_f dataset [12 + 3 EC].
* Pipeline [10]
  + Pipeline can be configured to use the cifar\_10, cifar\_100\_c, and cifar\_100\_f datasets [6].
  + Bar plots for ANN and CNN accuracies for all datasets can be found [here](https://github.com/nalinahuja/CS390-NIP/tree/main/lab2/plots) [4].

**Lab Questions**

*How is a CNN superior to a standard ANN for image processing?*

TODO

*Why do we sometimes use pooling in CNNs?*

TODO

*Why do you think the cifar* *datasets are harder than mnist?*

TODO

**CNN Model Accuracy Optimization**

TODO

**CNN Hyperparameter Explanation**

TODO

**ANN Outputs**

**CNN Outputs**