Predicting Pneumonia in Chest X-Rays

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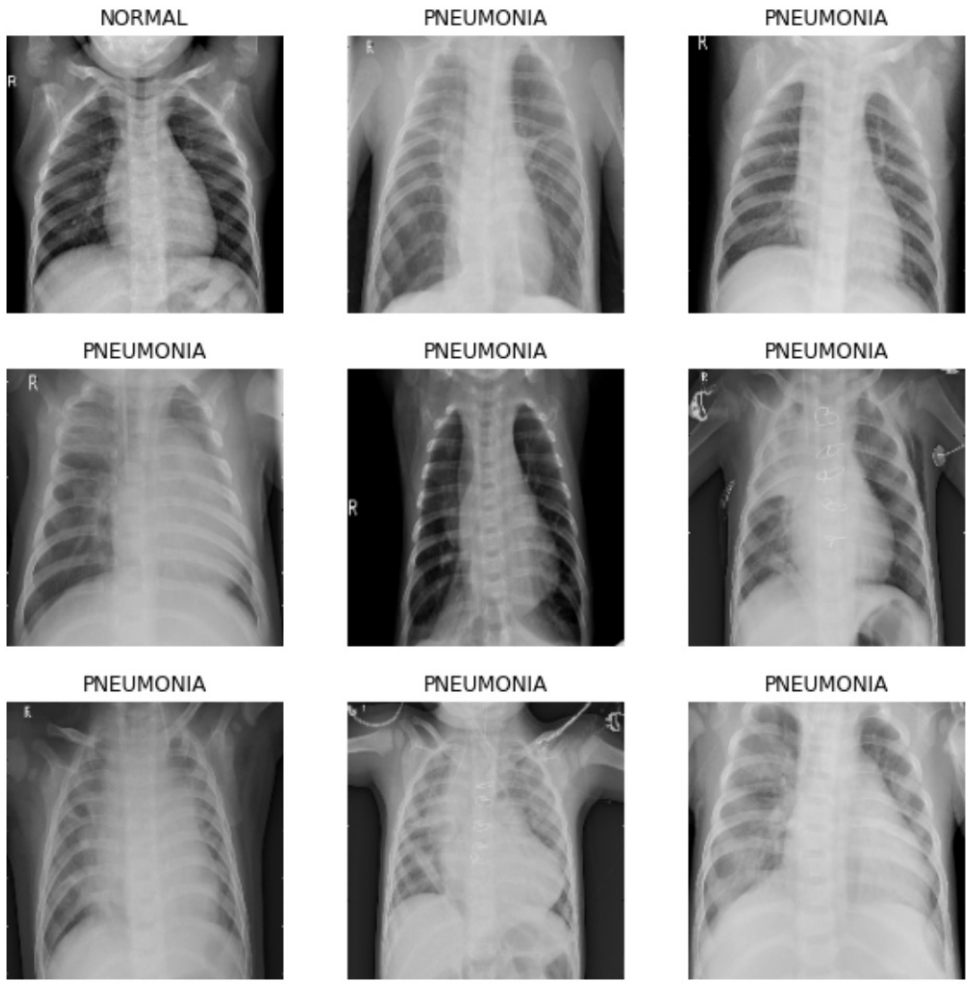
Flat Iron - Data Science
Module 4



Research Question

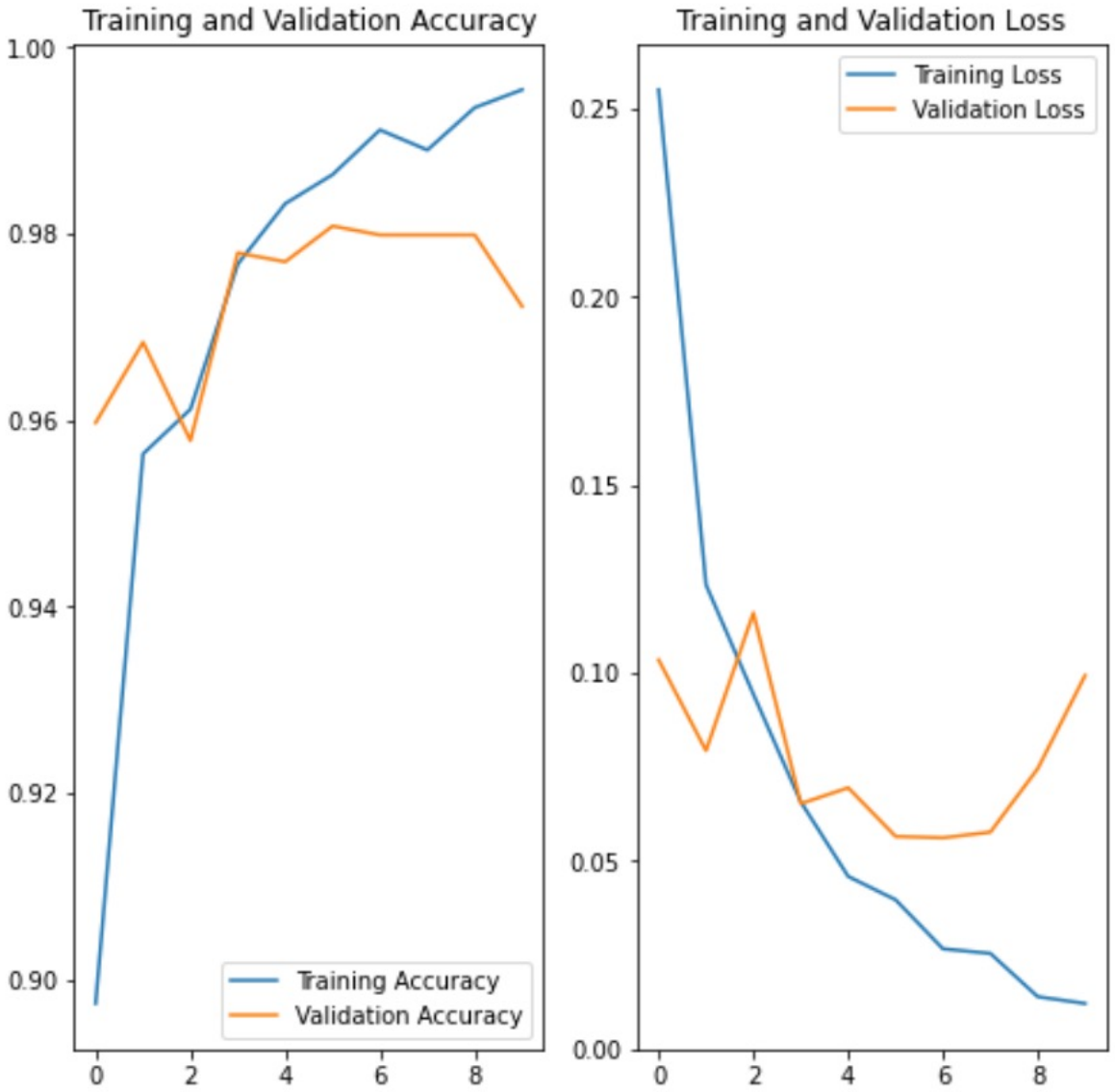
Given a set of patient chest x-rays, can we accurately predict pneumonia cases?

Iteration:

Adjusting layers

```
Epoch 1/10
131/131 [==============================] - 129s 982ms/step - loss: 0.2551 - accuracy: 0.8974
Epoch 2/10
131/131 [==============================] - 124s 941ms/step - loss: 0.1234 - accuracy: 0.9564
Epoch 3/10
131/131 [==============================] - 123s 939ms/step - loss: 0.0944 - accuracy: 0.9612
Epoch 4/10
131/131 [==============================] - 123s 943ms/step - loss: 0.0657 - accuracy: 0.9768
Epoch 5/10
131/131 [==============================] - 120s 917ms/step - loss: 0.0459 - accuracy: 0.9832
Epoch 6/10
131/131 [==============================] - 119s 908ms/step - loss: 0.0397 - accuracy: 0.9863
Epoch 7/10
131/131 [==============================] - 122s 932ms/step - loss: 0.0267 - accuracy: 0.9911
Epoch 8/10
131/131 [==============================] - 120s 919ms/step - loss: 0.0254 - accuracy: 0.9890
Epoch 9/10
131/131 [==============================] - 120s 920ms/step - loss: 0.0139 - accuracy: 0.9935
Epoch 10/10
131/131 [==============================] - 123s 937ms/step - loss: 0.0121 - accuracy: 0.9954
```

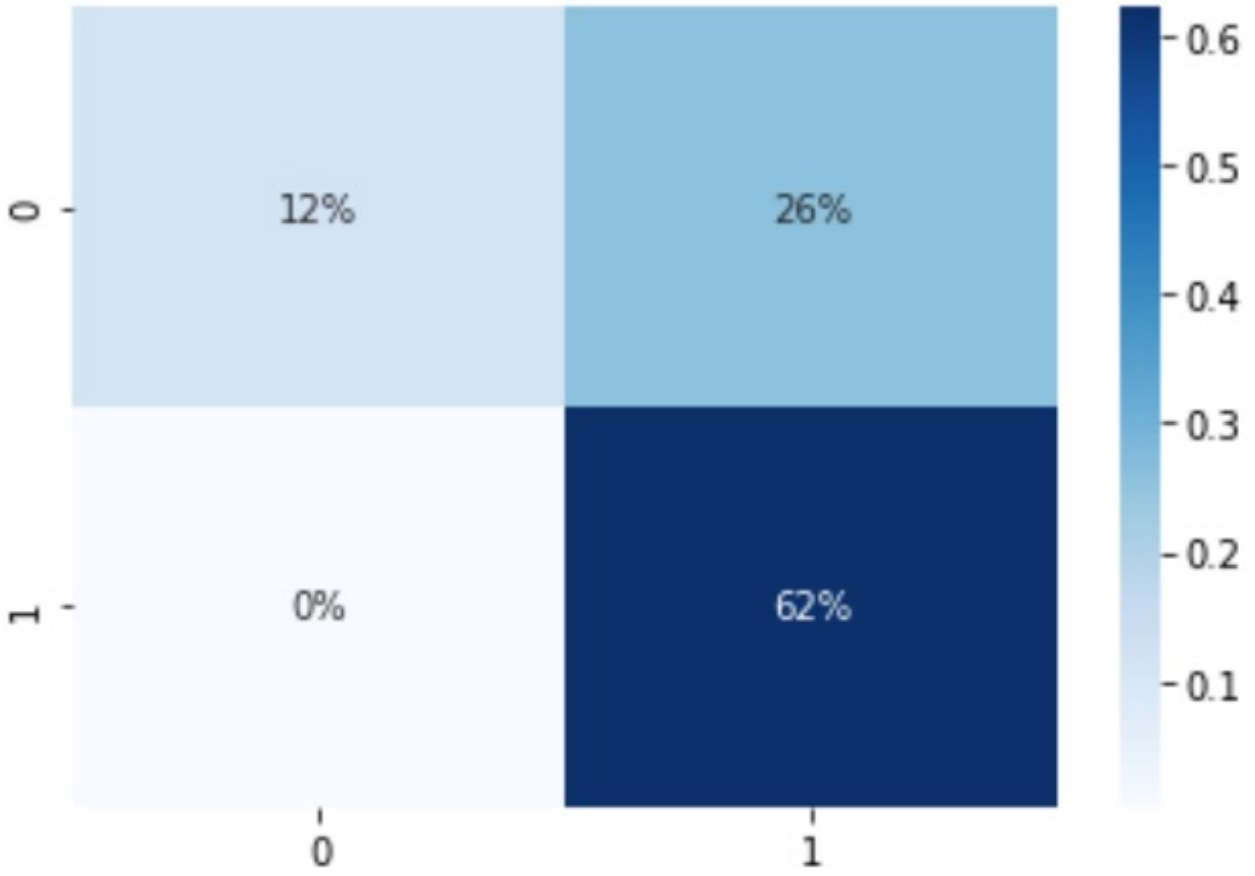
Diminished return on resources



Results:

A more useful tool.

73.72 %



Take-aways

- SageMaker is a useful tool for integrating cloud-based computing resources when faced with local memory constraints.
- Keras is more explicitly documented and easier to implement and tune.

Future avenues for exploration

- Would different weighting techniques yield greater accuracy?
- What types of patient data (ie, sex, smoker) are most clearly represented in the images?

Sources

- https://colab.research.google.com/github/tensorflow/docs/blob/master/site/en/tutorials/images/classification.ipynb#scrollTo=dC40sRITBSsQ
- https://machinelearningmastery.com/how-to-make-classification-and-regression-predictions-for-deep-learning-models-in-keras/
- https://www.pyimagesearch.com/2019/02/04/keras-multiple-inputs-and-mixed-data/

Thank you!