Pneumonia Detection

TENSORFLOW & KERAS

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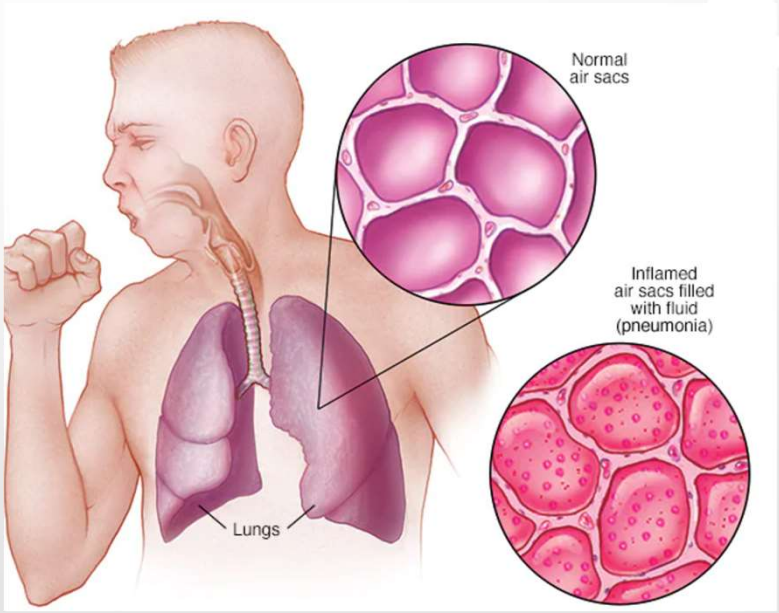
What is Pneumonia?

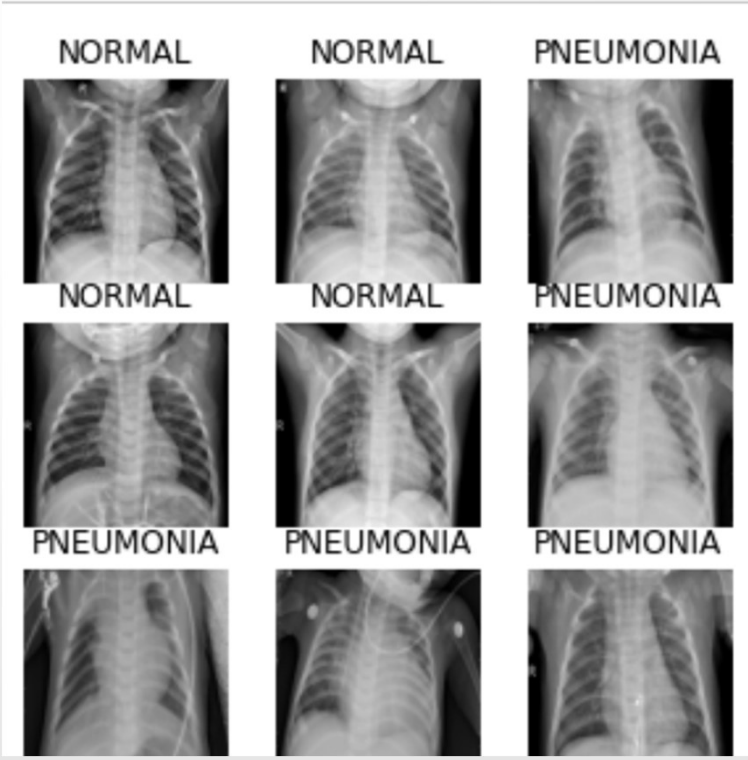
Pneumonia is a common lung infection caused by bacteria, a virus, or fungi. It is often spread via coughing, sneezing, touching or even breathing, and those who don't exhibit symptoms can also spread the illness. It may resemble common cold and flu symptoms.

- The symptoms may include:
- Fever;
- Difficulty breathing;
- Chest pain;
- Cough.



Summary

In this project we will use Keras inside TensorFlow to build an algorithm that will help us to make predictions wheatear or not a person has pneumonia based on X-Ray images.



DATA

Dataset provided by Kaggle.

It is free and you can have access to it, here:

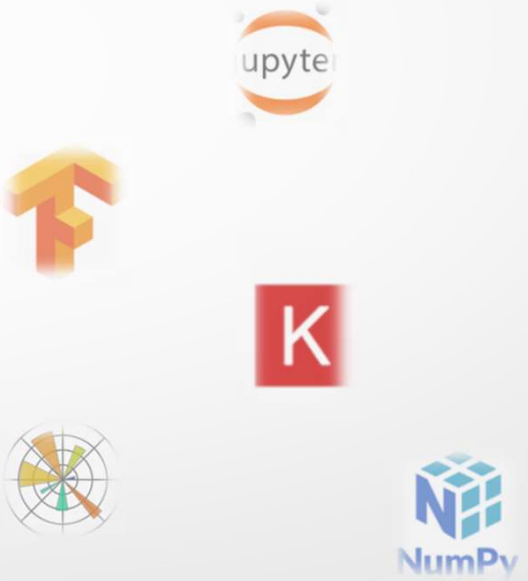
https://www.kaggle.com/paultimothymooney/chest-xray-pneumonia

- The data include 3 file folders belonging to 2 classes.

  2 types of X-Ray imagens defined as "NORMAL" AND "PNEUMONIA".

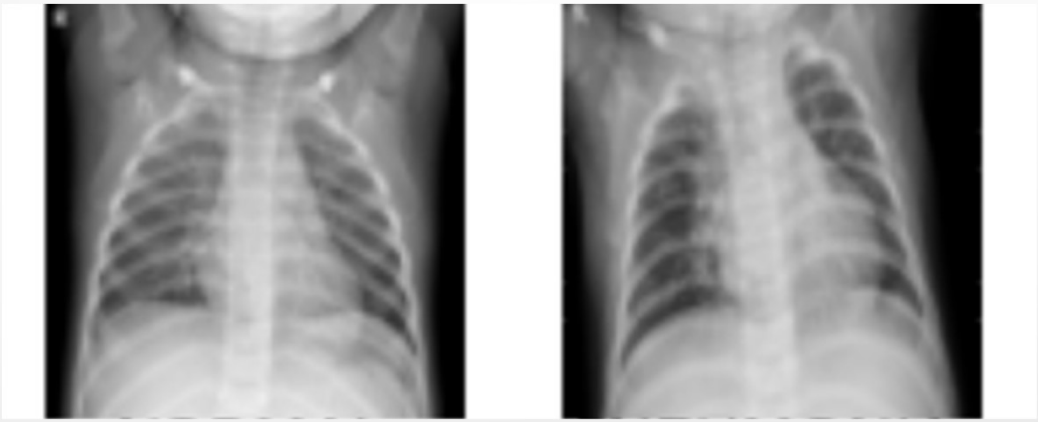
Environment and tools

- Jupyter Notebook;
- TensorFlow;
- Keras;
- Numpy;
- Matplotlib;
- Lime.



Challenge

As you can see, it is hard to have any knowledge of it by looking at it.



Which one of these images should be classified as "Normal" and which one as "Pneumonia"?

Image Classification Model

Applying Convolutional Neural Network (CNN)

- Convolutional Layers
- Pooling Layer
- Fully Connected
- Output

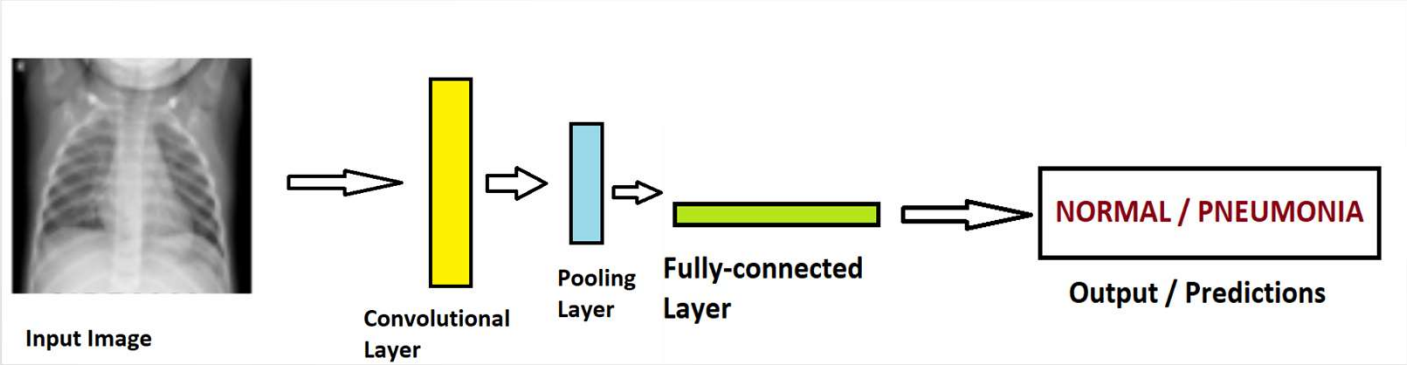


Image Classification Model

- Our model will find parameters starting with simple to more complex parameters deeper in the layers

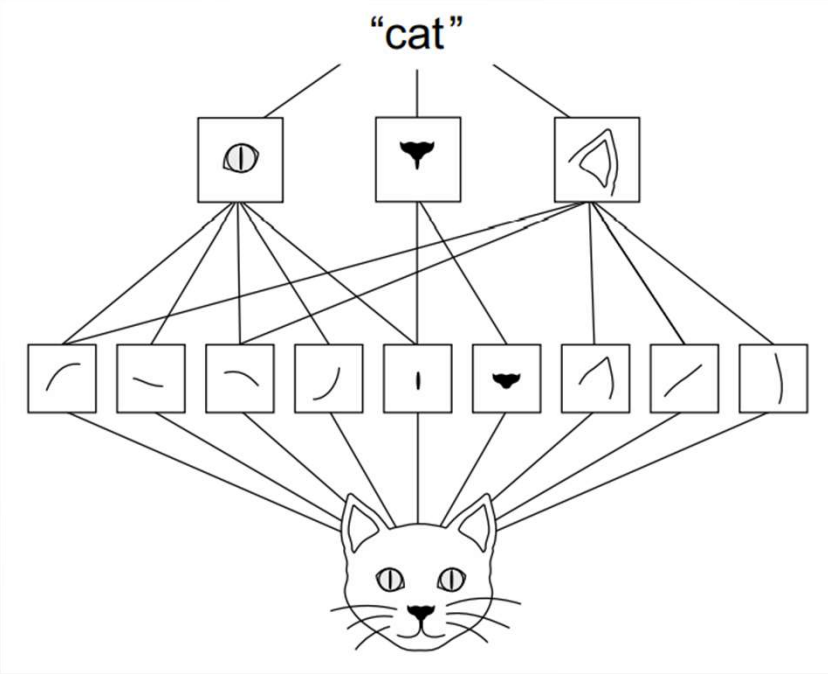


Figure 1. Book: Deep Learning with Python
Francois Chollet; 2017.

Image Classification Model

Single filter:
Matching simple features.

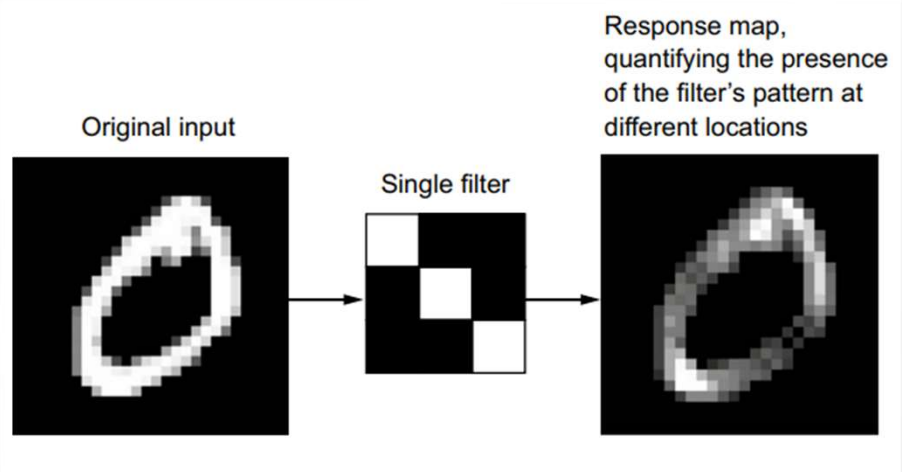
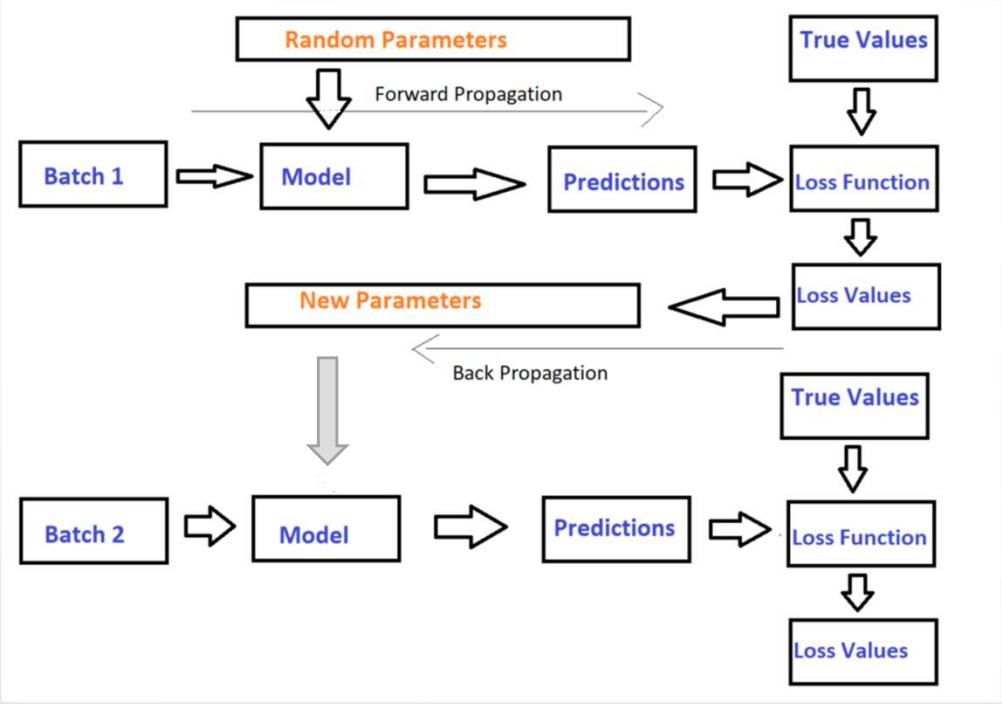


Figure 2. Book: Deep Learning with Python

Francois Chollet; 2017.

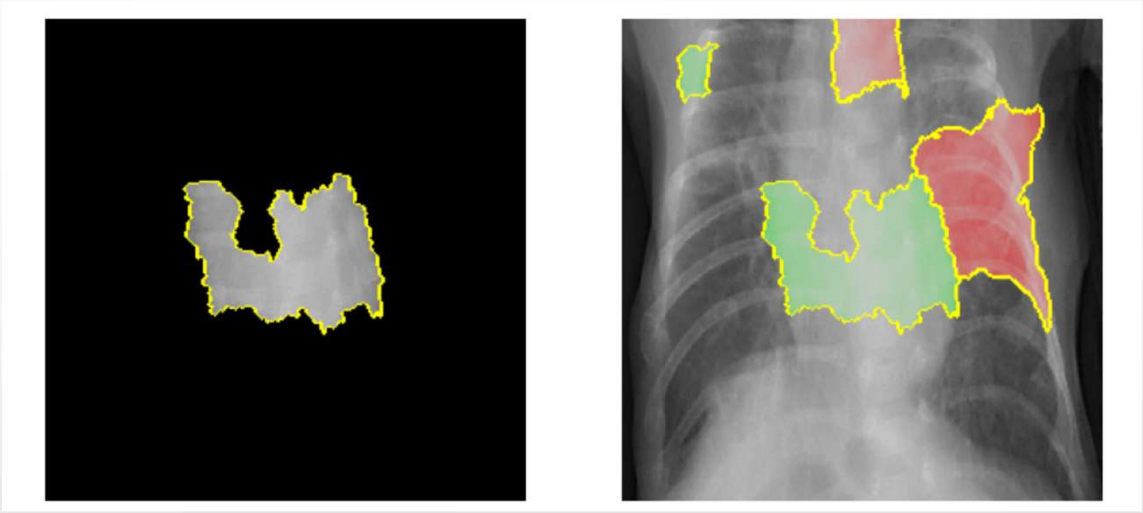
Deep Learning Algorithm



Lime Package

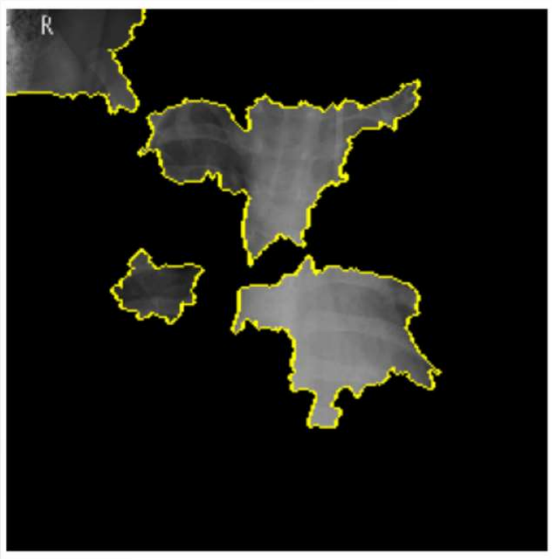
local interpretable model-agnostic explanations

- I used Lime to have a better understand, how the model is getting its parameters



Lime

- The green parameter stands for as positive pneumonia
- The red parameter stands for normal condition.
- The model will then, measure both parts and it will define its condition based on its weight.
- The example below pointed to PNEUMONIA.



FINAL RESULTS

Convolutional Neural Network

We achieved a results of 90% of the test model accuracy

Thank you!!!!

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