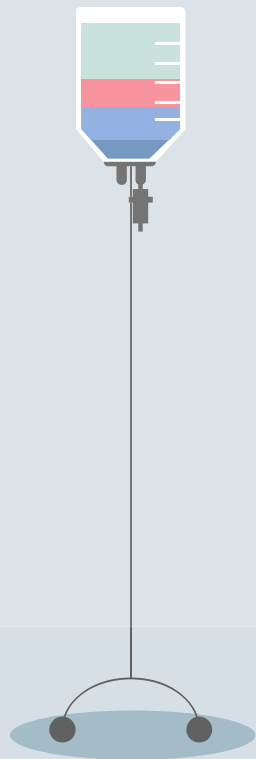


Detecting Pneumonia Using Deep Learning

Jenny Wang | June 2020



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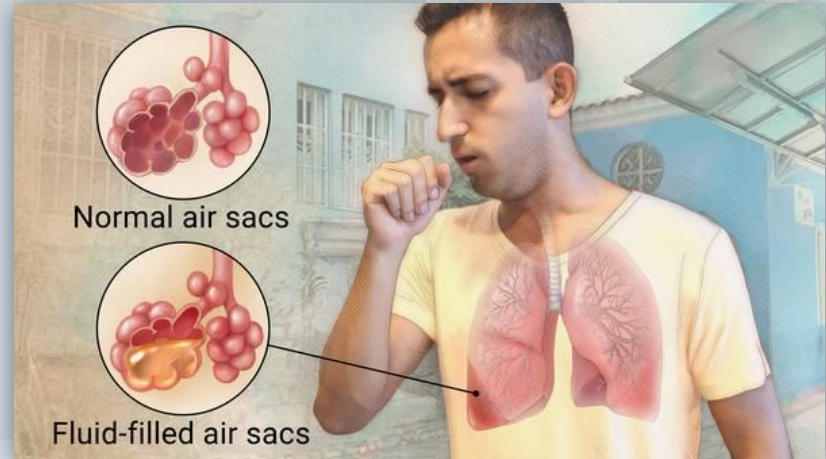
06

FUTURE WORK

WHAT IS PNEUMONIA?

WHAT IS PNEUMONIA?

Pneumonia is a severe lung infection, where it causes the **air sacs in the lungs to be filled with fluid**.



FACTS ABOUT PNEUMONIA

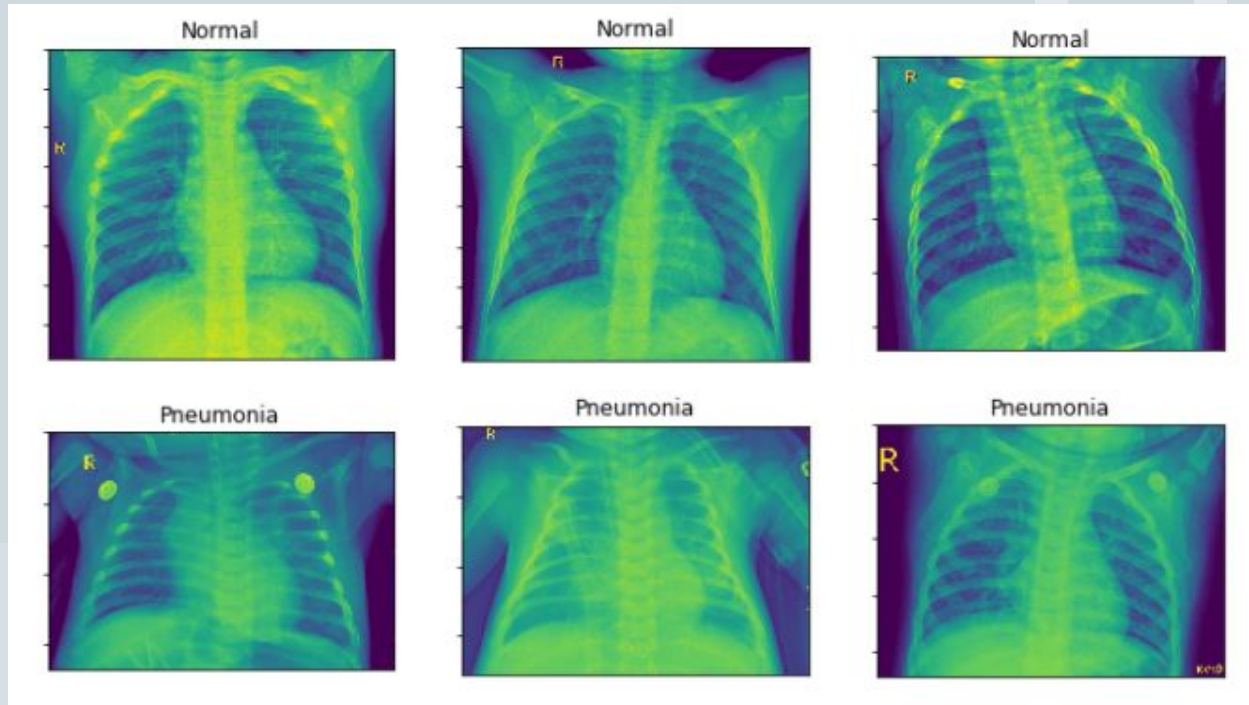
World's leading cause of death
for children under age of 5

#1 cause of hospital admission
for US children

#2 cause of hospital admission
for US adults

CONTEXT

X-rays have long been the best tool to detect Pneumonia.



CONTEXT

Radiologists still have a hard time identifying lung infection, delaying diagnosis.

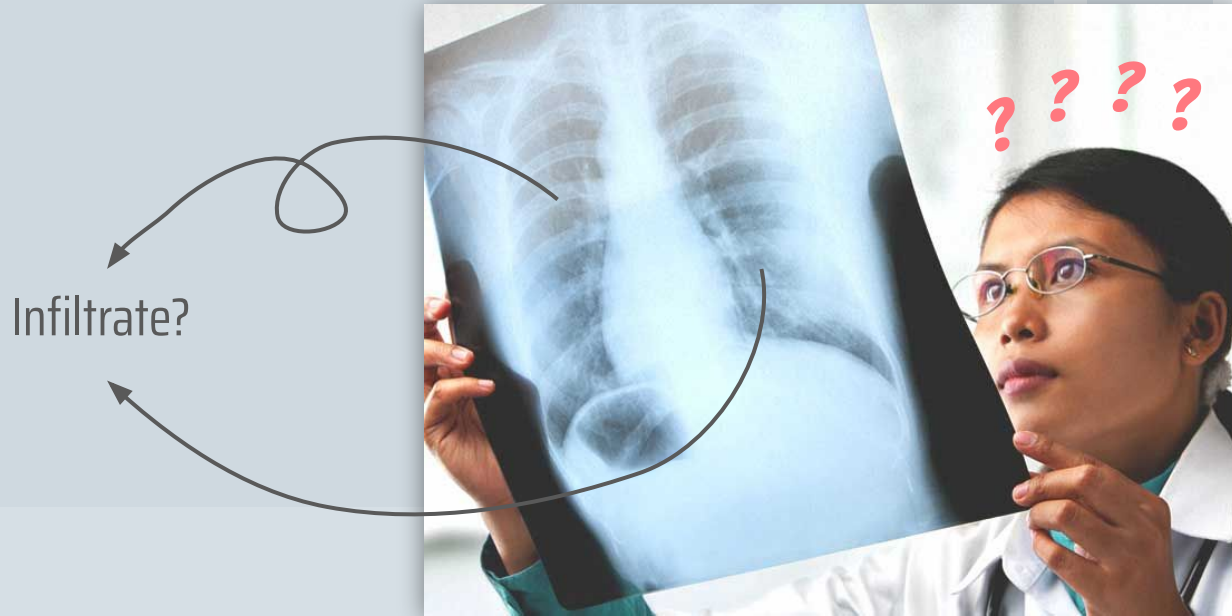
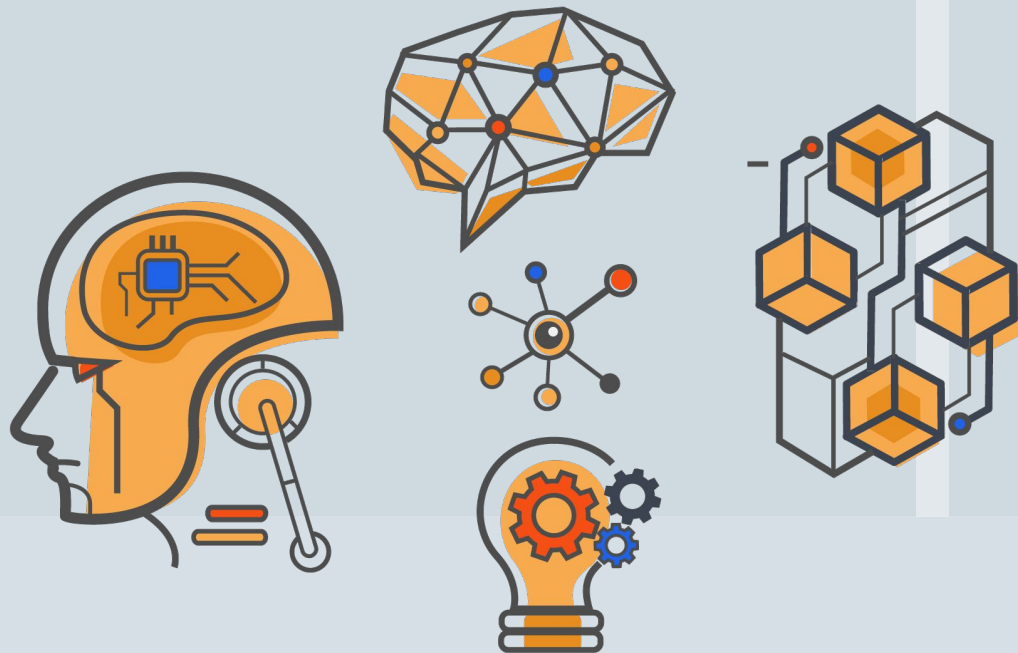


Photo Source: [Healthline](https://www.healthline.com)

CONTEXT

Deep learning can help!

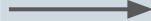


APPROACH



Data Collection

Chest X-ray scan images
from [Kaggle](#)



Data Exploring

Handle class imbalance

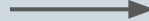
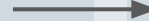


Image Preprocessing

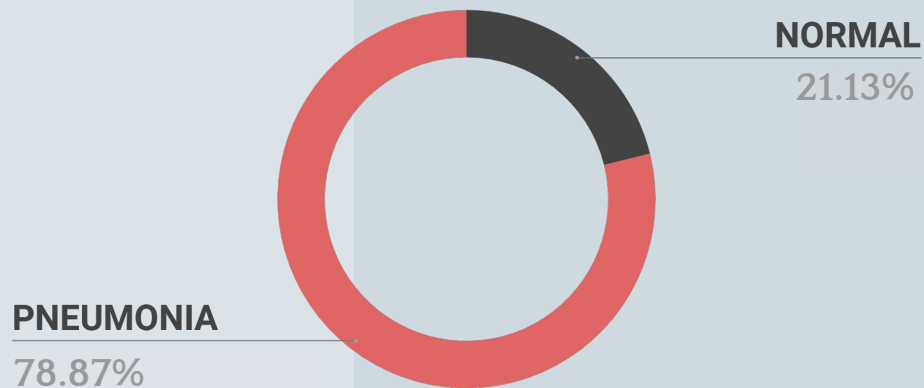
Pixel normalization
Image augmentation



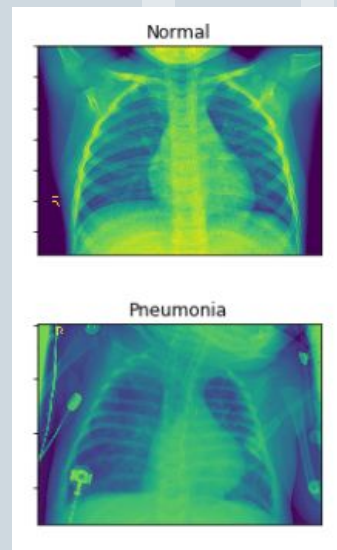
Data Modeling

Convolutional Neural
Network (CNN)

DATA



Training Dataset Class Pie Chart



4,139 Chest X-ray Scans

TARGET

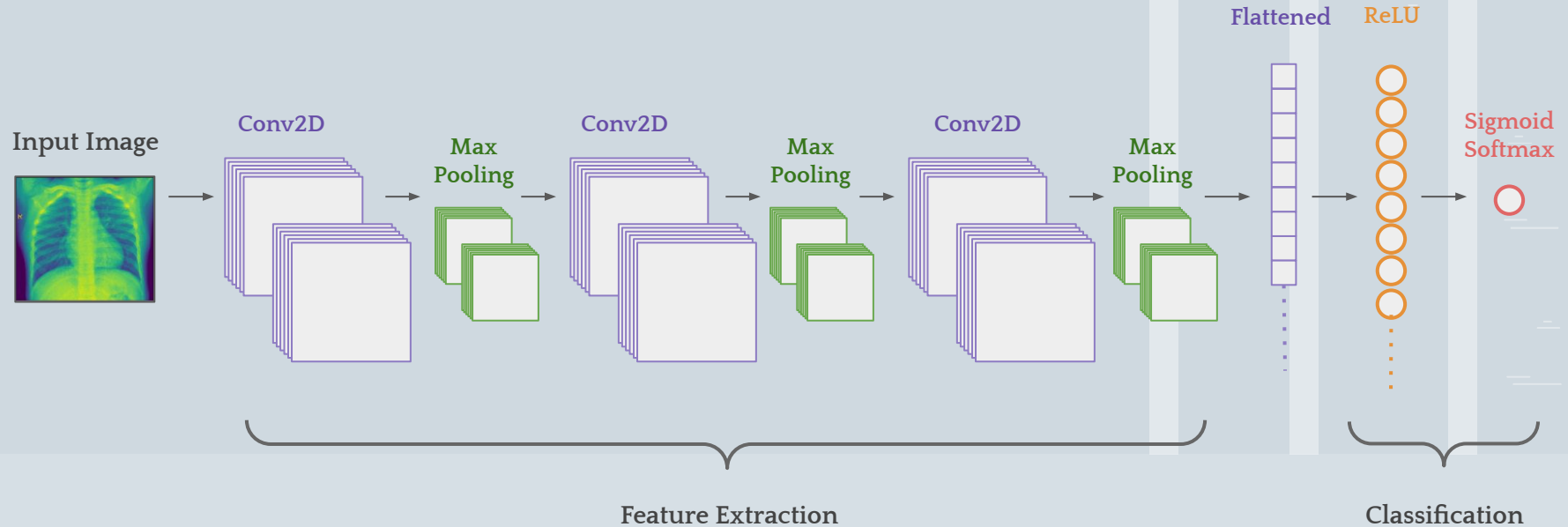


PNEUMONIA



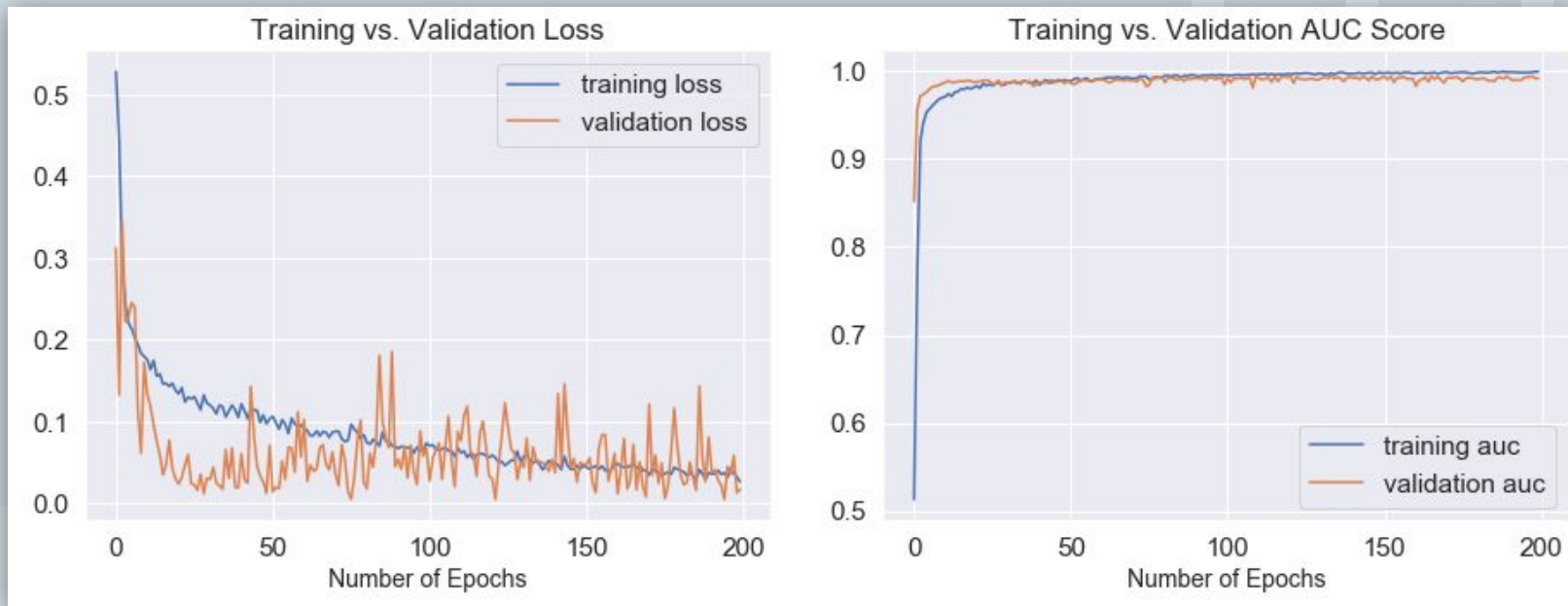
NORMAL

CNN MODEL ARCHITECTURE (HIGH LEVEL)



RESULTS

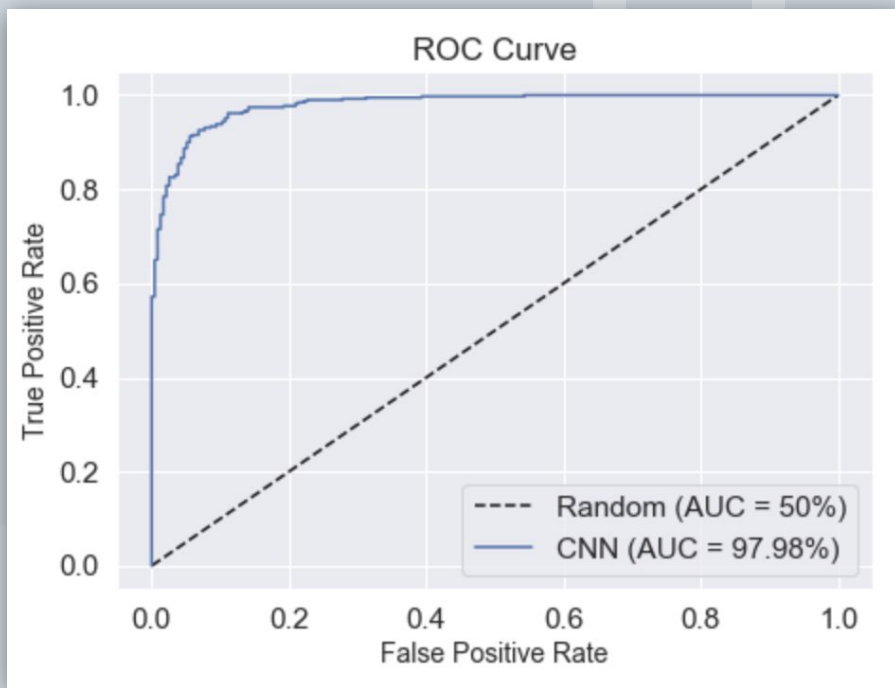
TRAINING VS. VALIDATION: Loss & AUC Score



RESULTS

97.98%
AUC

ROC CURVE



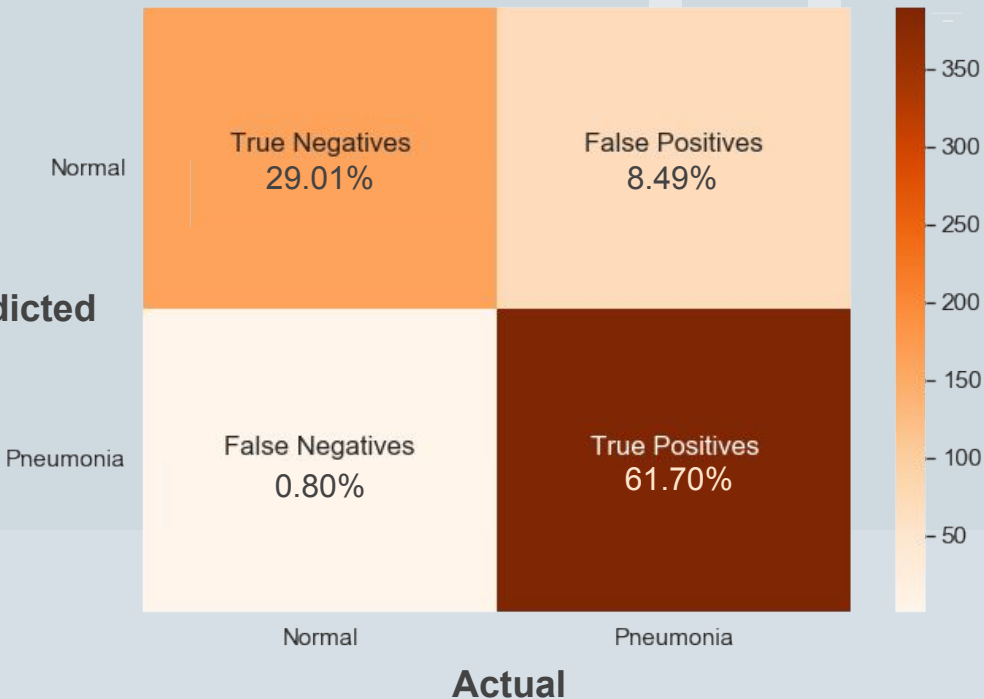
RESULTS

98.72%

RECALL

Predicted

CONFUSION MATRIX



Are there limitations to
our model performance?



OBTAIN MORE DIVERSE DATASET TO ENSURE MODEL ROBUSTNESS

Current Model

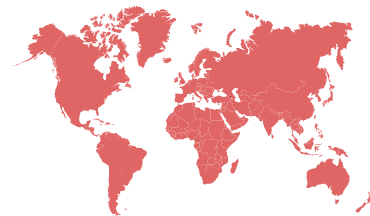


**Patients Demographics of
Chest X-Ray Scans:**

- + **Age:** < 5 years old
- + **Residence:** China



Ideal Model



**Patients Demographics of
Chest X-Ray Scans:**

- + **Age:** Children + Adults
- + **Residence:** World

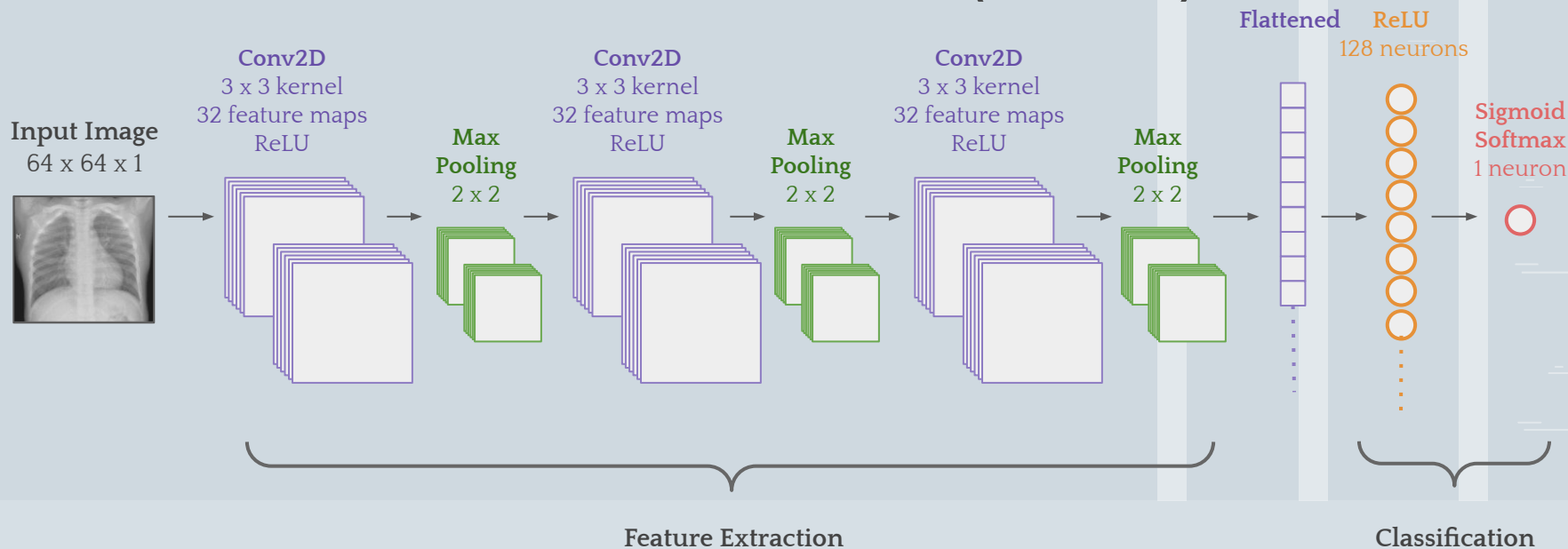
THANK YOU

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in



CNN MODEL ARCHITECTURE (DETAILED)



Optimizer: Adam | Loss Function: Binary Cross-entropy