

AUTOMATING PNEUMONIA DIAGNOSIS



PRESENTATION SCOPE

Machine Learning for Health Care

Business Problem
Data
Methods
Model
Conclusions
Future Directions





BUSINESS PROBLEM

Pulmonologists at Research Hospital would like to improve diagnosis of lung conditions using x-rays.

Can machine learning models be taught to distinguish between healthy and infected lungs?

DATA

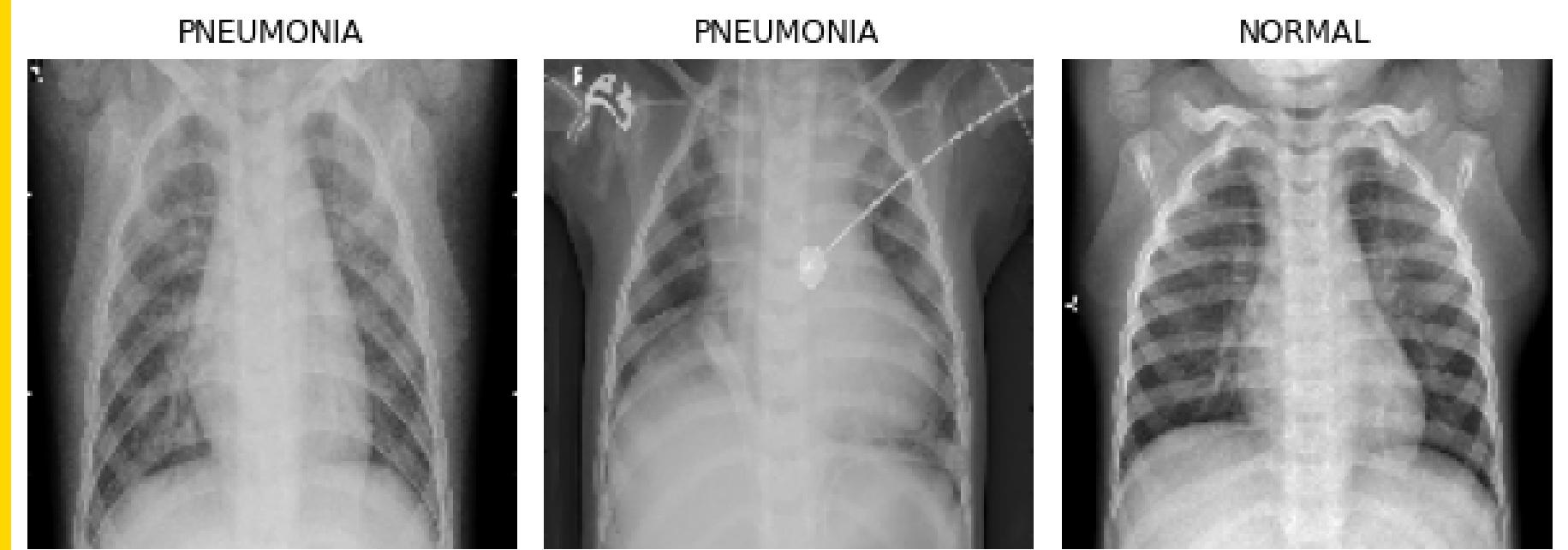
Chest X-Rays from pediatric patients

Classes: Normal & Pneumonia

Training set: 5216 images

Testing set: 624 images

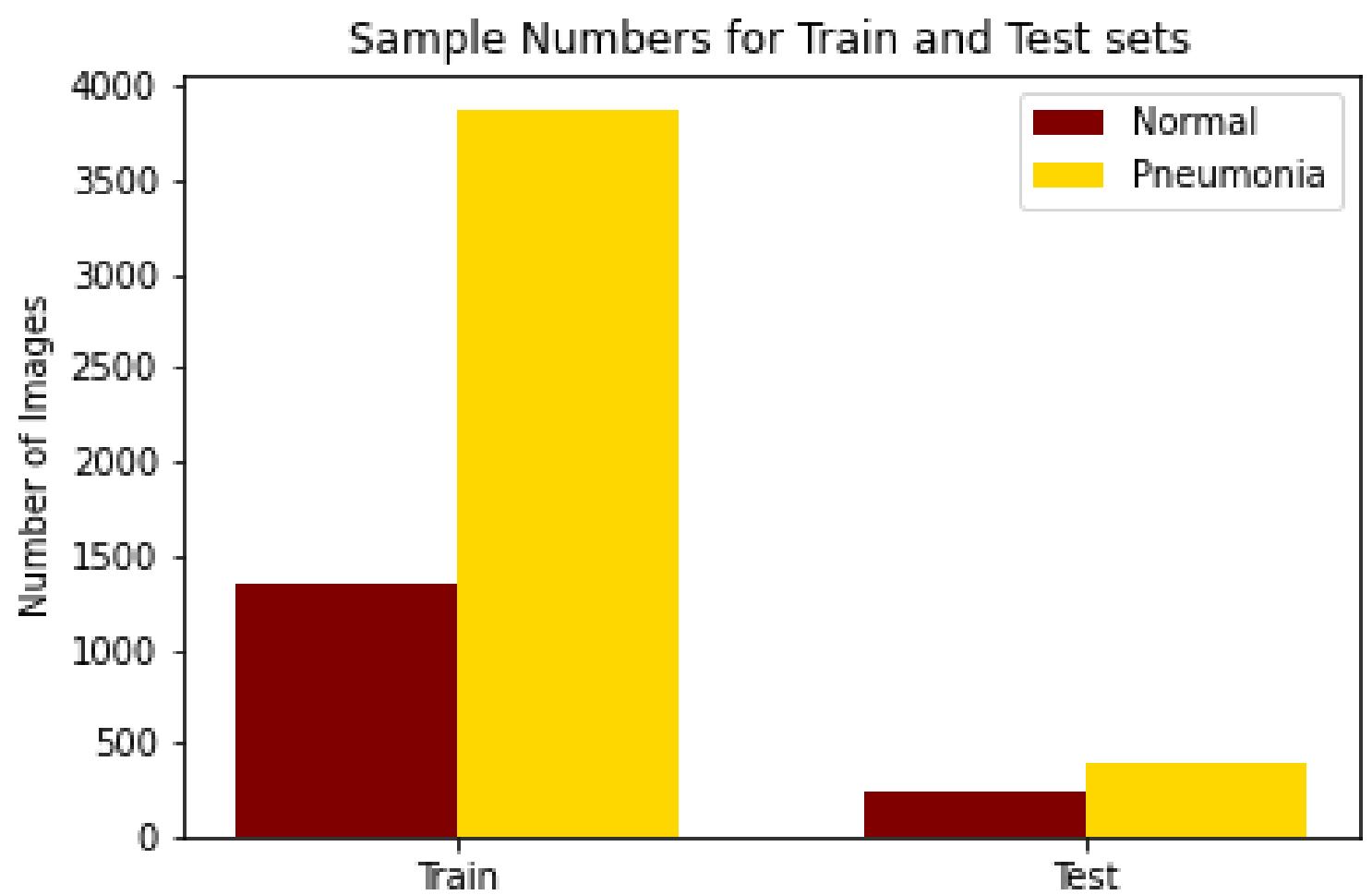
Validation set: 16 images



METHODS

Convolutional Neural Network
-mimic visual perception

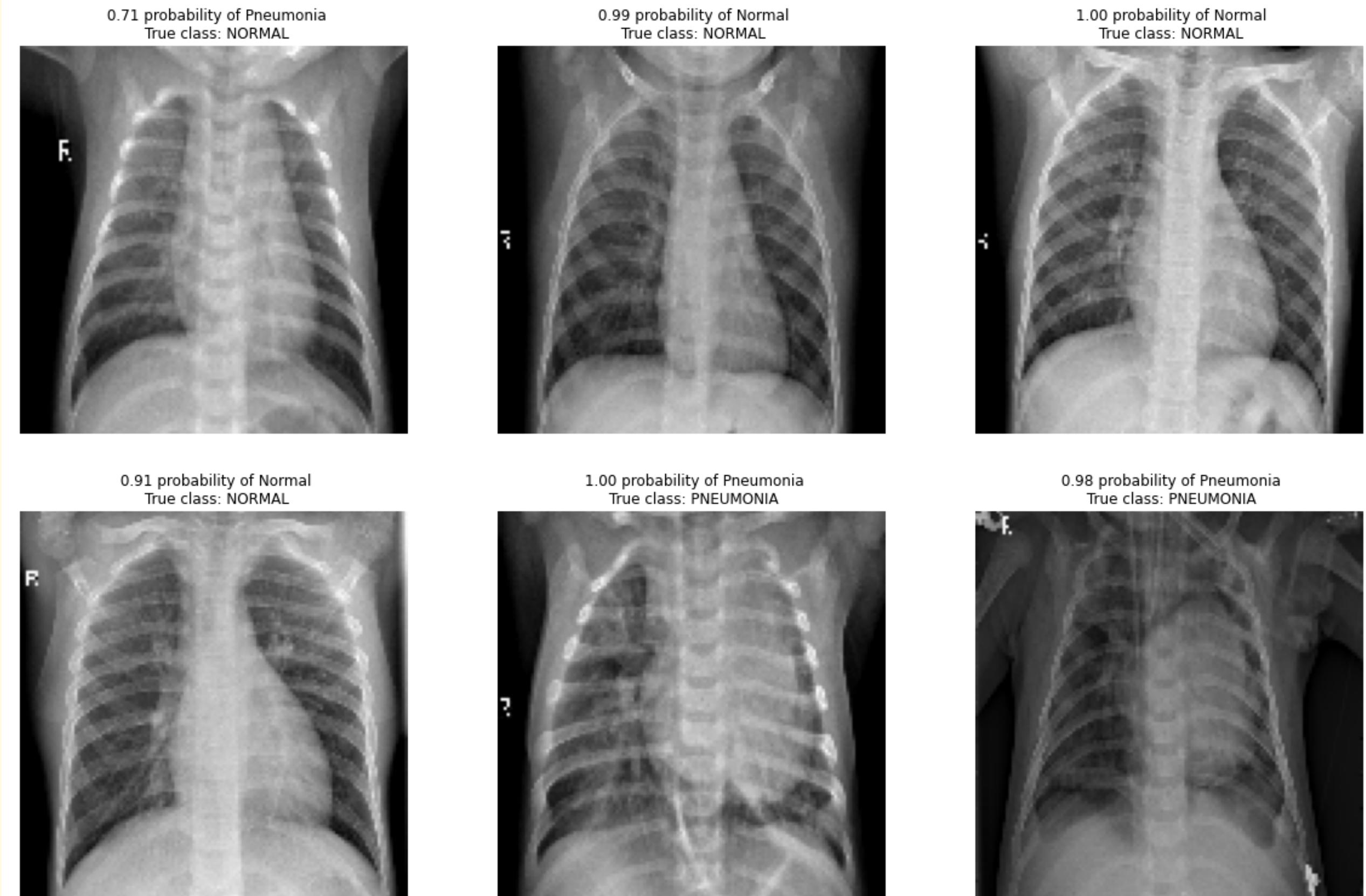
Data is imbalanced
- augmented with very small shifts in image orientation



MODEL

Test Confusion Matrix		
True label	NORMAL	PNEUMONIA
NORMAL	187	47
PNEUMONIA	14	376

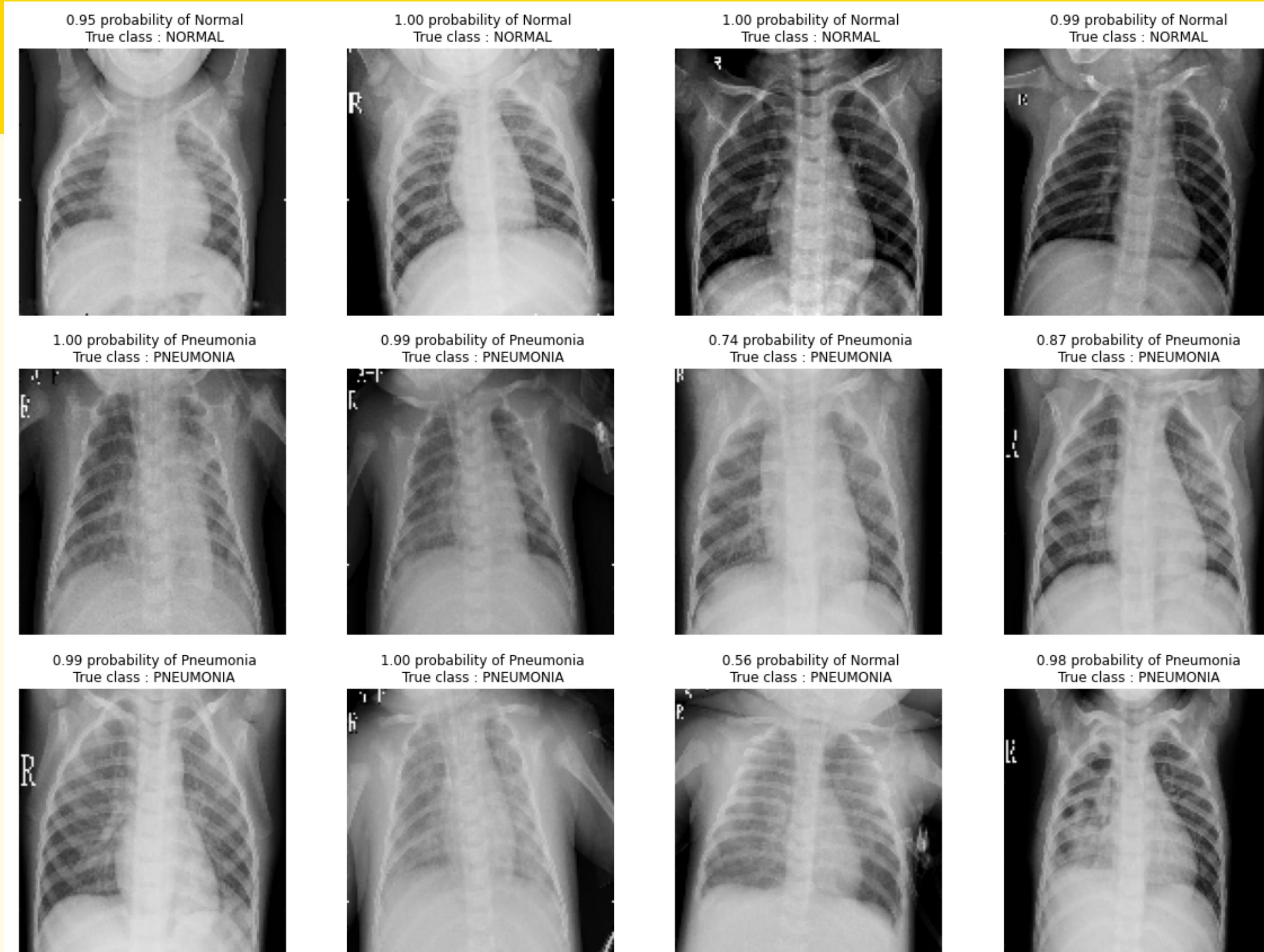
Predicted label



MODEL

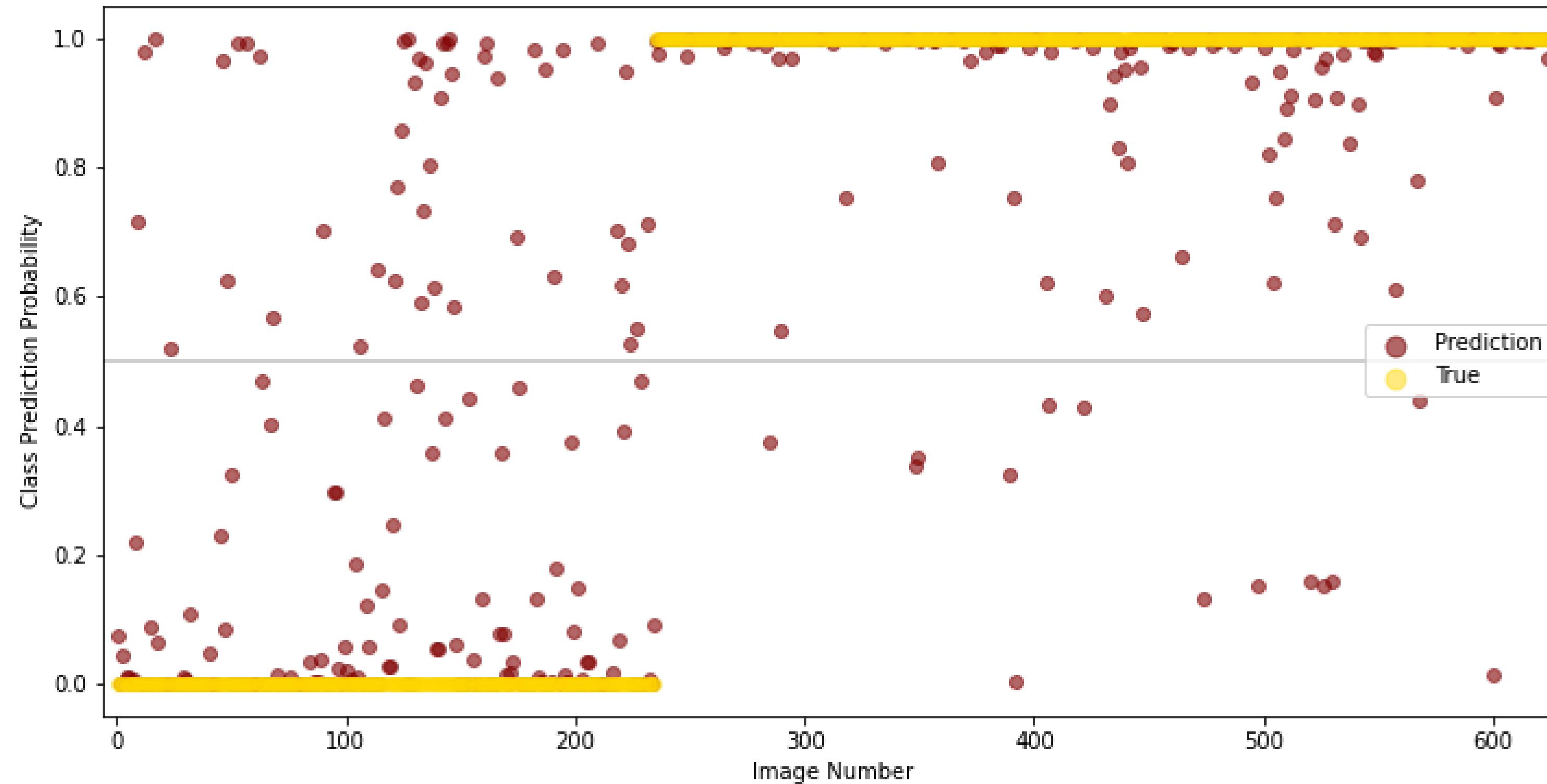
True label

		Validation Confusion Matrix	
		NORMAL	PNEUMONIA
True label	NORMAL	8	0
	PNEUMONIA	1	7
Predicted label		NORMAL	PNEUMONIA

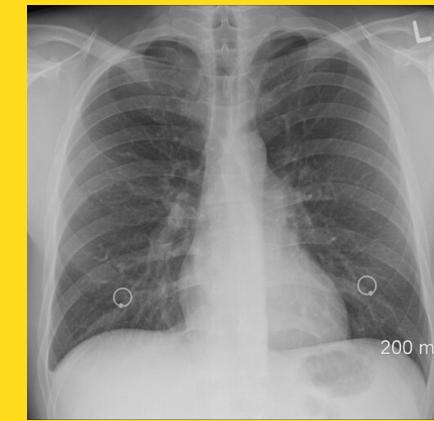


MODEL

Prediction Probability and True Class of Test Images



CONCLUSIONS & FUTURE DIRECTIONS



Current Model

Was able to differentiate
between normal and
pneumonia x-rays



Improved Model

Continue tuning the
model to decrease false
negatives



Diagnostic Model

Train a model to
determine infection
type



THANK YOU!

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