Image Classification of Patients with Pneumonia

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Addressing the problems with the healthcare system

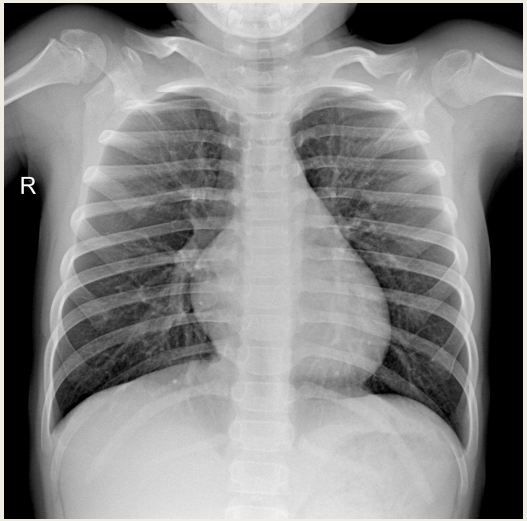
- Doctor shortage
- Burnout in healthcare workers
- Poor relationships with patients and doctors

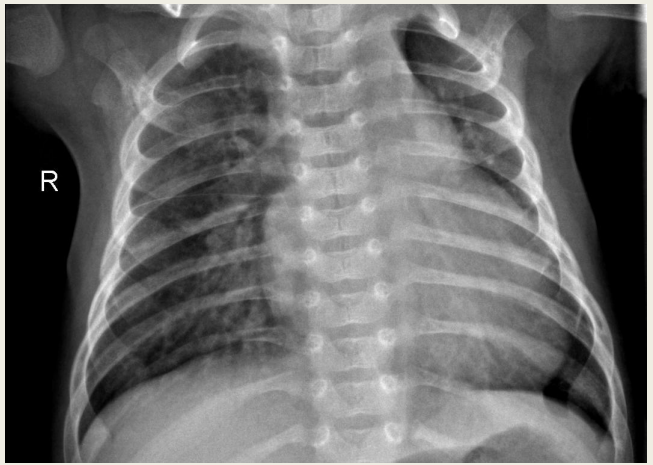
Artificial intelligence in medicine

- Create a highly trained model to help with diagnosis
- Help address the issue of doctor shortages
- May provide a more accurate result

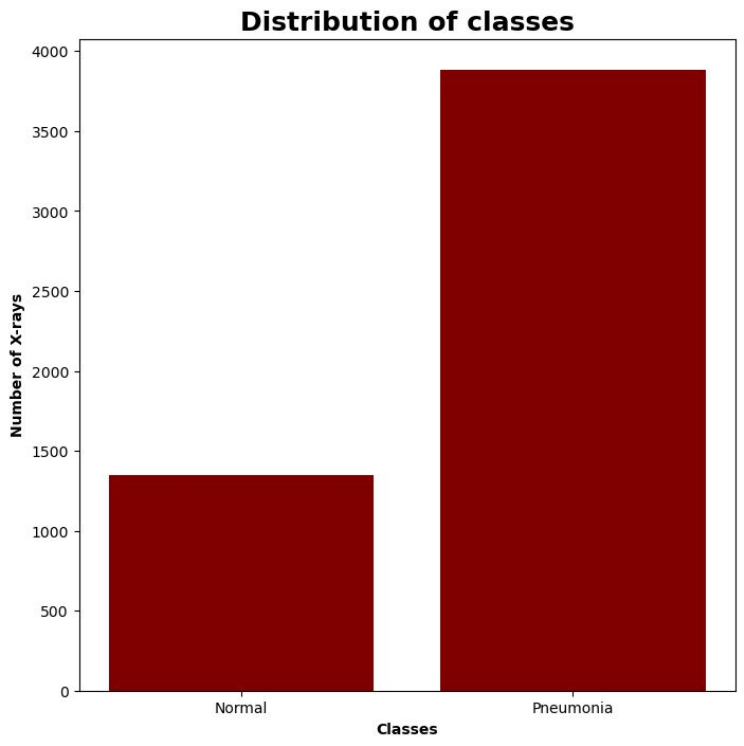
About the data

- Data provided by Mendeley Data
  - *Contains two folders:*
    - Train
    - Test
  - *Two classes in each folder:*
    - NORMAL
    - PNEUMONIA
- X-ray images of the chest as shown
  - *Top: normal lung*
  - *Bottom: lung with pneumonia*





About the data cont.

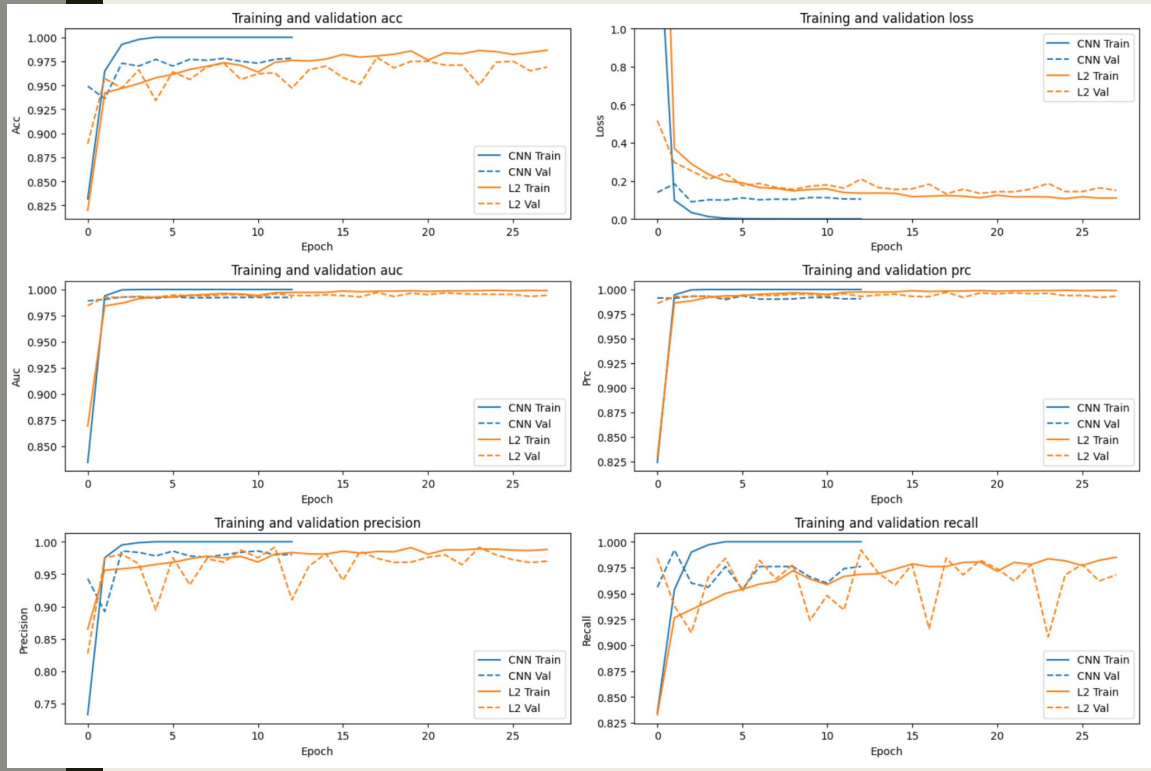


Problems with unbalanced data

- Create a biased model
- Leading to poor predictions
- Overall reduced performance

Method of developing the deep learning model

- Start simple and add complexity
- Add regressions to prevent overfitting
- Plot metrics vs. epoch



Summary of the model with the l2 regularizer

The first dense layer has a l2 regularizer to prevent overfitting

Results of the model

Precision	0.78125
Recall	0.9615384615384616
Accuracy	0.8076923076923077
F1	0.8620689655172413

- Metrics may be improved upon by altering the model
- Accuracy and recall scores should be the main focus
  - *Low recall means high false negatives!*
  - *Will be detrimental to both the patient and hospital*

Summary

- Using the model with the L2 regularization is recommended
  - *Relatively higher accuracy*
  - *High recall score*
- AI has the ability to perform just as well as physicians
  - *Artificial Intelligence Versus Clinicians in Disease Diagnosis*
- Improve treatments
  - *Provide more accurate diagnosis*
  - *Train inexperienced doctors*
- Assists doctors
  - *Lessen the workload of doctors*
  - *Allow doctors to treat more patients*

Thank you!

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