Detecting Pneumonia in Chest Radiographs

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Summary

- **Pneumonia** accounts for 14% of all deaths of children under 5 years old
- **Medecins Sans Limites (MSL)**, an AI-based medical research company, hopes to use **Convolutional Neural Networks** to identify patients with pneumonia based on **Chest Radiographs**

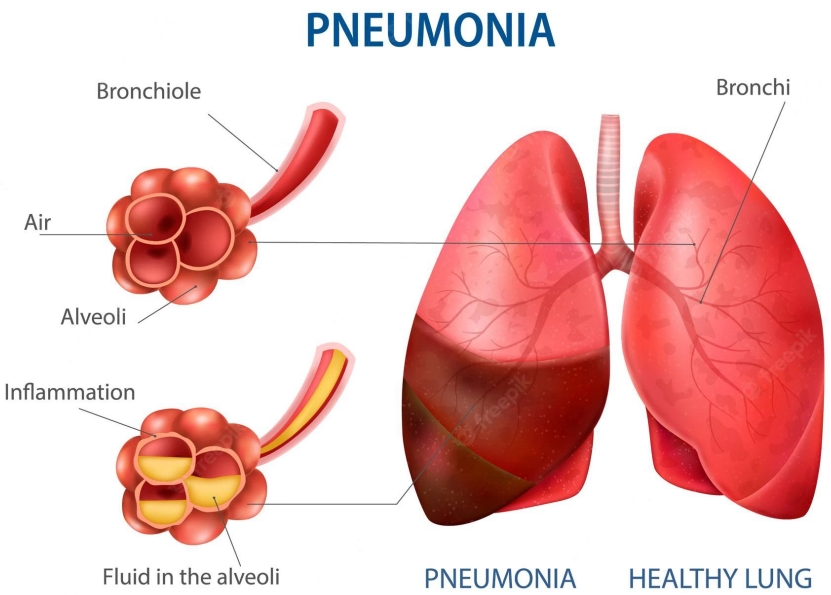
Outline

- The Problem
- Data
- Methods
- Results
- Conclusions

The Problem

- According to the World Health Organization, pneumonia accounts for 14% of all deaths of children under 5 years old, **killing almost 800,000 children in 2019**

- Medical Professionals need tools to accurately identify and treat illnesses worldwide

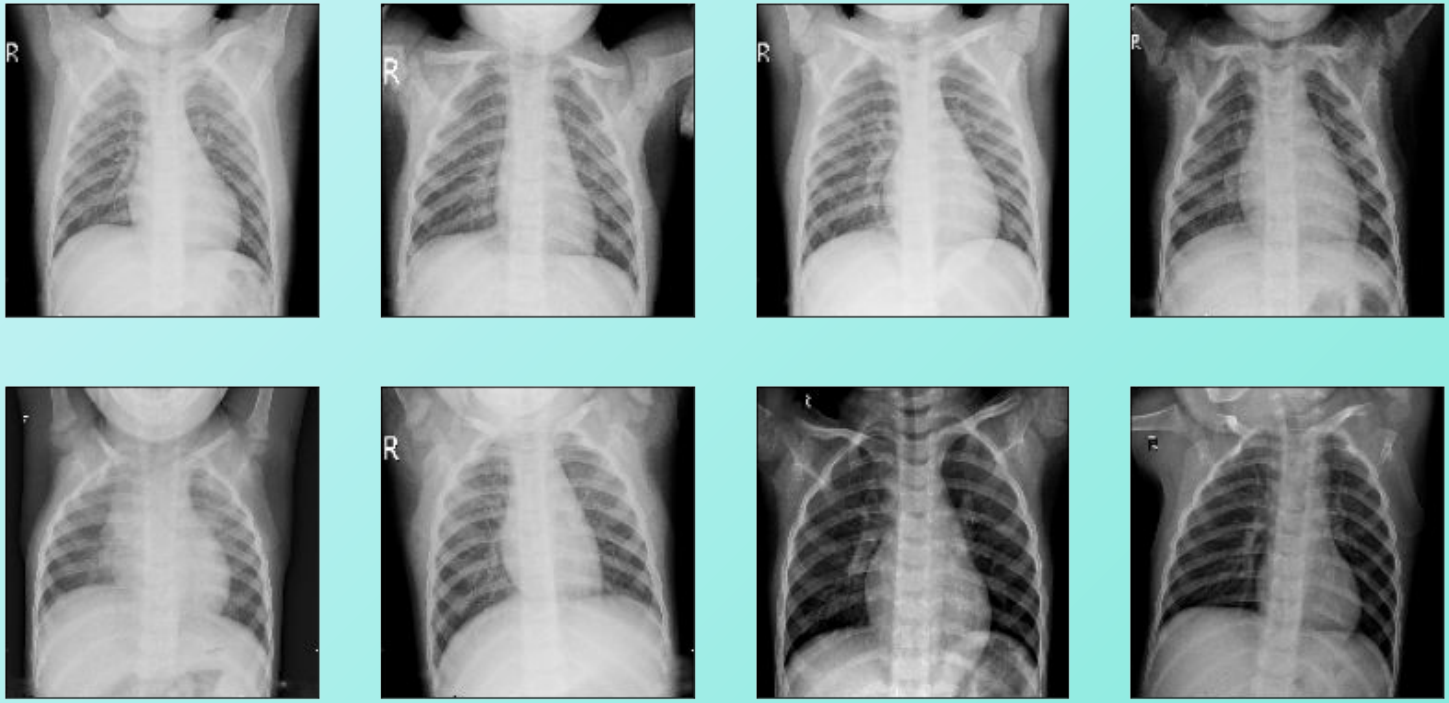


Data

- 5,863 Total Images
- X-Rays from pediatric patients 1-5 years old
- Classes reduced to 2: NORMAL and PNEUMONIA

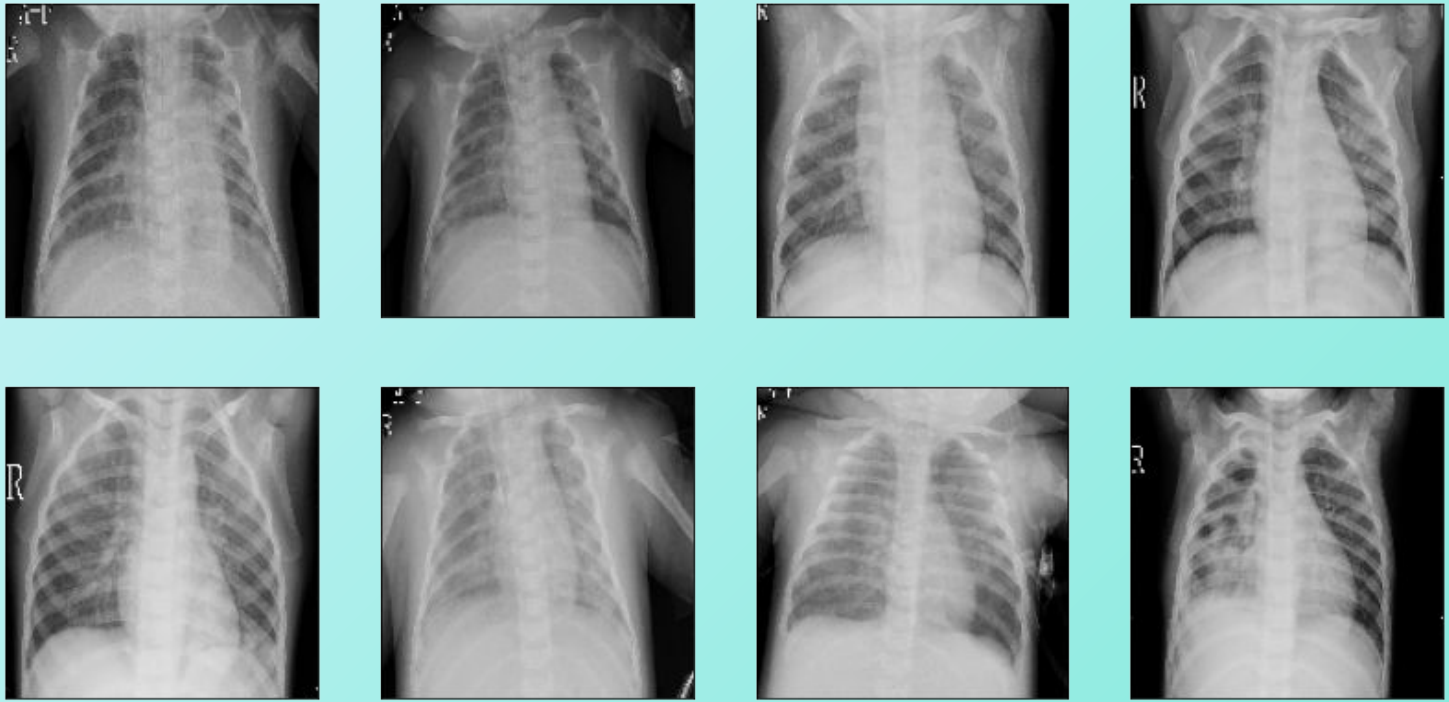
Data

Data Labeled NORMAL

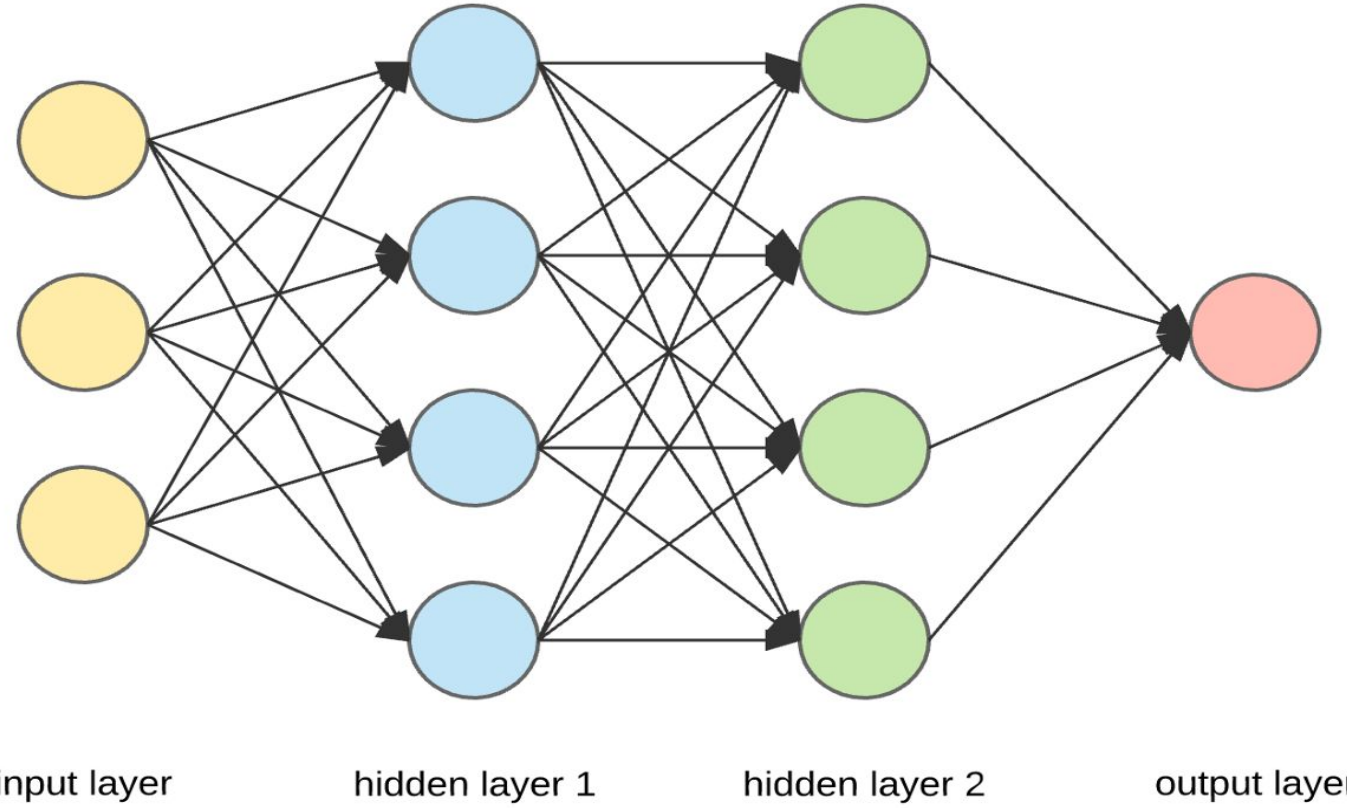


Data

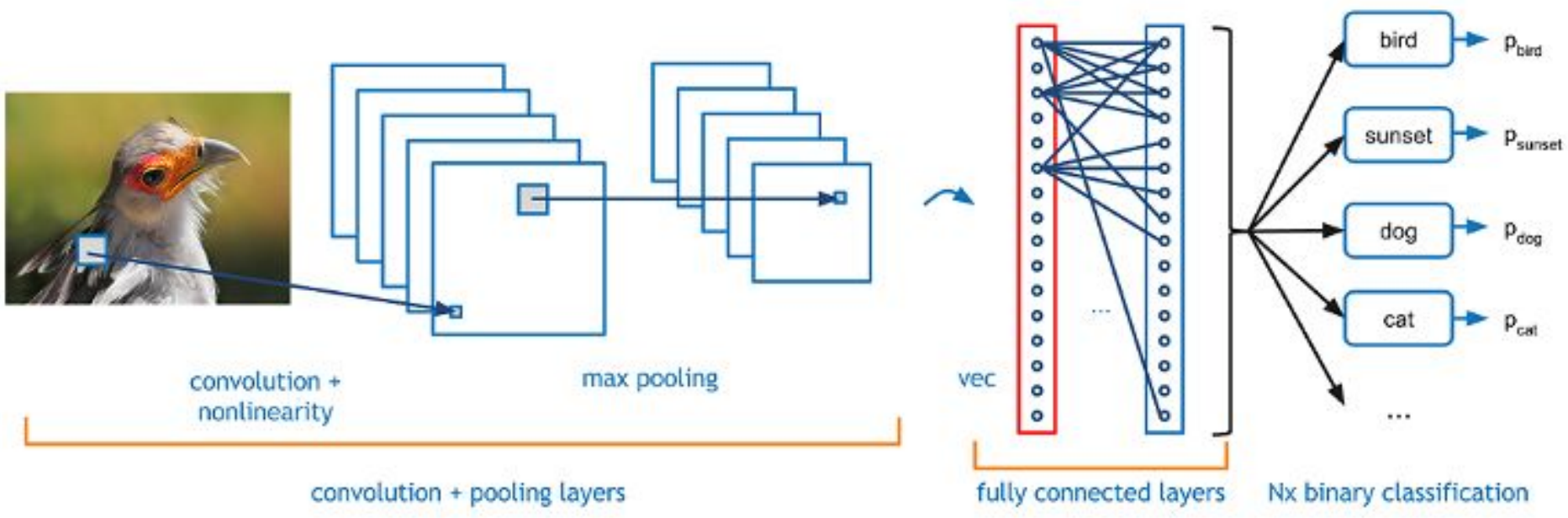
Data Labeled PNEUMONIA



Methods - Deep Learning Neural Networks



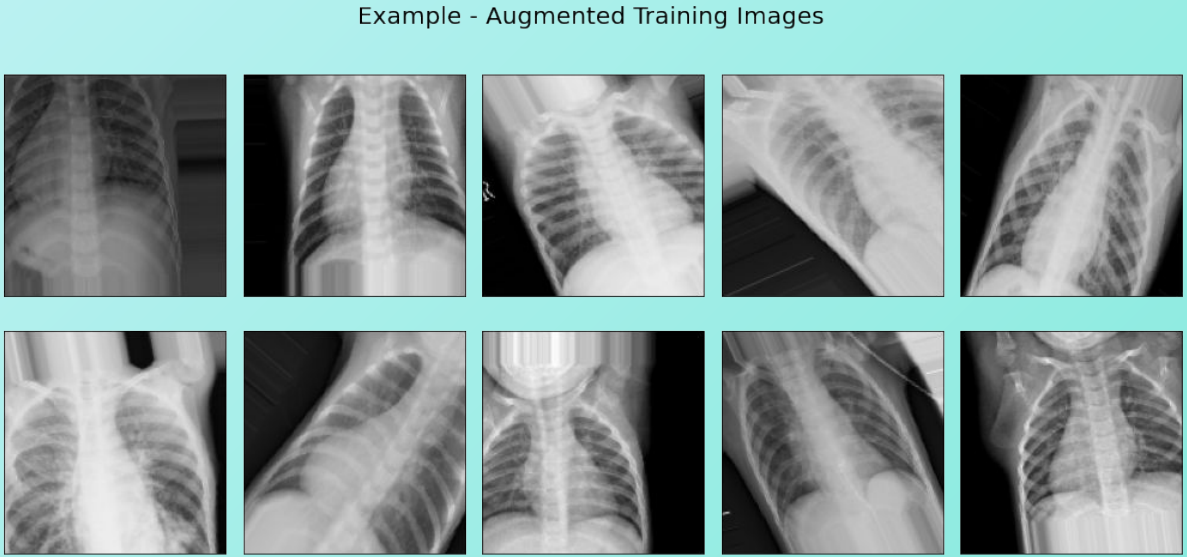
Methods - Convolutional Neural Network



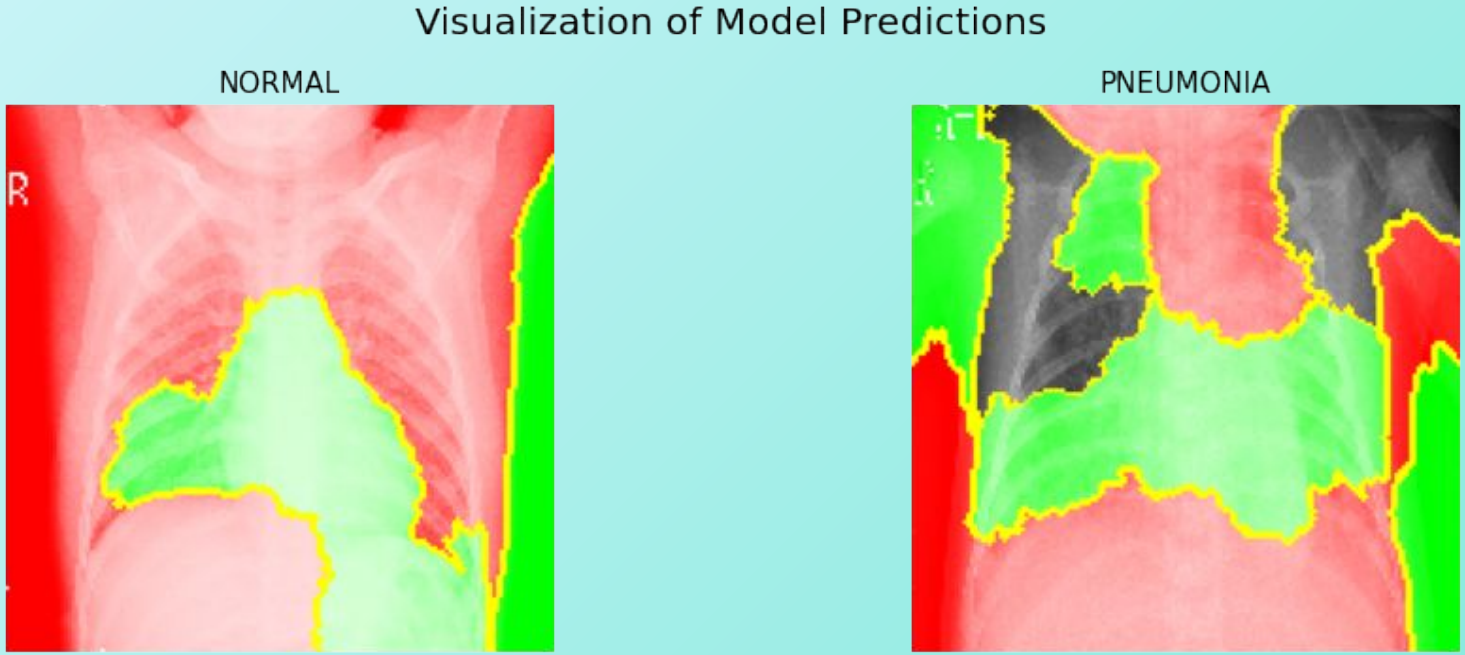
Methods - Data Augmentation

Training images were randomly altered:

- Rotation
- Width
- Height
- Zoom
- Shear



Methods - Understanding Model Prediction

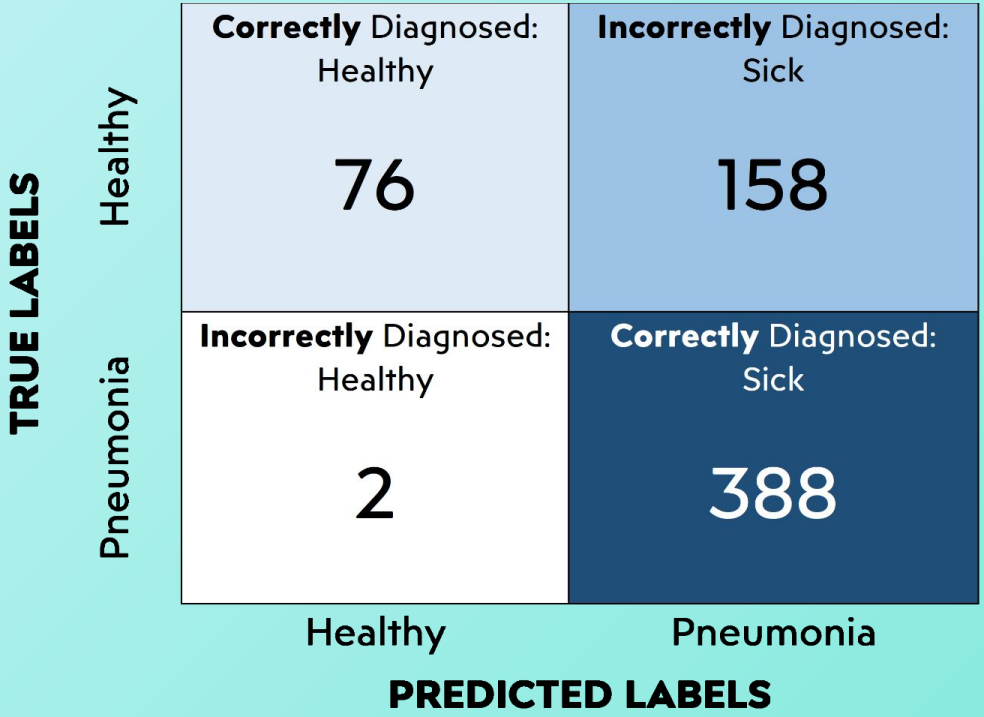


Results - Baseline Model

Accuracy:

Percentage of *successful predictions* by the model:

74%

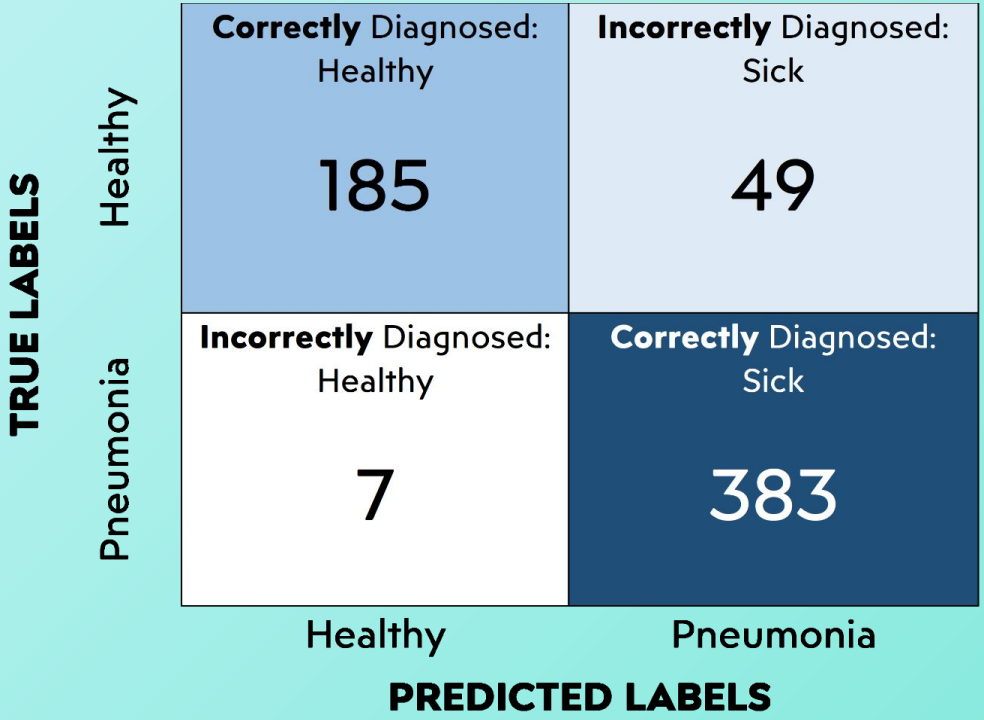


Results - Final Model

Accuracy

Percentage of *successful predictions* by the model:

91%

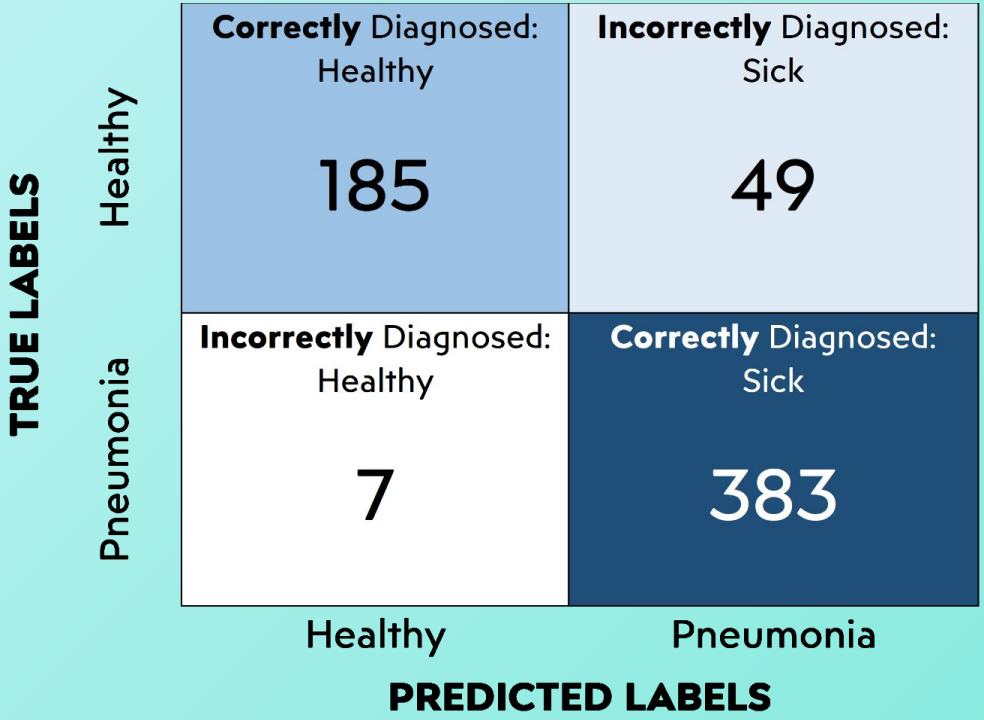


Results - Final Model

Sensitivity

Percentage of sick patients *successfully identified*:

98%



Conclusion

- High scoring model
- Medecins Sans Limites can confidently deploy this model for use in medical settings

Next Steps

- Additional data collection for further fine tuning
- Adjust model for wider demographic of patients
- Create classifiers that can identify multiple illnesses

Thank you

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