Chest Xray Pneumonia Classification

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Summary

- CNN image classification modeling of pediatric chest x-rays predicts pneumonia with a 96% accuracy
- Model detects pneumonia as cloudy areas in the lungs:
  - Bacterial pneumonia: localized
  - Viral pneumonia: dispersed

Overview

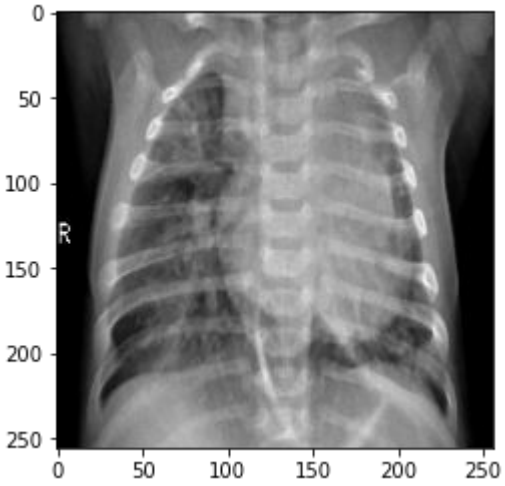
- Business Problem
- Data
- Modeling
- Results
- Conclusions
- Next Steps

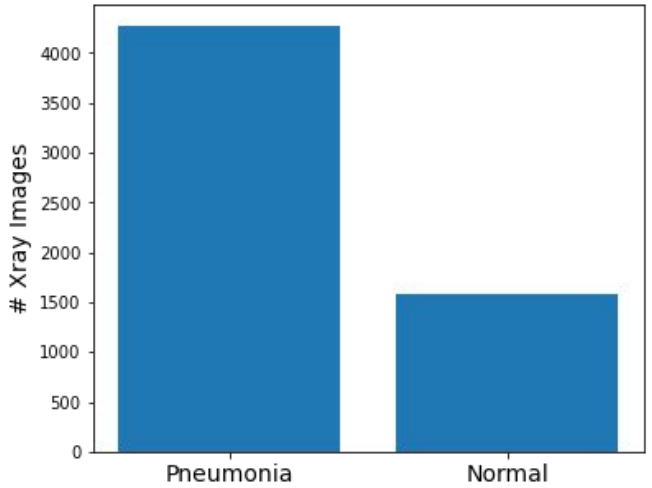
Business Problem

- Local Hospital wishes to improve its pneumonia diagnostic process
- Implementing a high accuracy classification model will:
  - Reduce errors in diagnosing pneumonia
  - Reduce diagnosis time
- These adjustments will improve the hospital experience and increase patient retention

Data

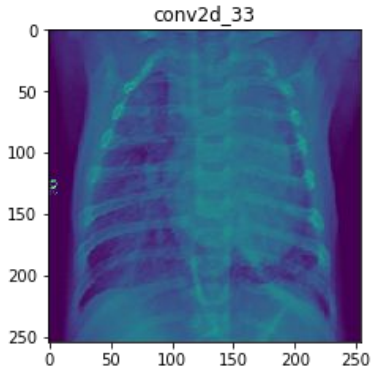
- Chest x-ray images from Guangzhou Women and Children's Medical Center
  - 5,895 images (256x256)
  - Pediatric patients: ages 1-5

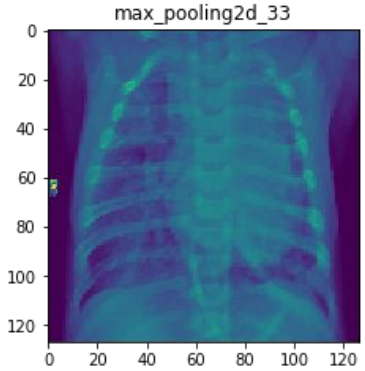


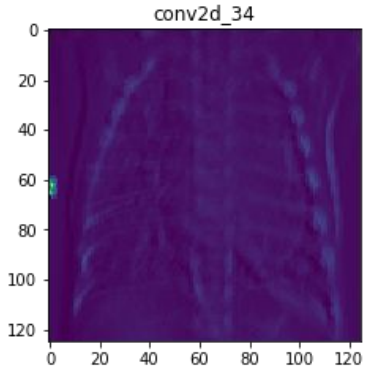


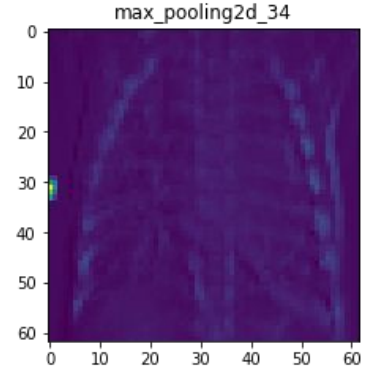
Model

- Convolutional Neural Network
  - Identifies important image features
  - Filters out irrelevant information
- Iterative Process
  - Architecture
  - Hyperparameter tuning
  - Regularization
- Evaluation Metric
  - Accuracy



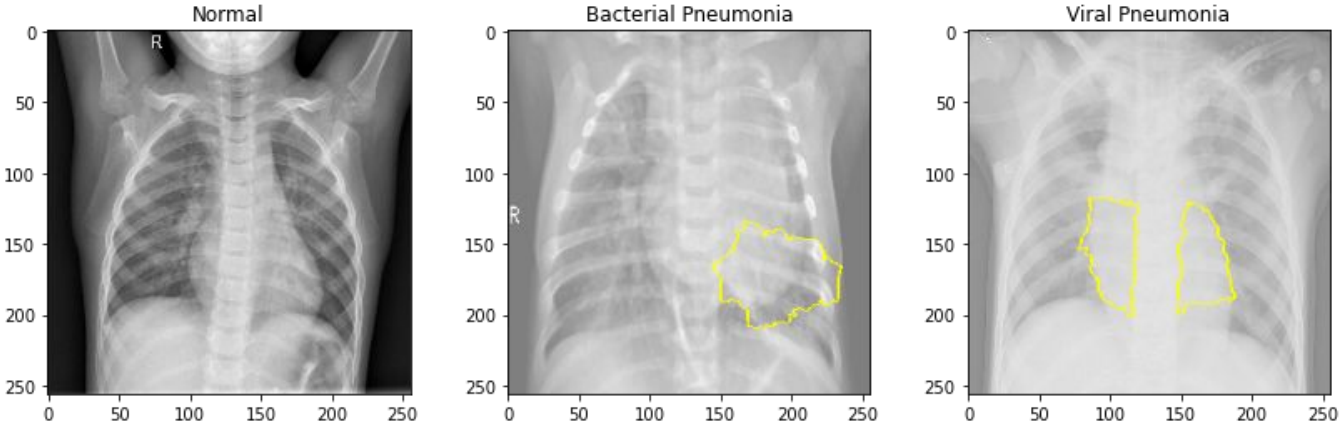






Results

- 96% accuracy
- 94% recall
- Pneumonia Feature Detection:
  - Bacterial: localized cloudiness
  - Viral: dispersed cloudiness



Conclusion

- Use model in conjunction with current pneumonia diagnosis process
- Run model on all chest x-rays even if pneumonia is not suspected
- Use model to aid in training of new doctors

Next Steps

- Expand dataset to include all age groups
- Further architecture and hyperparameter tuning
- Expand model to include other diseases/conditions that could be detected in a chest x-ray

Thank You!

Questions?

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