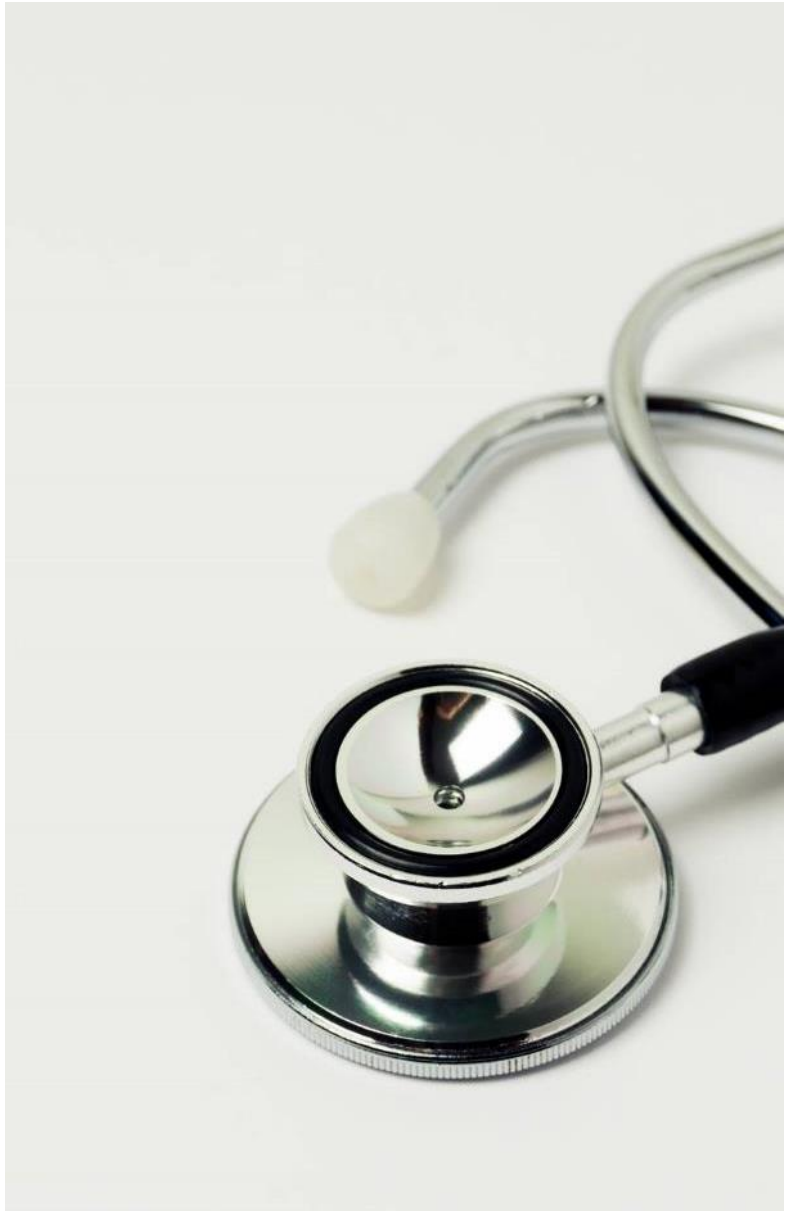
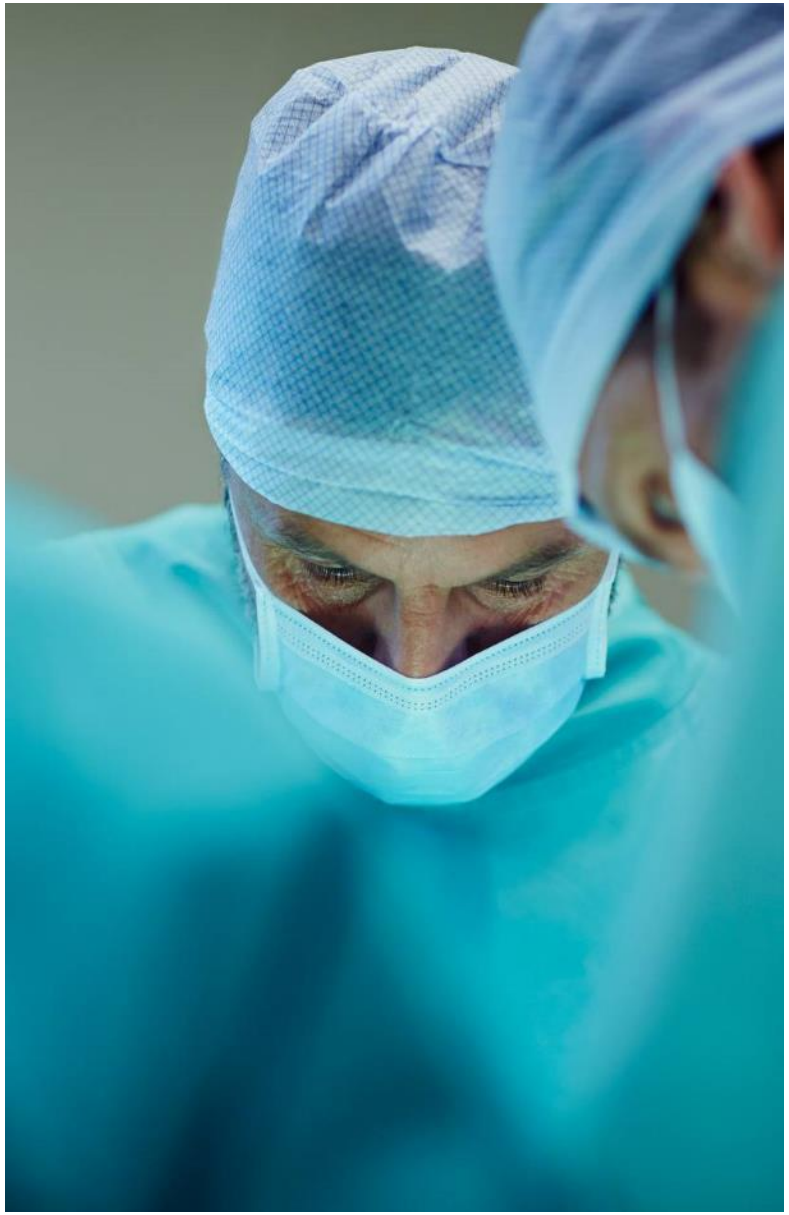
PNEUMONIA DIAGNOSIS USING MACHINE LEARNING

BACKGROUND

- Pneumonia is one of the leading causes of death for children under 5 years old in China
- Vector of infection dictates the course of treatment
- Diagnosis generally begins with a physical exam and includes imaging/testing



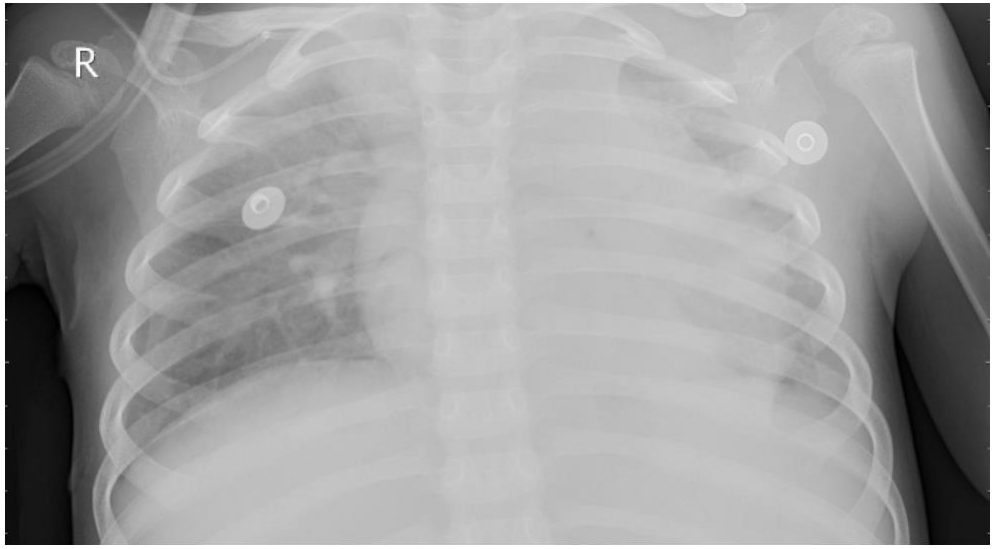


BUSINESS PROBLEM

- Chest X-ray interpretation can result in misdiagnosis
- Guangzhou Medical University wants to streamline pneumonia diagnosis
- Tasked with developing a classification model for chest X-ray images

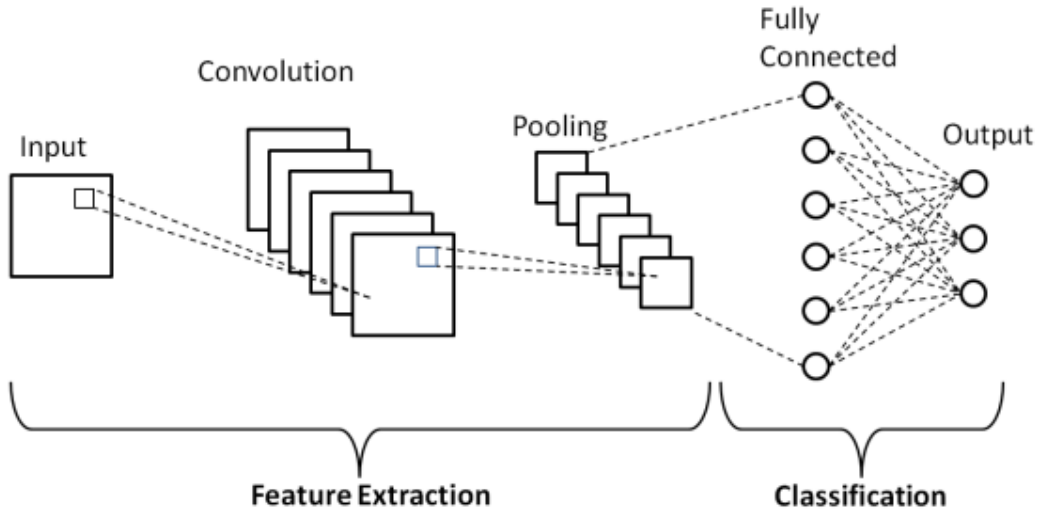
DATA UNDERSTANDING

- Chest X-ray images from pediatric patients 1-5 years old
- Original images screened for quality control and labeled
- 5,856 images representing 2 categories
  - Label imbalance, 75% pneumonia
- Organized into train/validation/test image sets



MODELING PROCESS

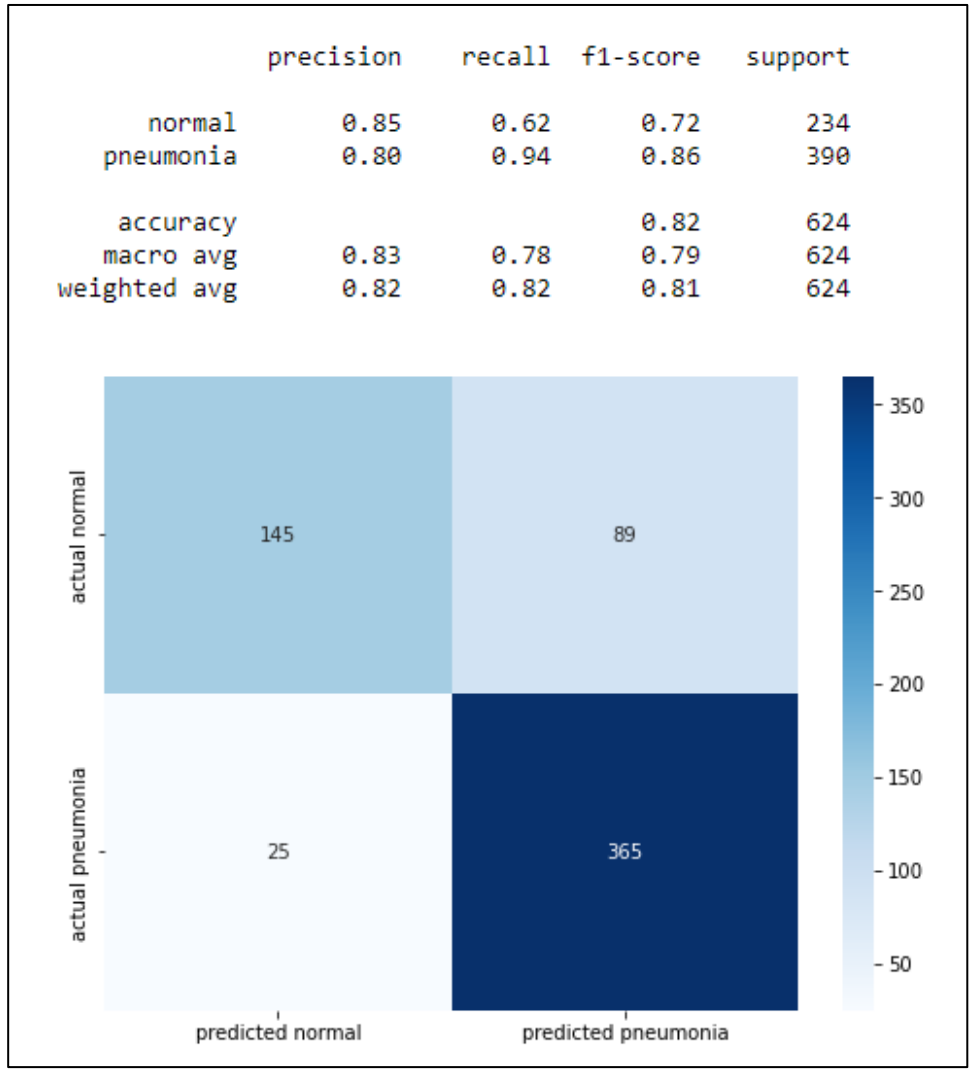
- Baseline modeling with Multilayer perceptron
- Iterative model training using convoluted neural networks
- Focus on maintaining high recall for pneumonia classification while reducing false positive errors
- Evaluated models with classification reports and confusion matrices



FINAL MODEL SELECTION

- Evaluated model on testing data
- Focus on preserving high recall on pneumonia cases, secondary total accuracy
- Our best model had overall accuracy of 82%
- Recall for pneumonia cases was 94%

	precision	recall	f1-score	support
normal	0.85	0.62	0.72	234
pneumonia	0.80	0.94	0.86	390
accuracy			0.82	624
macro avg	0.83	0.78	0.79	624
weighted avg	0.82	0.82	0.81	624



NEXT STEPS

- Evaluate pretrained model performance
- See if we can adjust to ternary classification
  - Bacterial versus viral pneumonia
- Create web app allowing users to predict on uploaded images

THANK YOU

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https://github.com/brtracy/phase4_project