



Pneumonia detection

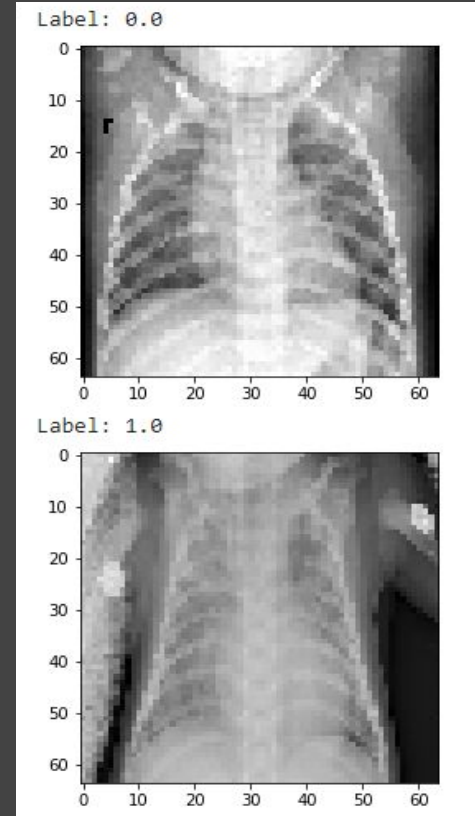
TEAMMATES:

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Project Description

- Doctors want AI to detect cases of pneumonia through x-rays.
 - AI would make the process of classifying cases faster.
- Needs to be able to:
 - Classify images accurately.
 - Make conclusions from what it learned in the training data: adapting & classifying when the image is at rotated or sizes.



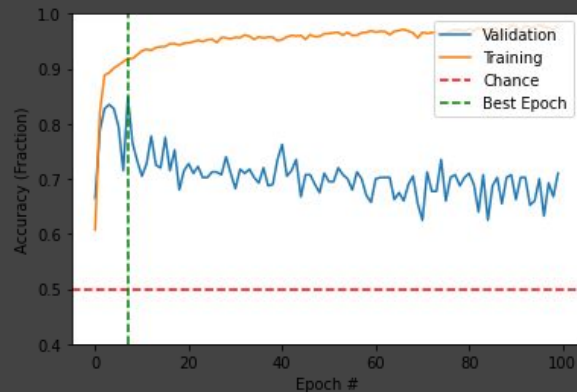
These are two images used in our model. They show how the model classifies x-rays.

Process

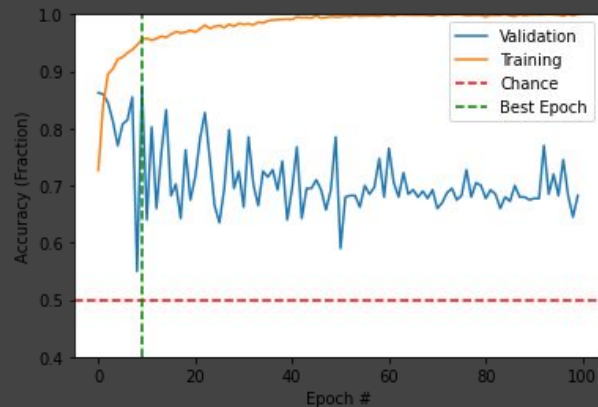
★ A neural network is a machine learning algorithm loosely based on how the brain functions

- 1) We created a 2-layer neural network model called “dense”
- 2) We created a convolutional neural network model called “cnn”
- 3) We then fitted and trained both models as well as compared accuracy scores
 - a) Both models ended up overfitting, which means memorizing and not learning
- 4) Our next step was to try transfer learning

“dense” model accuracy plot



“cnn” model accuracy plot



Expert Model Classifier

- There are a few models to select from with different accuracies:
 - VGG 16: 73%
 - VGG 19: 72%
 - ResNet 50: 79%
 - DenseNet 121: 74%
- ResNet50 has the highest accuracy

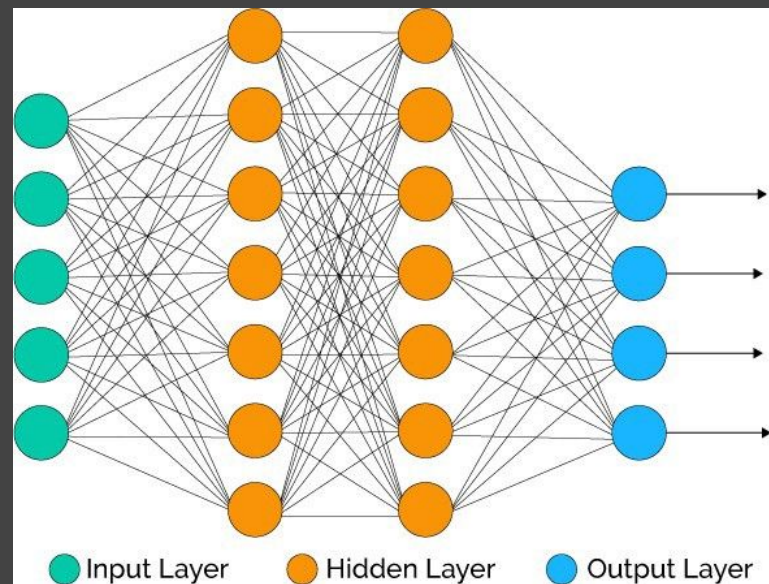
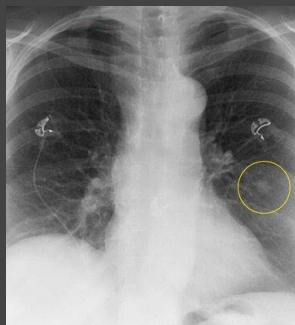


Diagram of Neural Network

Data and ML Problem Setup

Input and output data

- **Input:** Chest X-rays



- **Output:** Prediction
 - 0.0 = normal
 - 1.0 = Pneumonia

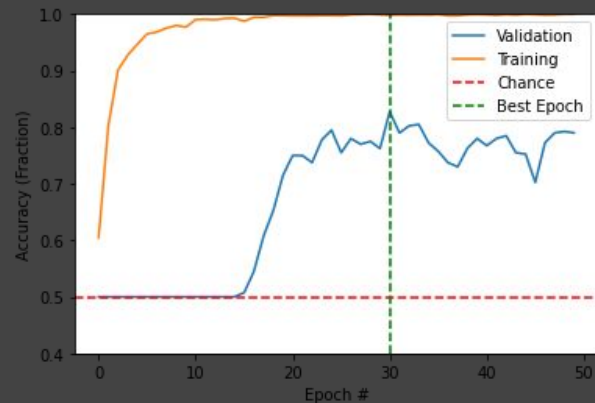
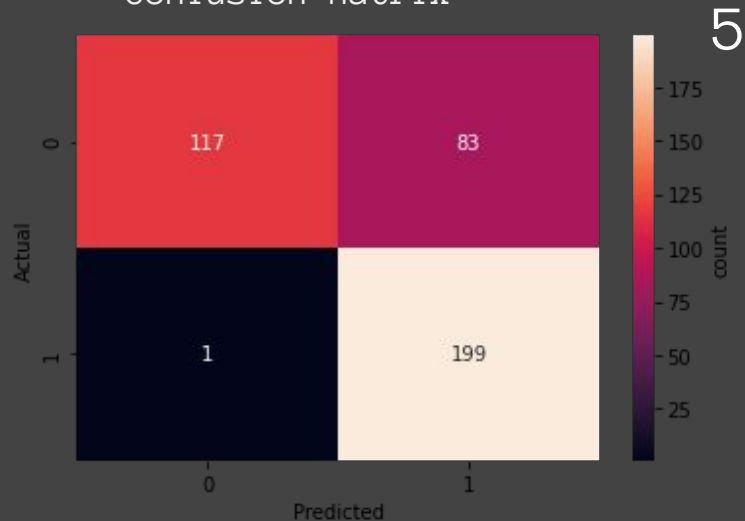
What machine learning approach are you using? Why?

- Classification
 - Normal/Pneumonic Patients

AI Model and Accuracy

- Classify a chest X-Ray as normal or pneumonic.
- ResNet50 Expert Model
 - ResNet50 has the best results with classifying the X-Rays.
 - 79% Accuracy
 - Predicted:
 - 199 True Positives
 - 117 True Negatives
 - 83 False Positives
 - 1 False Negative
 - Precision: $199/282 = 71\%$
 - Recall: $199/200 = 100\%$

Confusion Matrix



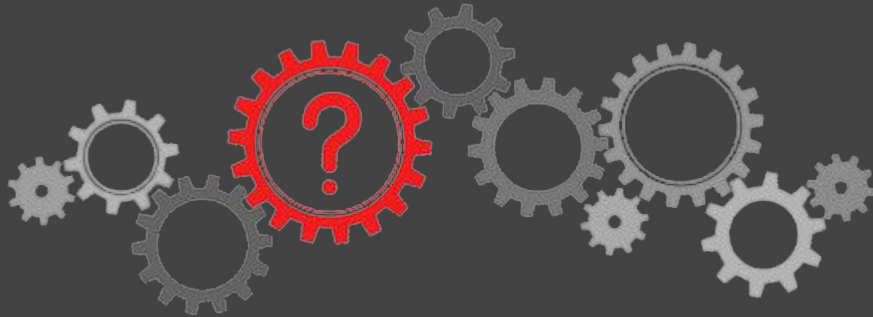
Accuracy Graph

Discussion Questions

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- What are some ethical problems with using AI in healthcare?
- What are a few ways we can prevent these problems?



Answer in the
chat!!

Possible Concerns

- Ethical problems:
 - Privacy
 - Biases
 - Misdiagnosis
- Preventing these problems:
 - Decide which model is best
 - Consider all sides of the dataset
 - Decide where exactly you can use AI so that it poses the least amount of risk possible



Real-World Implementation + Application

- How might you operationalize this in the real world? What more data would you collect?
- Could you implement this to a problem in healthcare?

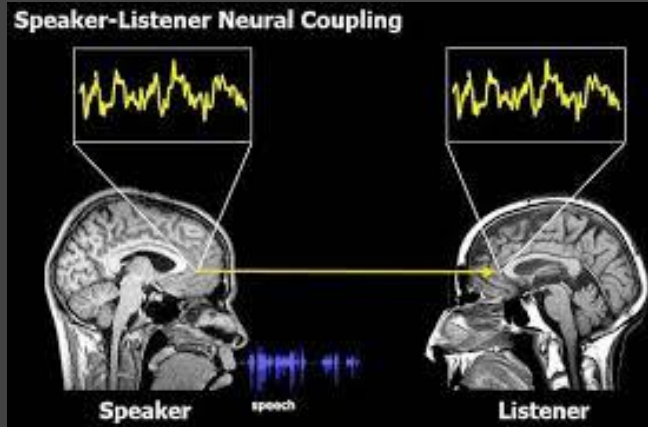


Answer in
the chat!!

Real-World Implementation + Application

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An example of medical imaging is used in pneumonia differentiation



The images produced in medical imaging

Speaker vs. Listen Brain Studies

Poverty conditions

Thank you!

Feel free to put any questions in the chat!