Pneumonia Classification

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Business Problem

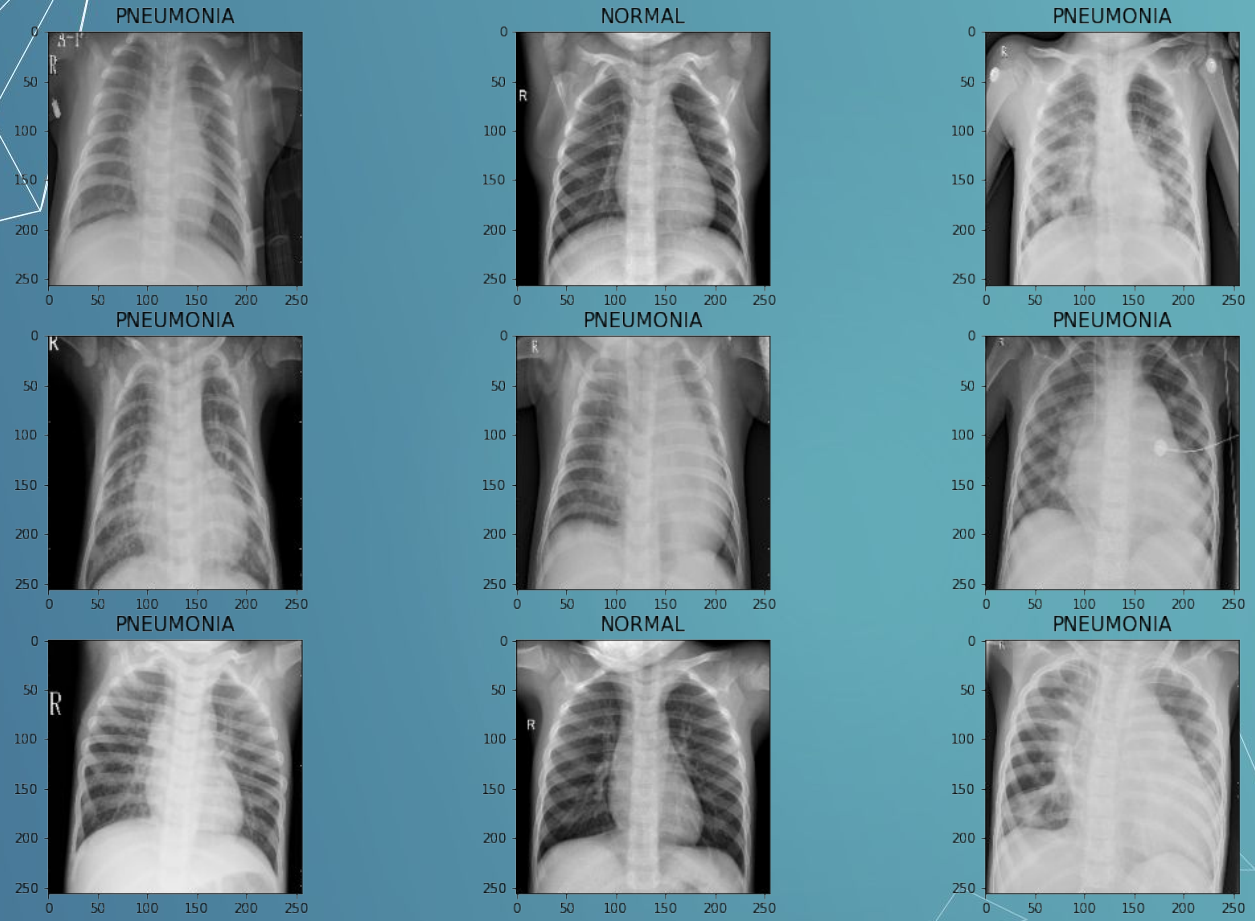
- Neural Network Modeling can assist doctors in determining whether a patient has pneumonia or not

- Misclassifying a patient as **not** having pneumonia when they **have** pneumonia could result in the patient not receiving the care they need

- Misclassifying a patient as having pneumonia when they do **not** have pneumonia can result in unnecessary medication or maybe a faulty diagnosis when another problem exists
    - Ex - getting diagnosed with pneumonia when the patient really has another sickness (treated inaccurately)

Data

Kaggle - normal images and pneumonia images



Training dataset: 1341 normal images 3875 pneumonia images

Methods

Feedforward Neural Network

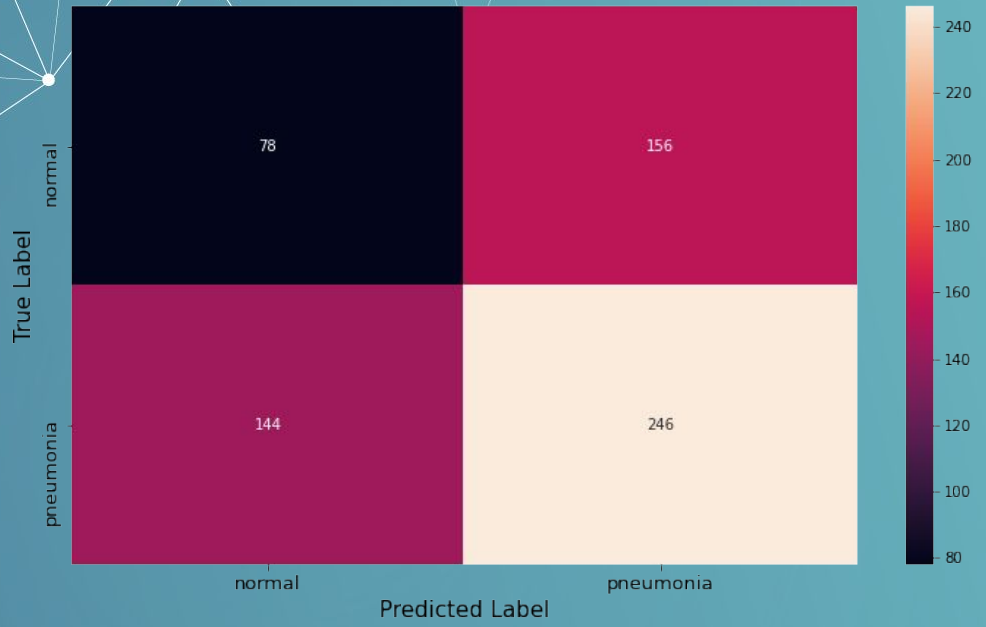
Convolutional Neural Network

InceptionV3 Neural Network

Results

Model 1

Feedforward
Neural Network



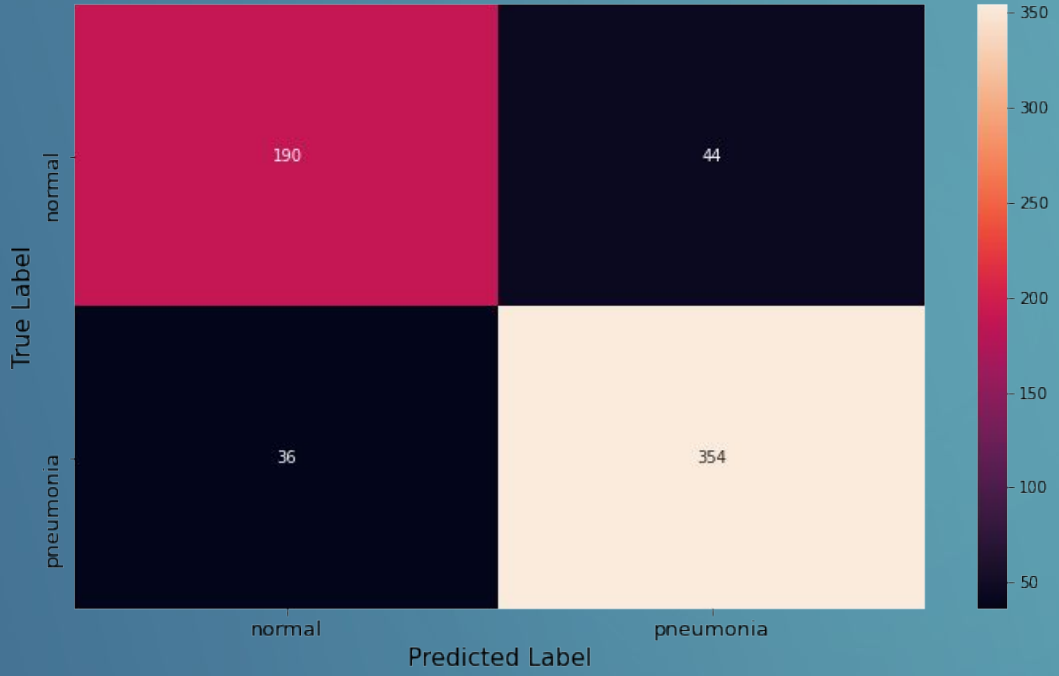
Results

Convolutional Neural Network

Results

Convolutional Neural Network

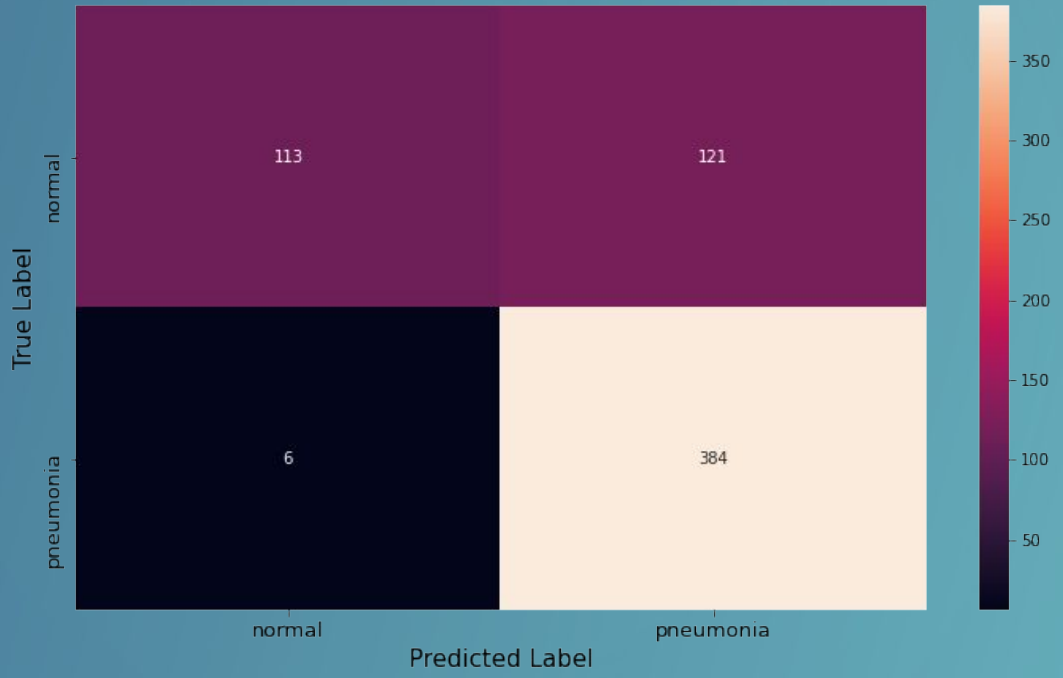
Model 3



Results

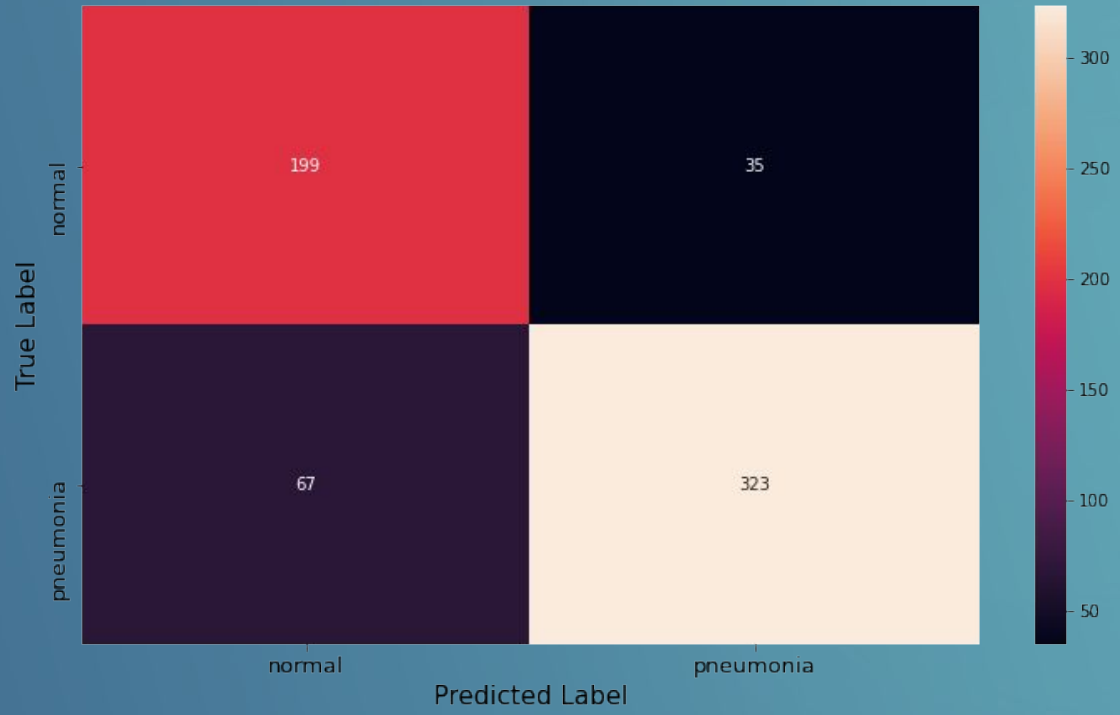
Model 4

Convolutional Neural Network



Results

Model 5



InceptionV3
Neural Network

Conclusion

Type II errors - misclassifying the patient as not having pneumonia when the patient has pneumonia is very bad. Make sure recall is high (less false negatives).

Model 4 had the least amount of false negatives but model 3 had the least amount of false negatives and false positives when combined

Further Exploration

- Run models on a computer built to handle complex models
- Spend more time with data augmentation so the model does not overfit
- Stick to CNN model because it's less likely to underfit than the others
- More images - especially a larger validation set
- Look into x-rays of lungs of smokers, those with asthma, and bronchitis

Does anyone have any questions?

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