Pneumonia Detection using Deep Transfer Learning

CS 577 S21 Deep Learning – Project Proposal

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Research Paper: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7345724/

Efficient Pneumonia Detection in Chest Xray Images Using Deep Transfer Learning

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Data Source: https://www.kaggle.com/paultimothymooney/chest-xray-pneumonia

The dataset contains subfolders for each image category (Pneumonia/Normal). There are 5,863 X-Ray images (JPEG) and 2 categories (Pneumonia/Normal).

Problem Statement:

Pneumonia affects 7% of the global population. Chest X-rays are primarily used for the diagnosis of this disease. However, even for a trained radiologist, it is a challenging task to examine chest X-rays. According to the WHO, pneumonia can be prevented with a simple intervention and early diagnosis and treatment.[1] There is a need to improve the diagnosis accuracy. Our aim is to propose a model for quick diagnosis of pneumonia and potentially save lives.

Methodology:

1. Transform data to python readable format.
2. Dataset is already divided into train, validate, and test.
3. Perform EDA
4. Try out a base model of Deep Neural Network.
5. As per the paper, implement Convolutional layers and pooling layers.
6. Compare with ResNet18, DenseNet121, InceptionV3, and Xception pre-trained neural networks.

Responsibilities:

	Responsibility/Member	Haripriya Aravapalli	Avinash Shekar
Preprocessing	Data Preparation	Team effort	
	EDA	Team effort	
Model build	Base model	Team effort	
	CNN		Individual
	ResNet18		Individual
	DenseNet121	Individual	
	InceptionV3	Individual	
Test	Test CNN, ResNet18	Individual	
	Test DenseNet121, InceptionV3		Individual
Results	Documentation	Team effort	
	Presentation	Team effort	

Most common tasks/responsibilities are combined team effort. For CNN and transfer learning, we will be working on each one individually. Testing will be switched up so we get to have another set of eye looking into each model.

References:

1. WHO Pneumonia is the Leading Cause of Death in Children. [(accessed on 31 December 2019)];2011 Available online: https://www.who.int/maternal_child_adolescent/news_events/news/2011/pneumonia/en.
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3. Huang G., Liu Z., Van Der Maaten L., Weinberger K.Q. The IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Jul, 2017. Densely connected convolutional networks; pp. 4700–4708.
4. Szegedy C., Vanhoucke V., Ioffe S., Shlens J., Wojna Z. Rethinking the inception architecture for computer vision; Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition; Las Vegas, NV, USA. 26 June–1 July 2016; pp. 2818–2826.