Classification of Chest X-ray

Kshitij Bhat
Josh Bernstein
Zach Buckley

Our team proposes to use the techniques we've learned in class to construct a neural network solution to classify Chest X-Ray images. Toward these ends, we've found a Kaggle Dataset[1] which is a 2GB random sample of a 42GB collection of images[2]. Our initial plan is to build up a Convolutional Neural Network (CNN) to perform the classifications, though we will need to adjust the network design from class to account for the multi-label classification target. We've begun doing some initial research into modifying a CNN design to account for multi-label outputs. For starters, this appears to involve changing the activation function for the final layer[3] of the network, but further research will be required. Though our team has little experience with the PyTorch framework, we've decided to try it, as we've been led to believe it has more flexibility with CNNs. Based on our initial research, due to our change to the final activation function, it will likely be better to use Binary Cross Entropy instead of Categorical Cross Entropy as our Performance Index, but that may change as we investigate multi-label classification problem solving techniques further.

Schedule

Date	Milestone	Description
11/11/19	Topic Selection Complete	Have Selected Topic
11/11/19	Group Proposal Submitted	Have Submitted Group Proposal
11/17/19	MVP Complete	Have Minimum Viable Product (MVP) – Initial Preprocessing/Train/Eval Pipeline
11/24/19	Product Refinement	Refined Software Product – Implement Several Improvements
12/01/19	Presentation/Paper	Complete Rough Presentation/Paper
12/7/19	Documentation	Individual Papers, Comment Clean-up, etc...
12/8/19	Final Project Submitted	Submit Final Project in Whole
12/9/19	Final Project Due	Final Project Submission Due

---

[1] https://www.kaggle.com/nih-chest-xrays/sample
[2] https://www.kaggle.com/nih-chest-xrays/data
[3] https://towardsdatascience.com/multi-label-image-classification-with-neural-network-keras-ddc1ab1afede