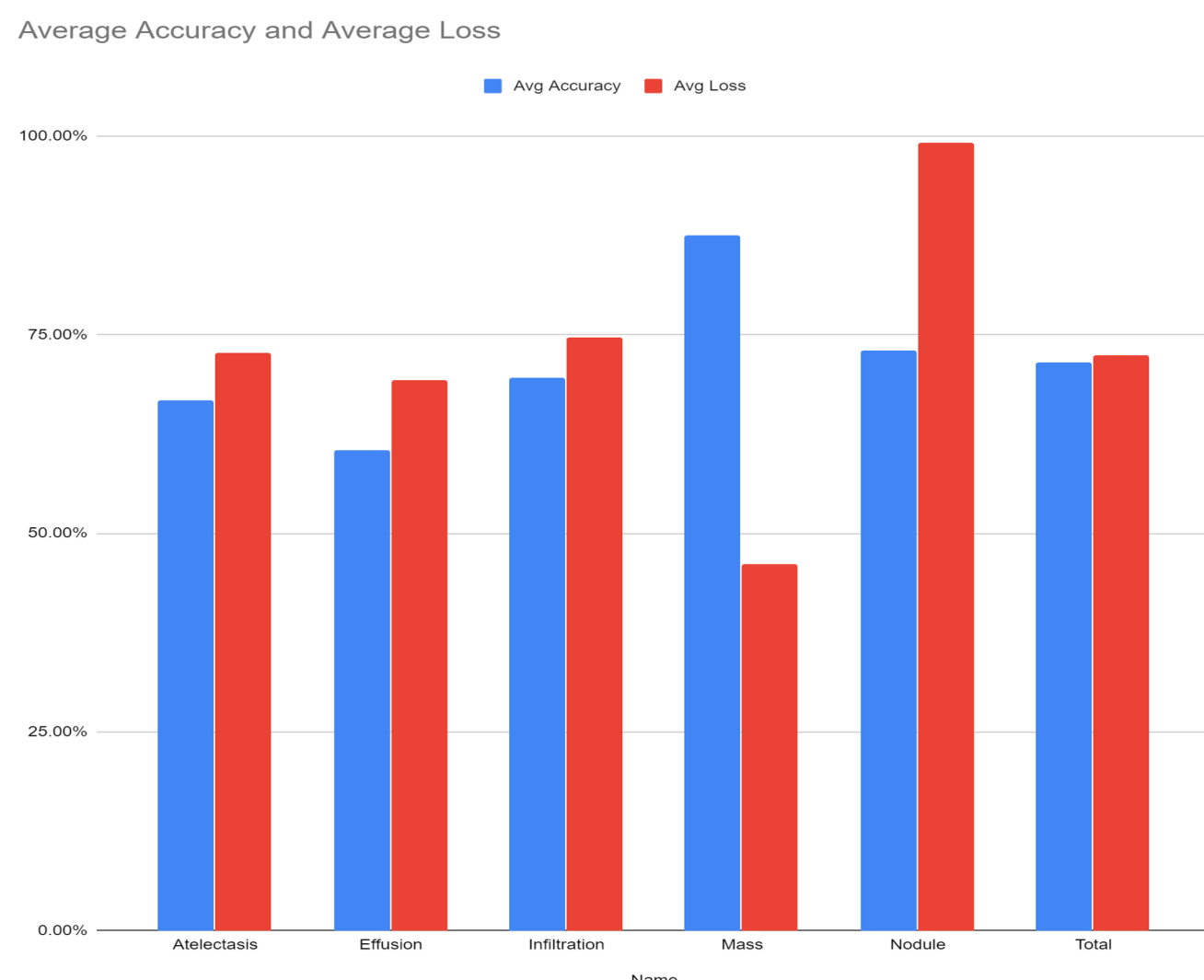


## Background

Americans living in rural areas have an average of 39.8 physicians per 100,000 residents, which means large medical facilities are closing at an alarming rate. This leaves rural areas, often inhabited by poor, blue collar workers, left with very little access to much needed medical care. In order to combat this diminishing access to medical care, the time and resources of remaining doctors must be conserved through technological efforts.

### Accuracy Per Disorder



### Further Information

Name	Definition	# of pngs	% of American population affected (per year)
Atelectasis	Partial or total collapse of the lung when alveoli deflate or are filled with alveolar fluid	11,559	>.06%
Effusion	Fluid buildup between tissues that line the lungs and the chest	13,317	>.06%
Infiltration	Diffusion or accumulation of foreign substances	19,894	7%
Mass	A build up of cells leading to the formation of a mass	5,782	.001-.3%
Nodule	A small, palpable mass usually on the epidermis	6,331	.5%

## Engineering Goal

To create a machine learning program that trains data of different x-ray images consisting of abnormalities in the cardiothoracic areas to be able to identify and classify client x-rays in order to broadly determine the irregularity or problem.

## Software Used

Anaconda

Visual Studio

Spyder

Convolutional Neural Network

TensorFlow

jGRASP

Keras

JavaFX/IntelliJ

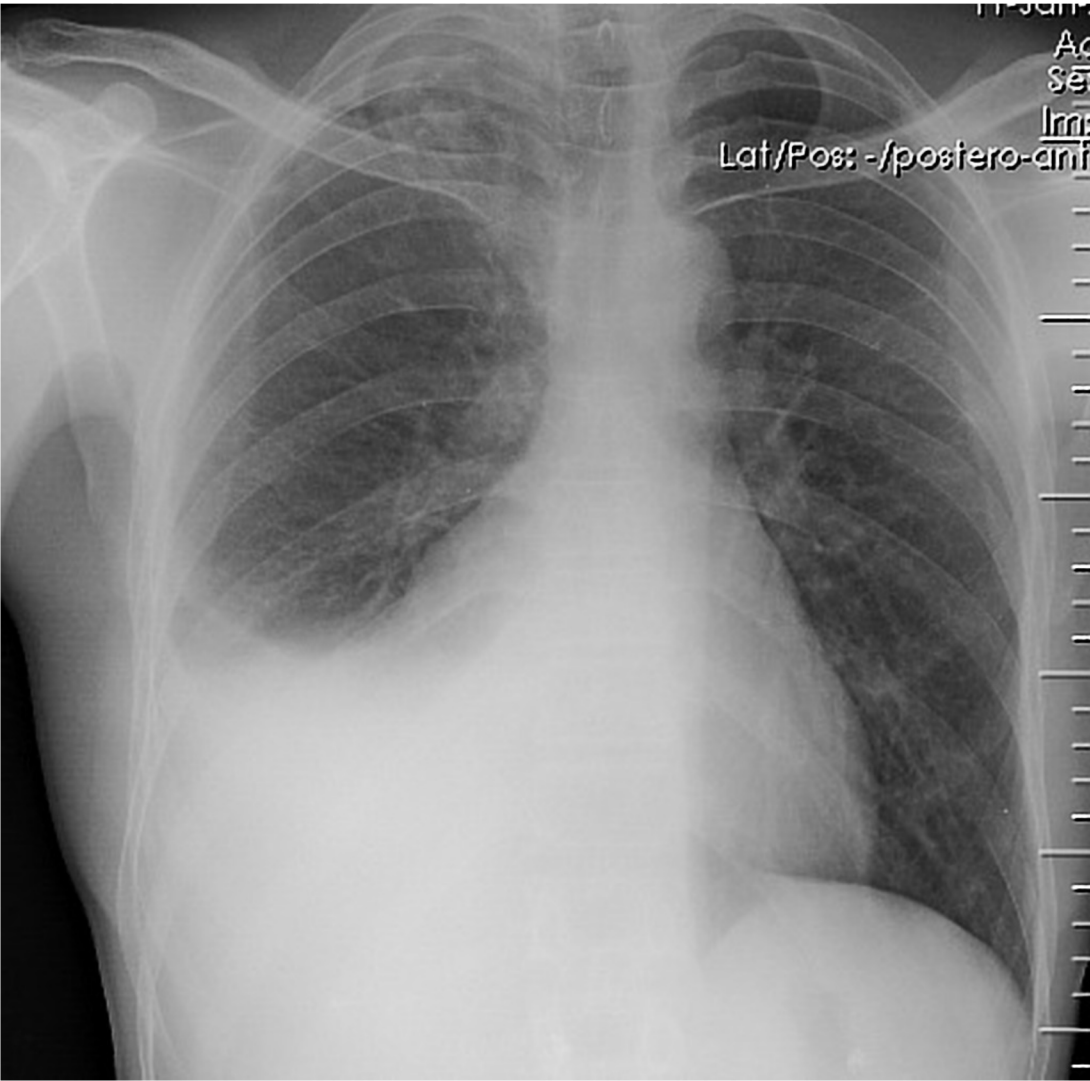
# Diagnosing Cardiothoracic Abnormalities using Machine Learning

Tested by Kyra Lee, Silver Harris, and Victoria Puck - Karam

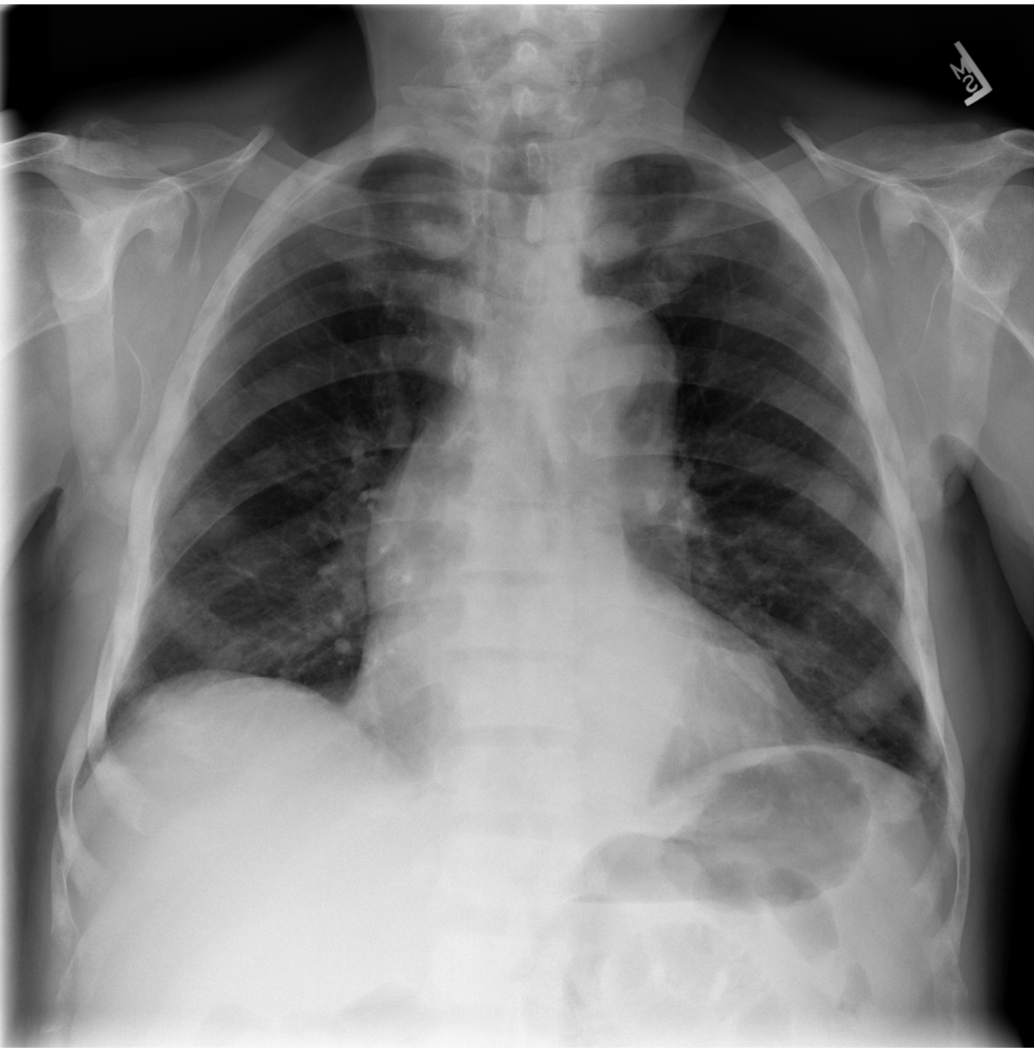
## Program Breakdown

### Abnormal X-Ray Images

EFFUSION



NO FINDING



ATELECTASIS



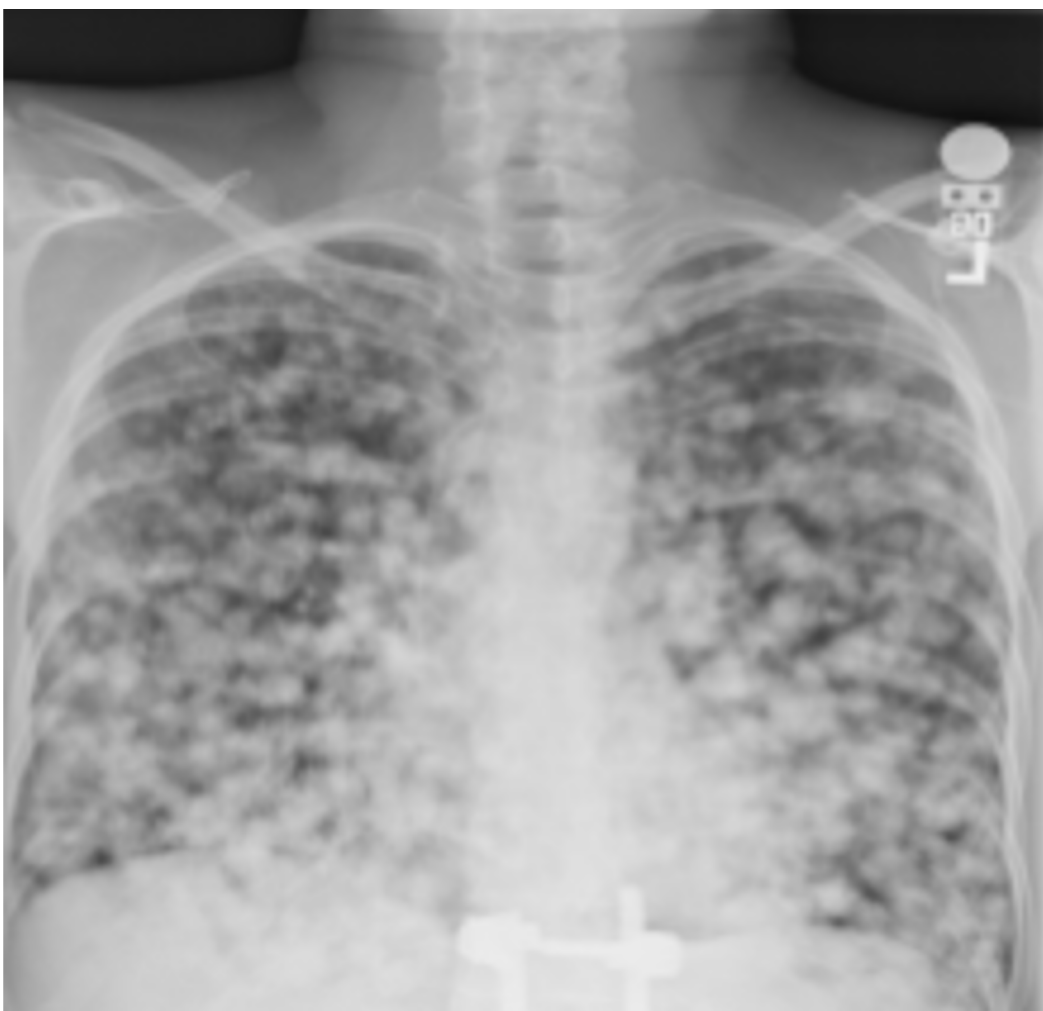
NODULE



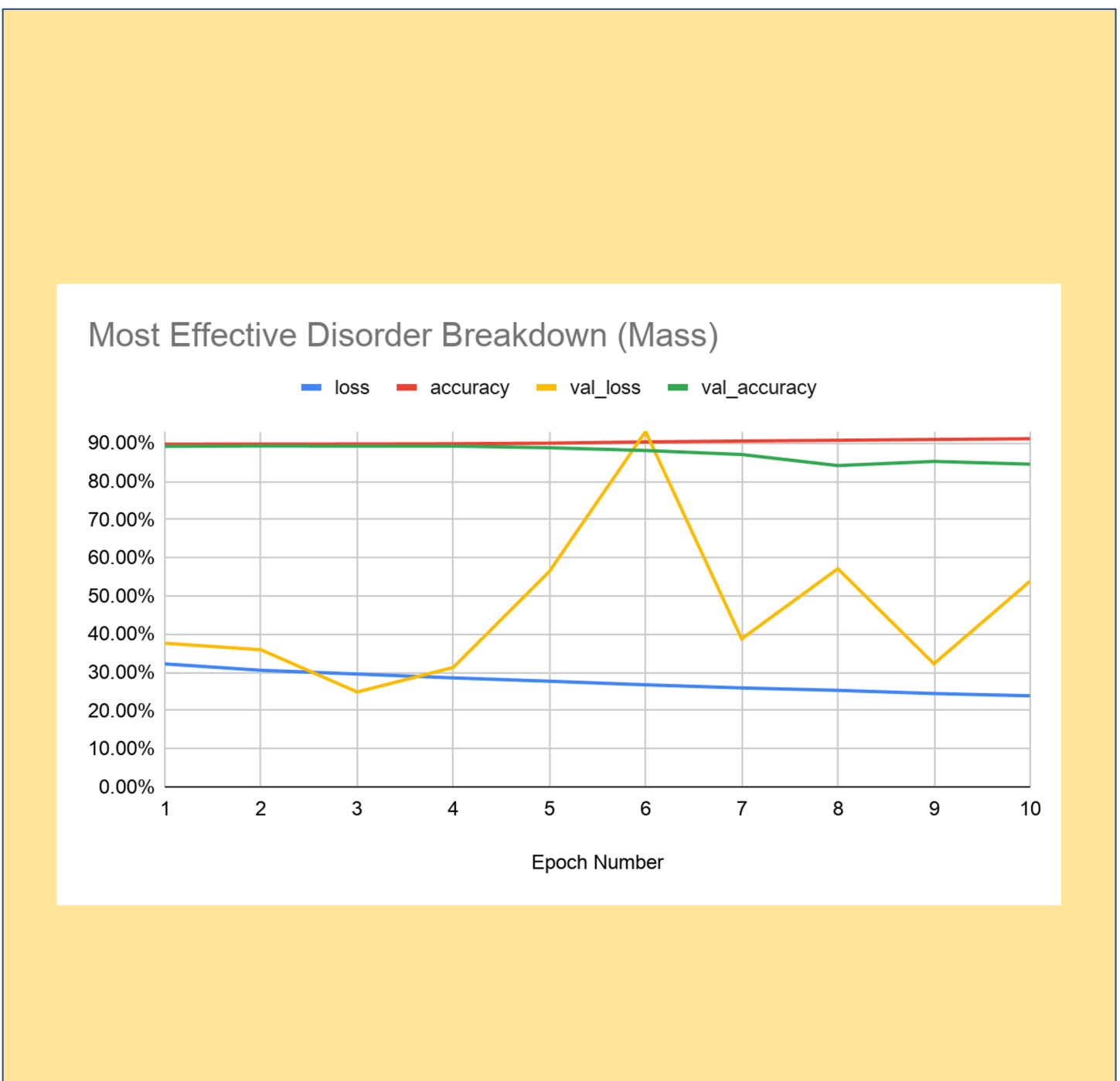
INFILTRATION



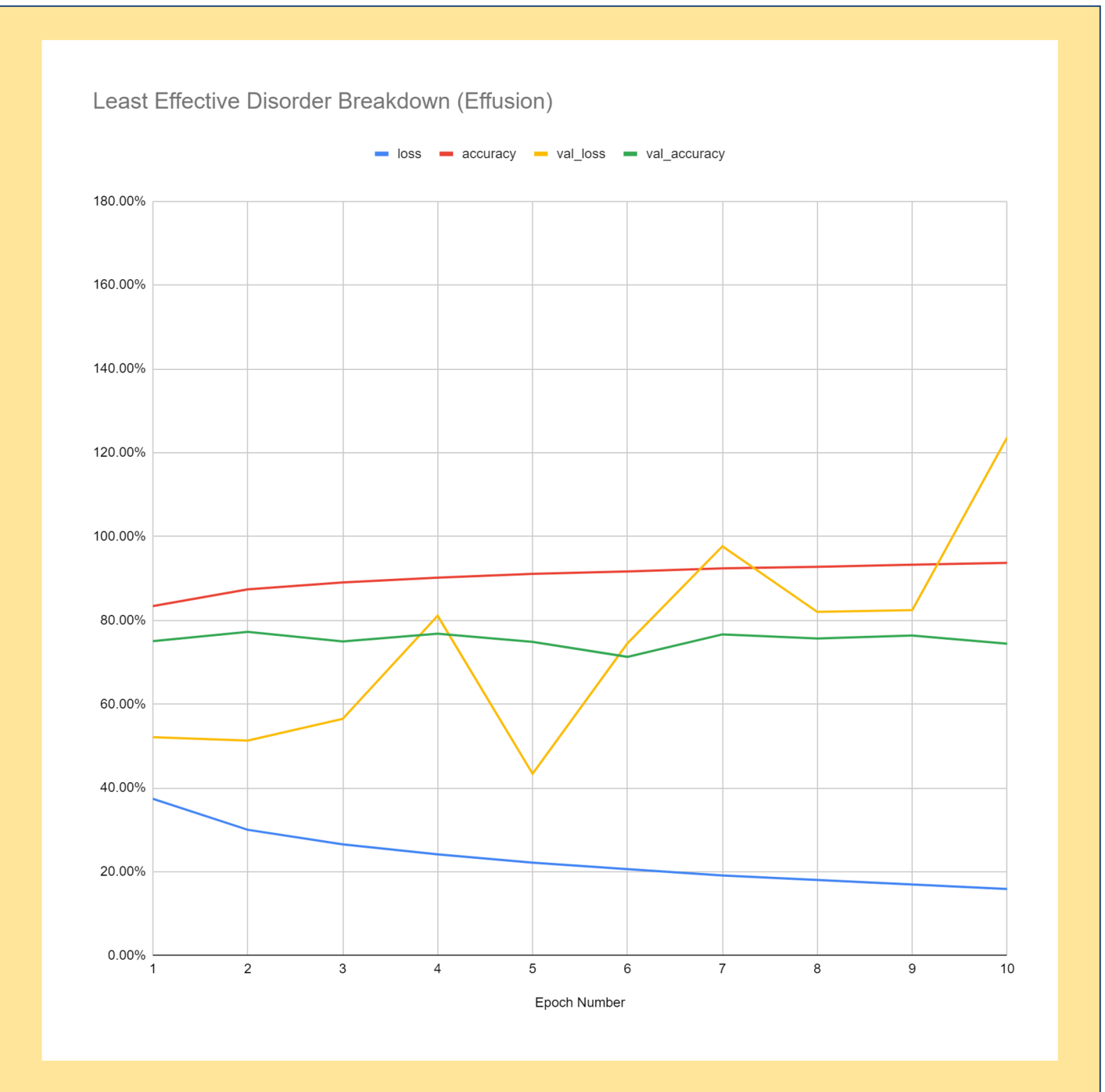
MASS



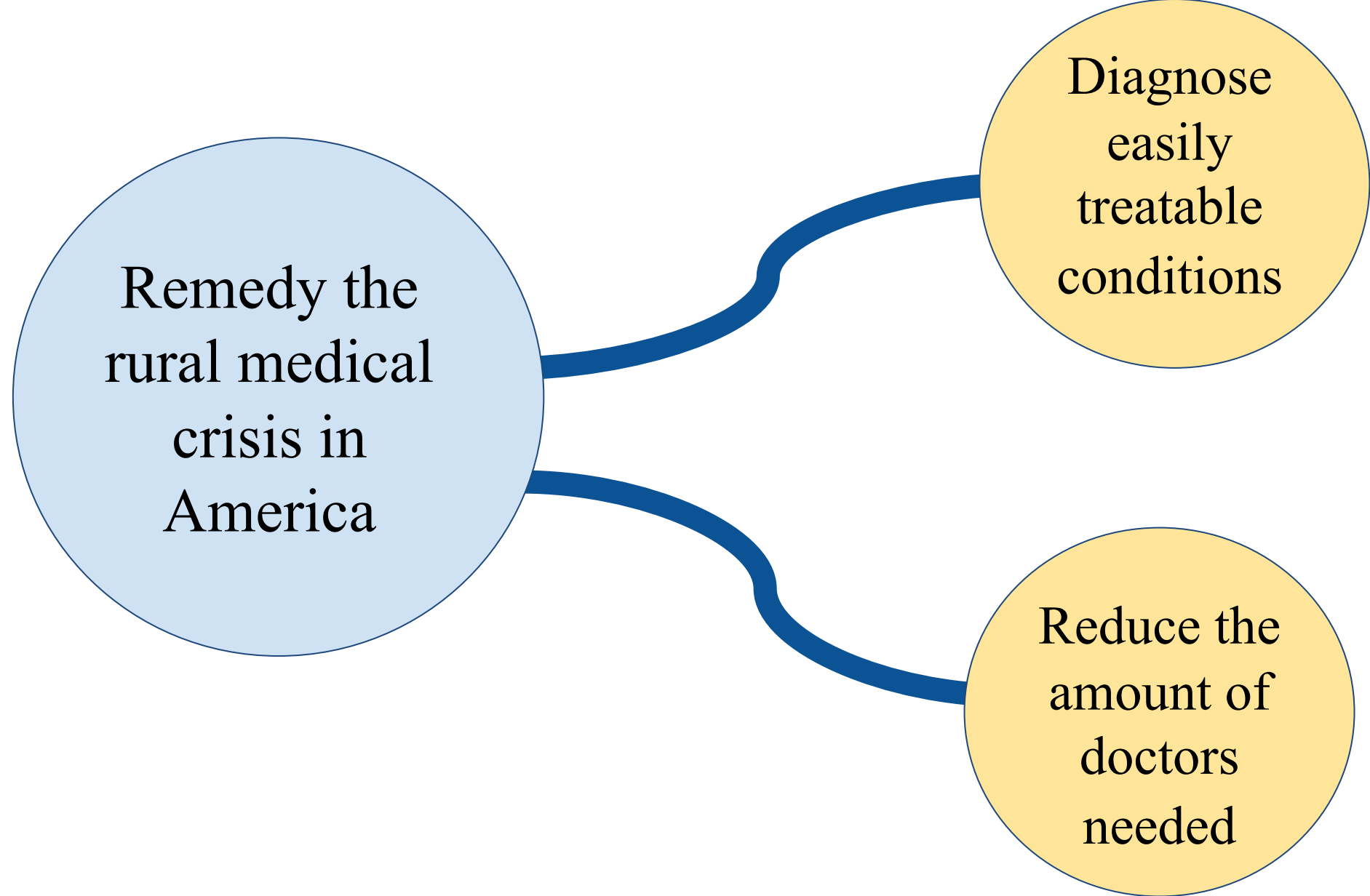
Photos by NIH



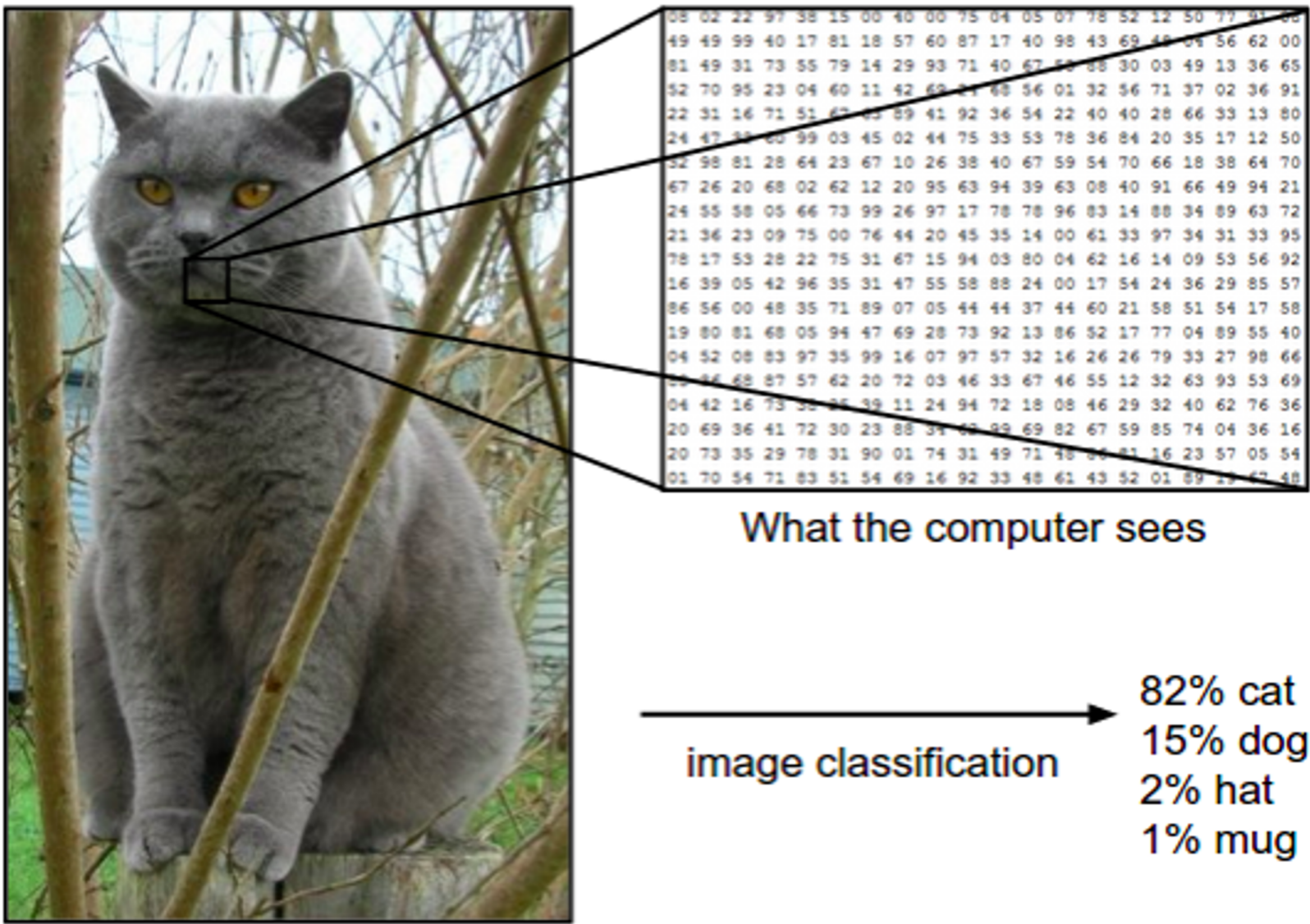
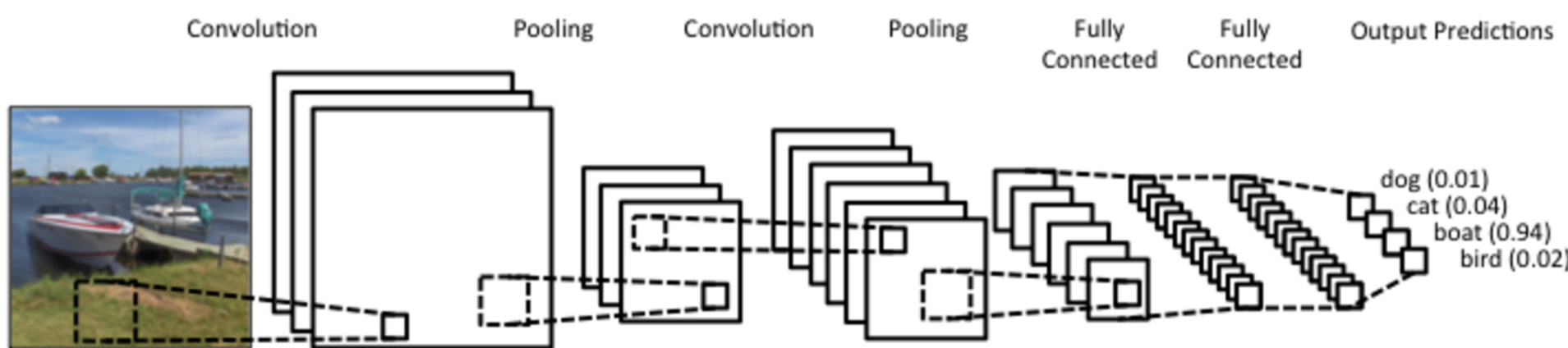
Graphs examining the most and least effective disorders, and their differing accuracies.



## Program Application



### Training Using CNN



## Future Work

To write a script that would increase the contrast of the images from the NIH database in order to accomodate the monochrome colors of the X-Rays - thus making the images easier to train using hexadecimal based ML, improving the accuracy rate. This would make the program more dependable and utilitarian.

An expansion of the program tis o identify further abnormalities throughout the body extending outside the cardiothoracic area. The NIH database of images used for this project has several other bodily abnormalities that could be included to increase the scope and versatility of the program.