Tuberculosis Chest X-ray Image Classification: A Deep Learning Approach

Tamiru Berhanu-Denka
(DVM, MSc)

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Business Understanding
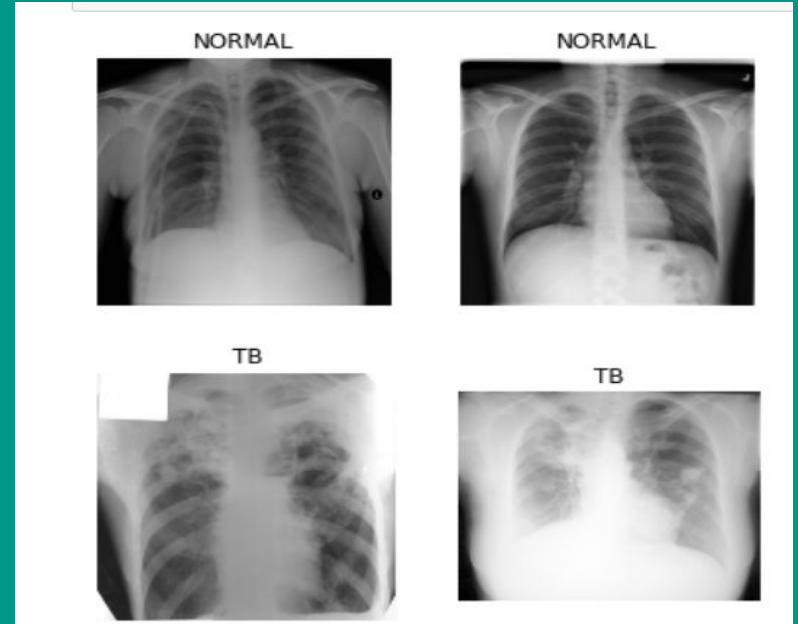
Project Goal

Data and Modeling
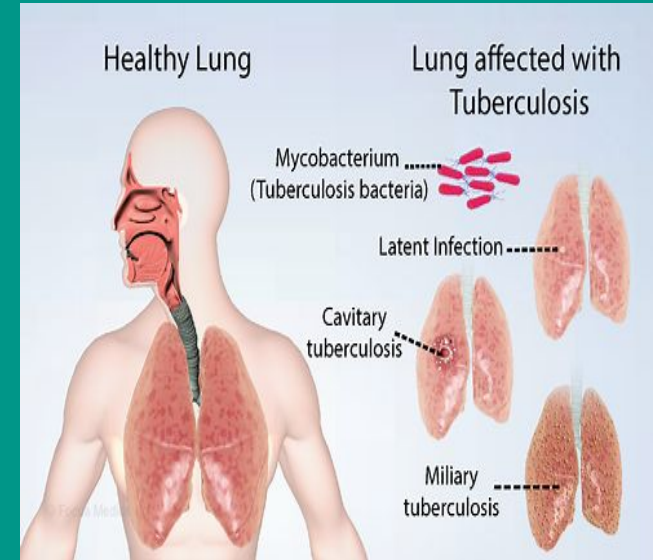
Results

Recommendation

Next Steps

Project Goal

To predict whether the chest x-ray image is Normal or Tuberculosis using image classification model.

Business Understanding

- **Death in 2020:1.5 million.**

- **~10 million people fell ill.**

- **2nd leading infectious killer after COVID-19 (above HIV/AIDS).**

- **Child and adolescent TB: Difficult to diagnose.**

- **AI Models- excellent accuracy.**

Healthy Lung

Lung affected with Tuberculosis

Mycobacterium (Tuberculosis bacteria)

Latent Infection

Cavitary tuberculosis

Miliary tuberculosis

Data

Chest X- ray Images

Tuberculosis

- 985 images
- NIAID/NIH TB Portal

Normal

- 3500 images
- SRSNA CXR dataset: RSNA pneumonia detection challenge dataset

Modeling

Convolutional Neural Network (CNN)

Accuracy :

❏ *Classifying images as Tuberculosis while the patient has Tuberculosis.*
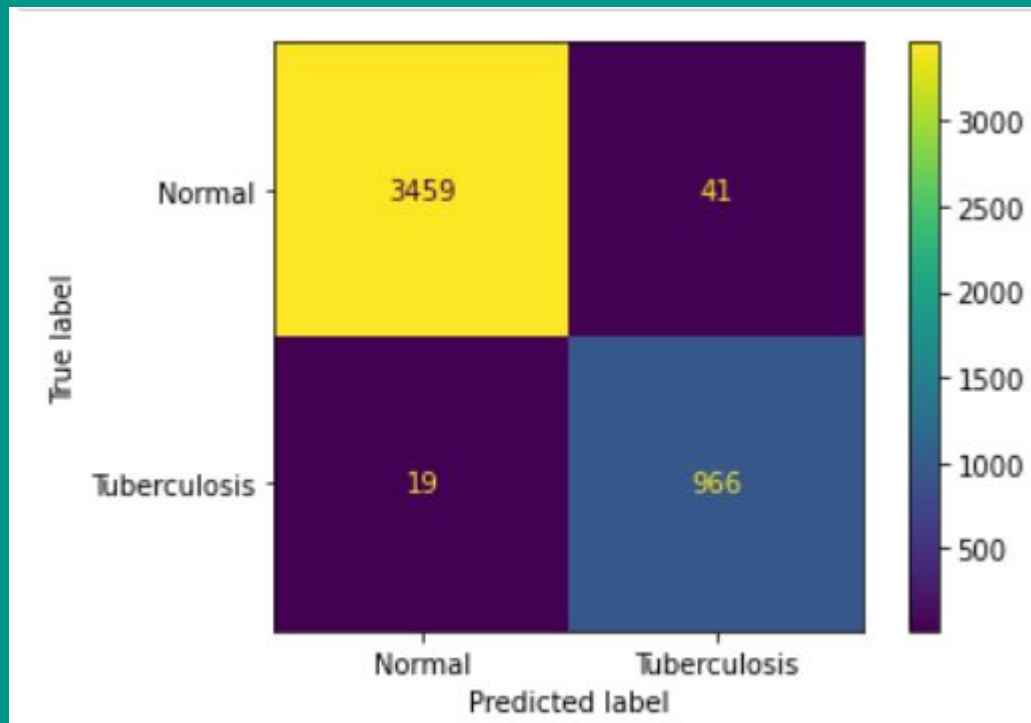❏ *Effective prevention and control.*

Recall:

❏ Classifying image as normal while the patient has Tuberculosis.
❏ Delayance in treatment .
❏ Increased Morbidity and Mortality.

Results

Convolutional Neural Network (CNN)

Scores

- ❏ 98.66% Accuracy
- ❏ 98.07% Recall

Recommendation

- ❏ Primary Decision support
- ❏ TB Screening/Diagnosis Tool
- ❏ Research

Next Steps

❏ More images

● Global source
● Different clinical phase of TB
● TB due to non Mtb

Thank you

Github: Tamiru3 (github.com)

Linkedin: Tamiru Berhanu Denka | LinkedIn