



Chest X-ray Image Classification with Deep Learning

A PRESENTATION BY THE AVENGERS

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Business Understanding

Pneumonia is diagnosed based on a patient's clinical symptoms, imaging and lab work. The preferred imaging is a plain chest radiograph (X-ray). On a chest X-ray, pneumonia is seen as opacities (white areas on the lung fields).

While some consider X-rays to be the gold standard of diagnosis, they are prone to misinterpretation depending on the quality of the image, experience of healthcare professionals etc.





Problem Statement

Tibabu hospital has observed an increase in Pneumonia infections. The hospital is understaffed, and cannot keep up with the high volume of patients.

They are looking for a solution to help with the diagnosis of pneumonia using chest x-ray images.

Proposed Solution

Come up with a classification algorithm that will determine if a patient has pneumonia or not based on their chest X-ray image(s).





Data Preparation

1

Obtain the
dataset
from Kaggle

2

Loading and
exploration of
the dataset

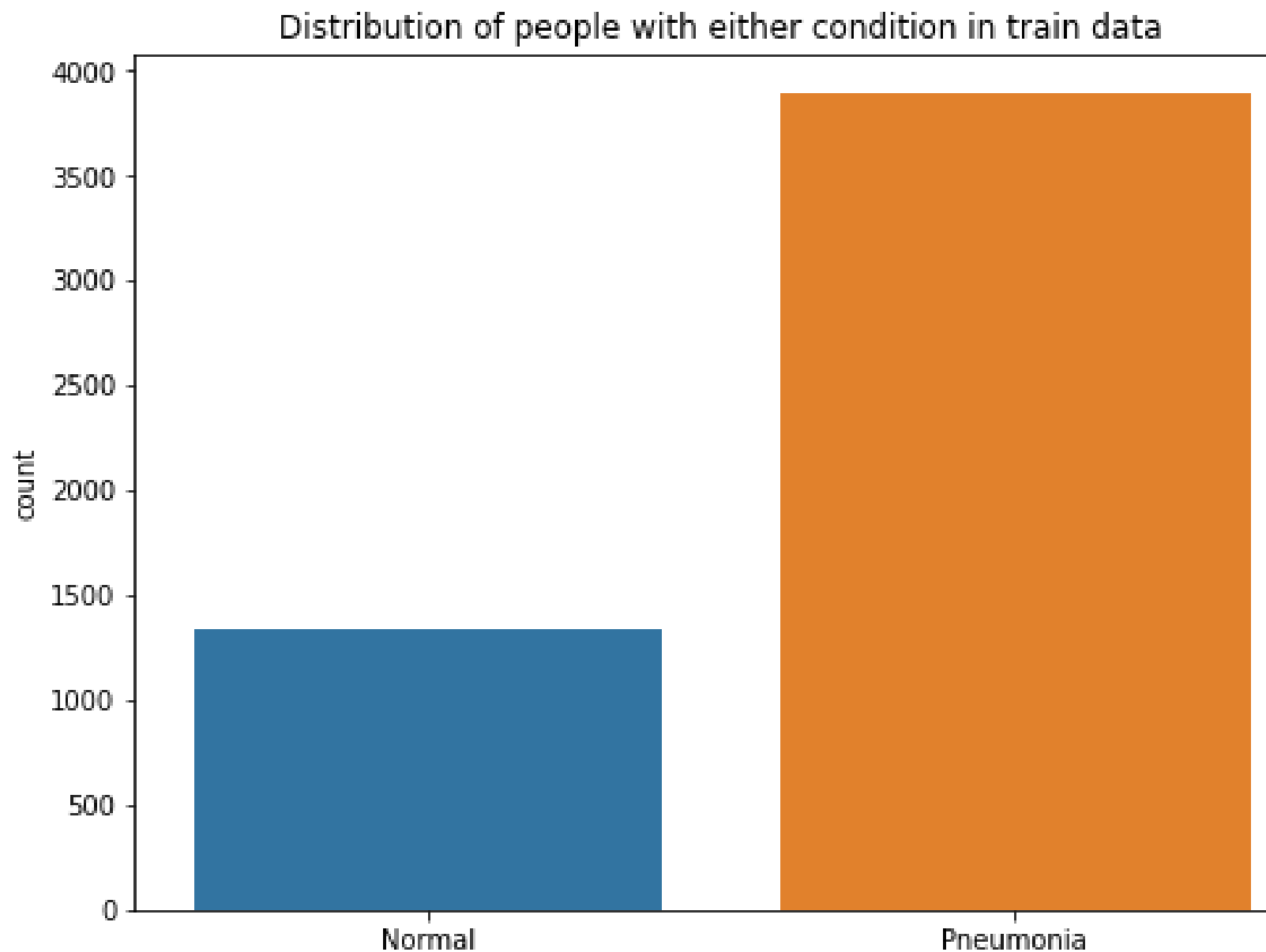
3

Make some
visualizations
for further
exploration

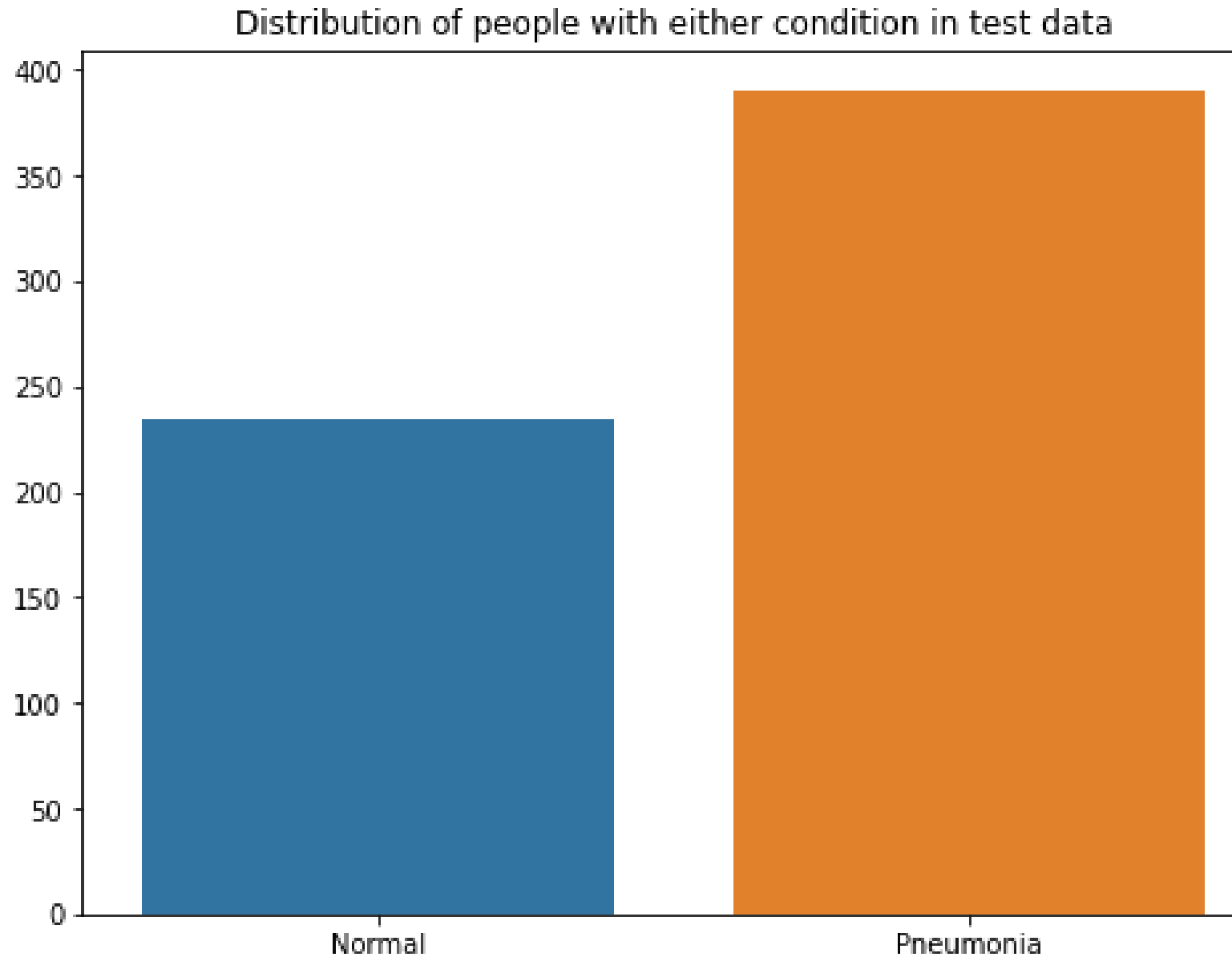
4

Reshape and
normalize the
data in
preparation for
modelling

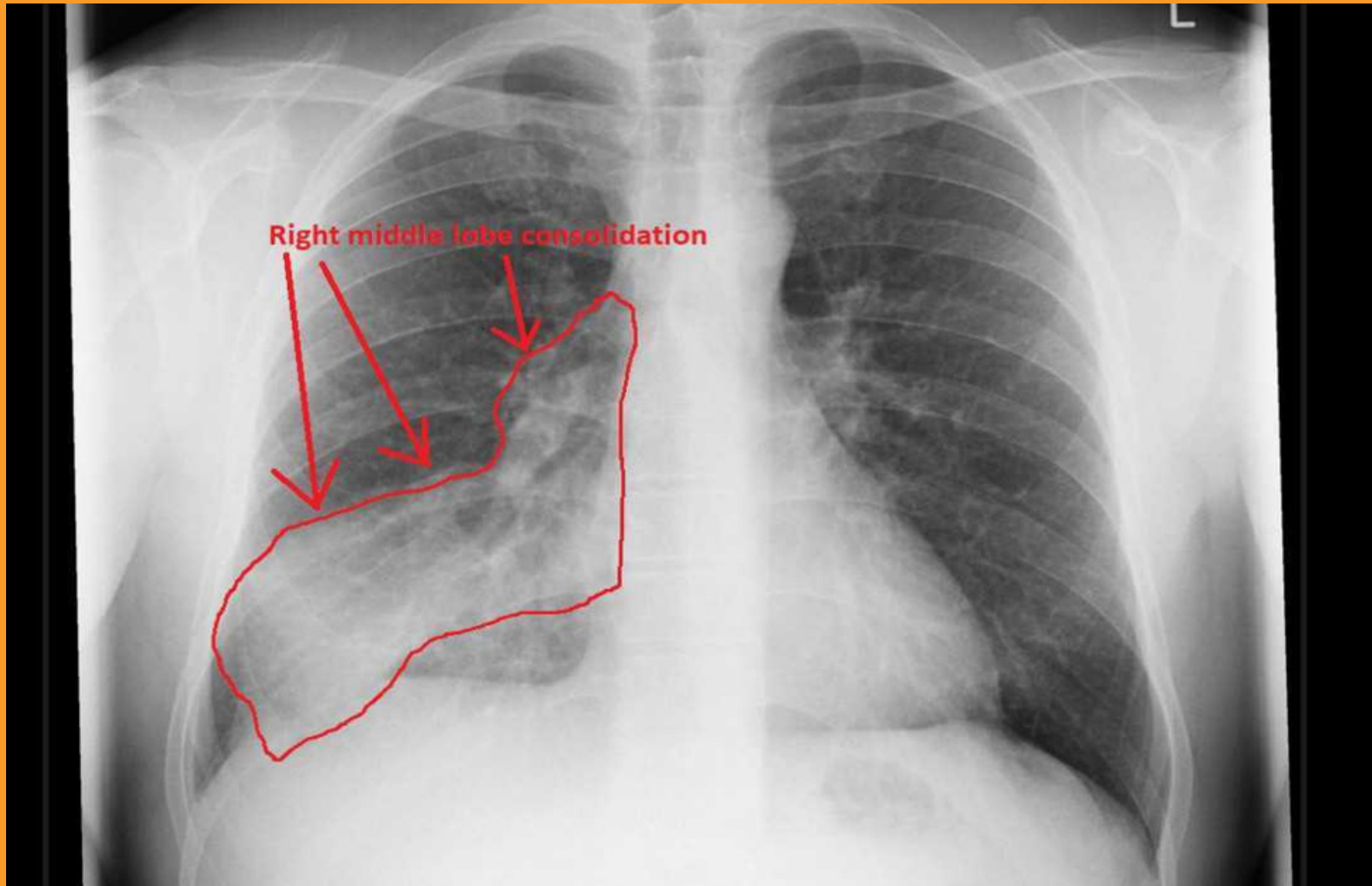
Distribution Of Normal and Pneumonia X-Rays on the Train Data



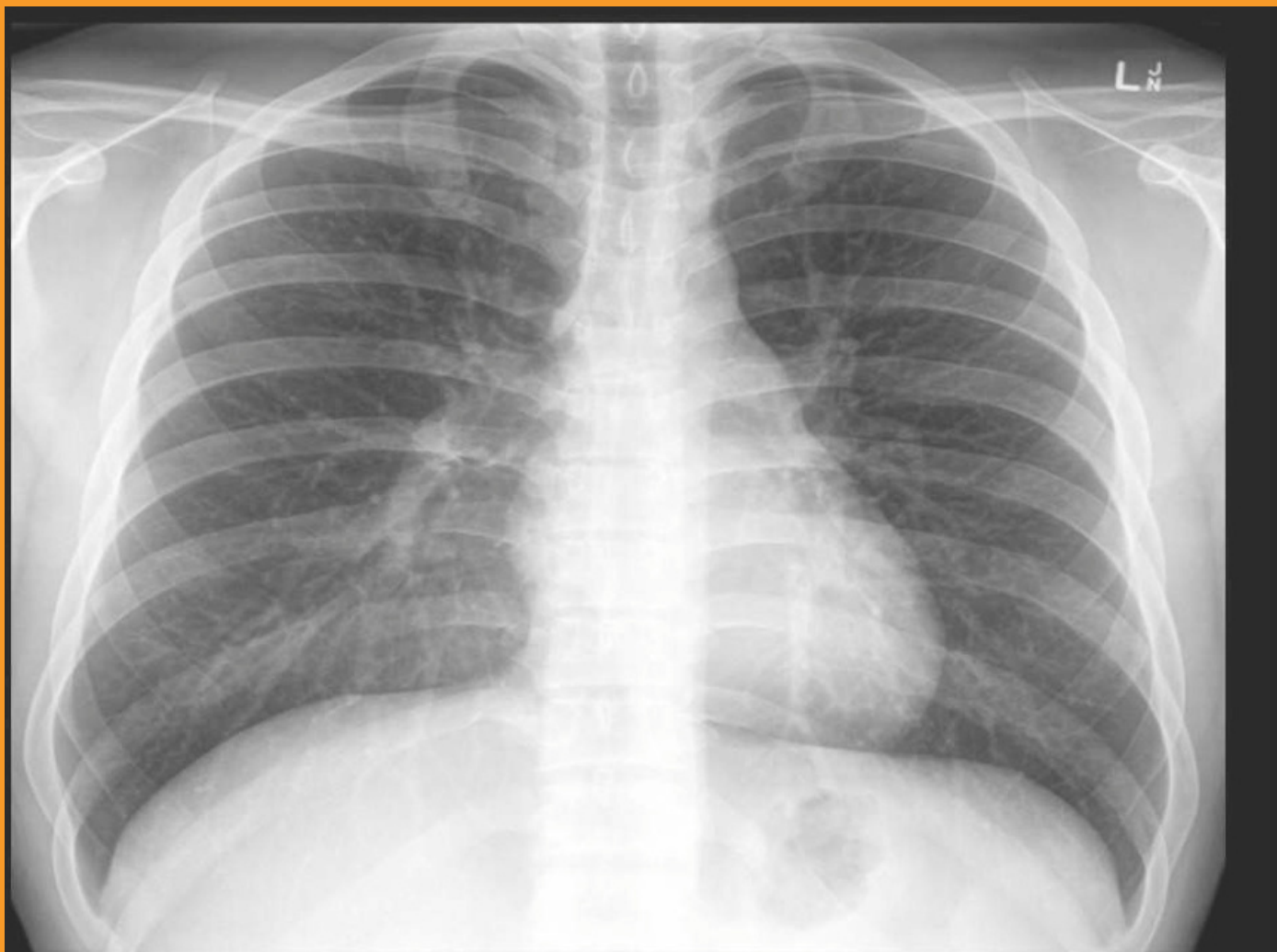
Distribution Of Normal and Pneumonia X-Rays on the Test Data



Graphical Representation of an Infected Lung VS a Normal Lung



An infected lung



A normal lung

The results for the final CNN model



98%

We have a 98%
chance of correctly
diagnosing
pneumonia

80%

Accuracy
score for our
final model

Conclusion

The sensitivity of detecting pneumonia by emergency medicine specialists and radiologists according to NIH is 83%, therefore:

- Integrate interpretation of chest x-rays using the model to improve pneumonia diagnostic accuracy.
- The algorithm is fast (36s) hence will increase efficiency.

DISCLAIMER: The above conclusions are purely technical.



Recommendation

Using the model for detection of pneumonia from chest x-ray images is a recommended option.

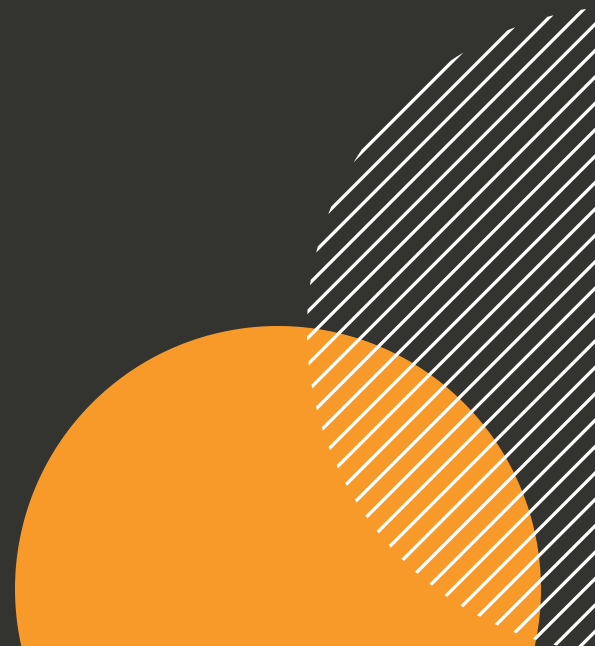
Based on the scores above the model can be deployed for use in the hospital. This will improve efficiency in diagnosis of pneumonia easing the burden of the understaffed workers.





**It is health that is real
wealth and not pieces of
gold and silver**

Mahatma Gandhi





Thank You

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Q&A

