In [1]:

```
from google.colab import drive
drive.mount('/gdrive')
%cd /gdrive/
```

```
Drive already mounted at /gdrive; to attempt to forcibly remount, call driv
e.mount("/gdrive", force_remount=True).
/gdrive
```

In [3]:

```
import time
import os
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from tqdm import tqdm_notebook as tqdm
!pip install pydicom
import pydicom
from pydicom import dcmread
from sklearn.utils import resample # Handle Imbalance
import pathlib
import PIL
import tensorflow_io as tfio
import tensorflow as tf
import keras
keras.backend.set_image_data_format('channels_last')
```

```
Requirement already satisfied: pydicom in /usr/local/lib/python3.7/dist-pack
ages (2.1.2)

Using TensorFlow backend.
```

In [4]:

```
os.chdir('/gdrive/MyDrive/Image_Segementation_CS2/')
```

In [5]:

```
# Read a saved files
dataset = pd.read_csv('siim/train-rle.csv')
df_main = pd.read_csv('Main_CS2_SIIM_All.csv')
df_downsampled = pd.read_csv('Main_CS2_SIIM.csv') # Only negative sampled.
```

In [10]:

```
df_downsampled.head(2)
```

Out[10]:

	Encoded_pixel	Path
0	209126 1 1019 6 1015 10 1012 13 1010 14 1008 1...	siim/dicom-images-train/1.2.276.0.7230010.3.1....
1	49820 3 1017 11 1012 13 1009 16 1007 18 1006 1...	siim/dicom-images-train/1.2.276.0.7230010.3.1....

In [6]:

```
# Metrics
def dice_coeff(actual,predicted,smooth=1):
  Actual = K.flatten(actual)
  Predict = K.flatten(predicted)
  intersection  = K.sum(Actual *Predict)
  return ((2.* intersection + smooth) / (K.sum(Actual) +K.sum(Predict) +smooth))
```

In [7]:

```
# Loading the best model
Segmentation_model   = final=tf.keras.models.load_model('new_model_save_test/best_models_Un
classification_model = tf.keras.models.load_model('best_models_classification.h5')
```

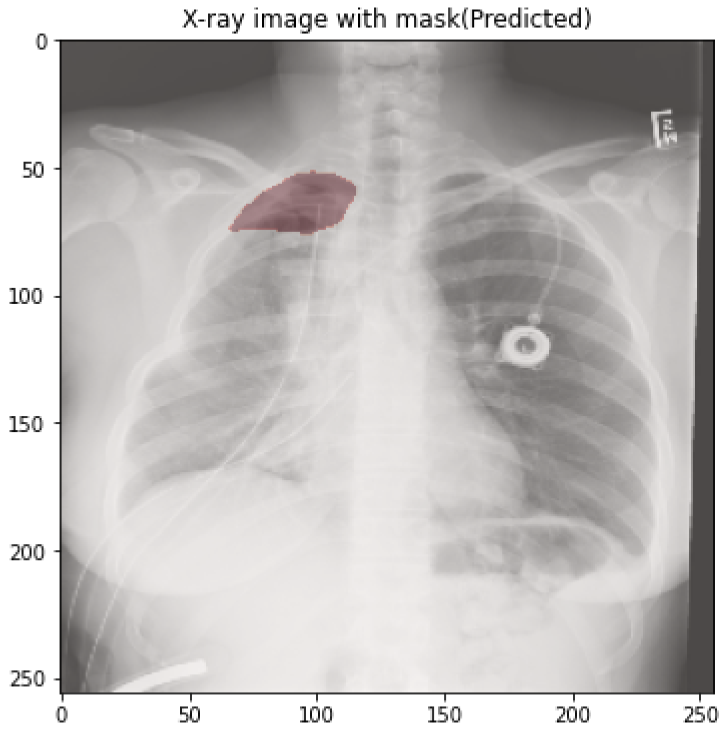
In [1]:

```
#Function-  Classification_Segmentation   --->
'''Here we are doing two actions, First we predicting whether given image has affected by p
    If Yes, Display X-ray with highlighted affected part.
    If No, Display image as it is. 😃
'''

def Classification_Segmentation(X):
  img = tf.io.read_file(X)
  image = tfio.image.decode_dicom_image(img, dtype=tf.uint8,color_dim=True,scale='preserve'
  image = tf.image.convert_image_dtype(image, tf.float32)#converting the image to tf.float3
  image=tf.squeeze(image,[0]) #squeezing the image because the file is of the shape(1,1024,
  b = tf.constant([1,1,3], tf.int32)
  image=tf.tile(image,b)#the image is of the shape (1024,1024,1) to make it (1024,1024,3) I
  image=tf.image.resize(image,size=[256,256])
  image=tf.expand_dims(image,axis=0)

  if classification_model.predict(image)>=0.5:
    print("Pneumothorax has been detected")
    mask=Segmentation_model.predict(image)
    mask=(mask>0.5).astype(np.uint8)

    plt.figure(figsize=(20,6))
    plt.title("X-ray image with mask(Predicted)")
    plt.imshow(np.squeeze(image),cmap='gray')
    plt.imshow(np.squeeze(mask),cmap='Reds',alpha=0.3)
    return plt.show()

  else:
    plt.figure(figsize=(20,6))
    print('Person is Healthy, No Pneumothorax is detected')
    plt.imshow(np.squeeze(image),cmap='gray')
    return plt.show()
```

In [13]:

```
start_time = time.time()
Classification_Segmentation(df_downsampled['Path'][50])
print("--- %s seconds --- for execution" % (time.time() - start_time))
```

```
Pneumothorax has been detected
```



```
--- 1.3128767013549805 seconds --- for execution
```

In [ ]:

```

```