LSTM:

Long short-term memory (**LSTM**) is an artificial recurrent neural network (RNN) architecture[1] used in the field of deep learning **(DL)**. Unlike standard feedforward neural networks, LSTM has feedback connections. It can process not only single data points (such as images), but also entire sequences of data (such as speech or video). It is a sequential pattern based learner.

CNN:
Convolutional neural networks are a specialized type of artificial neural networks that use a mathematical operation called convolution in place of general matrix multiplication in at least one of their layers.[13] They are specifically designed to process pixel data and are used in image recognition and processing.

CNN-LSTM:
The CNN LSTM architecture involves using Convolutional Neural Network (CNN) layers for feature extraction on input data combined with LSTMs to support sequence prediction.
CNN LSTMs were developed for visual time series prediction problems

CNN-BLSTM:

The CNN BLSTM architecture involves using Convolutional Neural Network (CNN) layers for feature extraction on input data combined with Bidirectional LSTMs to support sequence prediction.
CNN LSTMs were developed for visual time series prediction problems

THE CONTENT UNDER RESULTS WILL BE THE SAME FOR ALL THE MODELS.
RESULTS:
Section A contains the model metrics table which shows the final classification accuracy, precision, recall and f1-score along with the training time per epoch for the selected model. Section B shows the training and testing accuracy and loss over the different epochs of the training stage. Section C provides the confusion matrix which shows how good the model is with regards to distinguishing between the different diseases. Section D provides the exact final architecture used to construct the model.

FOR ALL THE MODELS, SAME INSTRUCTIONS FOR SECTION A and B.

A. MODELING ACCURACY TABLE

NO CONTENT BEYOND THE IMAGE. REMOVE TEXT. CHANGE IMAGE TO ACCOMDATE CHANGES.

B. ACCURACY AND LOSS LINE CHARTS

NO CONTENT BEYOND THE IMAGE. REMOVE TEXT.

SECTION C and D:

LSTM:

Confusion Matrix:

The LSTM model classifies 4 out of the 6 diseases with 100 accuracy and is the best model of classification among the 4 experimented with.

Architecture:

The model has 5 layers of LSTM and 5 dropout layers, 1 maxpooling layer and a couple of dense layers. More details about the structure can be found in the the hyperparameters table in the report.

CNN:

Confusion Matrix:

The CNN model struggles to classify multiple different diseases as evident from the image above.

Architecture:

The model has a 1 dimensional convolution layer, a dropout and a dense layer. More details about the structure can be found in the the hyperparameters table in the report.

CNN-LSTM:

Confusion Matrix:

The CNN-LSTM model performs relatively much better than CNN but struggles to classify pneumonia accurately as evident from the image above.

Architecture:

The model has 2 one dimensional convolution layers, 2 layers of LSTM and 3 dropout layers, 1 maxpooling layer and a couple of dense layers. More details about the structure can be found in the the hyperparameters table in the report.

CNN-BLSTM:

Confusion Matrix:

The CNN-BLSTM model performs better than CNN and CNN-LSTM as it classifies all the activities with better accuracy in comparison and has relatively reduced confusion level. It classifies pneumoni with a 100% classification accuracy which the CNN-LSTM failed to classify with over 80% accuracy.

Architecture:

The model has 2 one dimensional convolution layers, 2 layers of Bidirectional LSTMs and 3 dropout layers, 1 maxpooling layer and a couple of dense layers. More details about the structure can be found in the the hyperparameters table in the report.