NLP Project

FCAI-HU

Team Number: 5

Team Members Names & IDs:

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Dataset Details

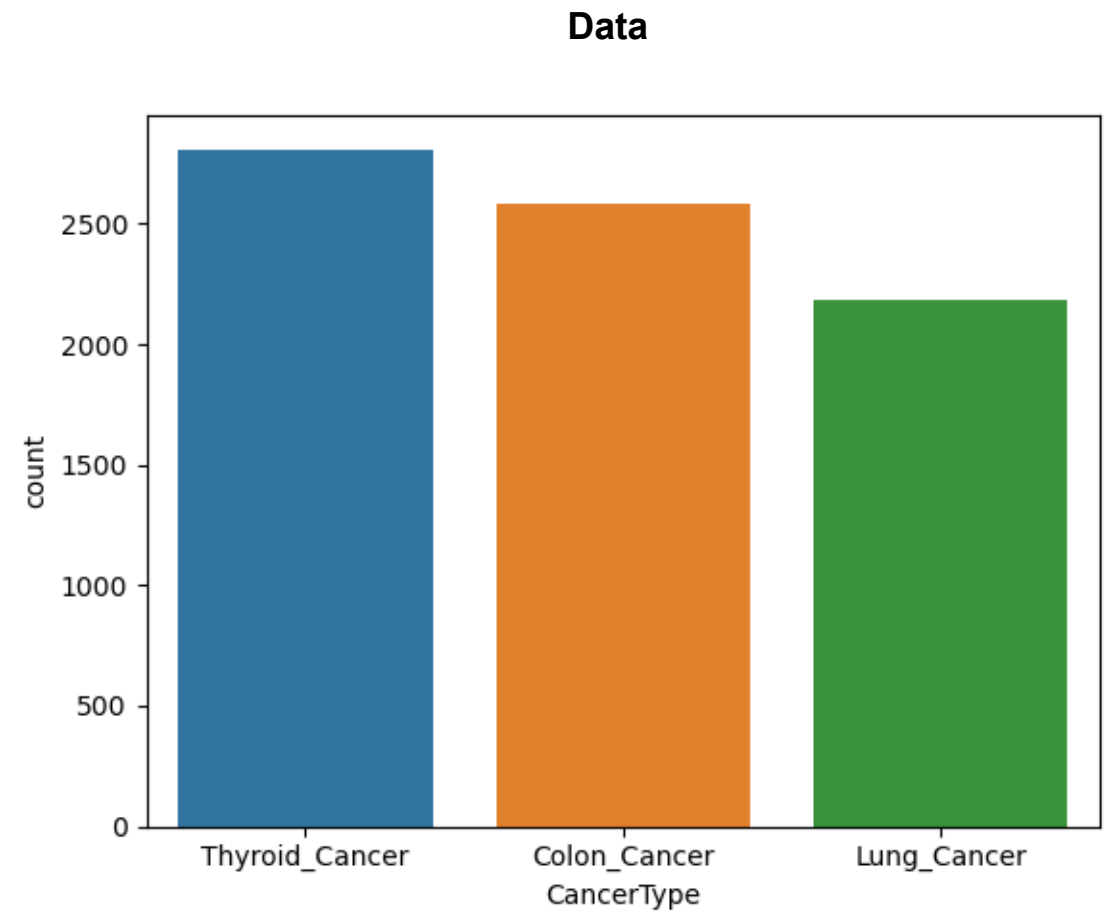
Dataset Name: Medical Text Dataset - Cancer Doc Classification.

Dataset Link:
Medical Text Dataset -Cancer Doc Classification | Kaggle

Number of Samples: 7570
[Train : Test] Ratio -> 6056 text : 1514 text = **80% : 20%**

Number of Classes: 3
Classes Labels: Thyroid Cancer, Lung Cancer, Colon Cancer

Analysis & Distribution Data

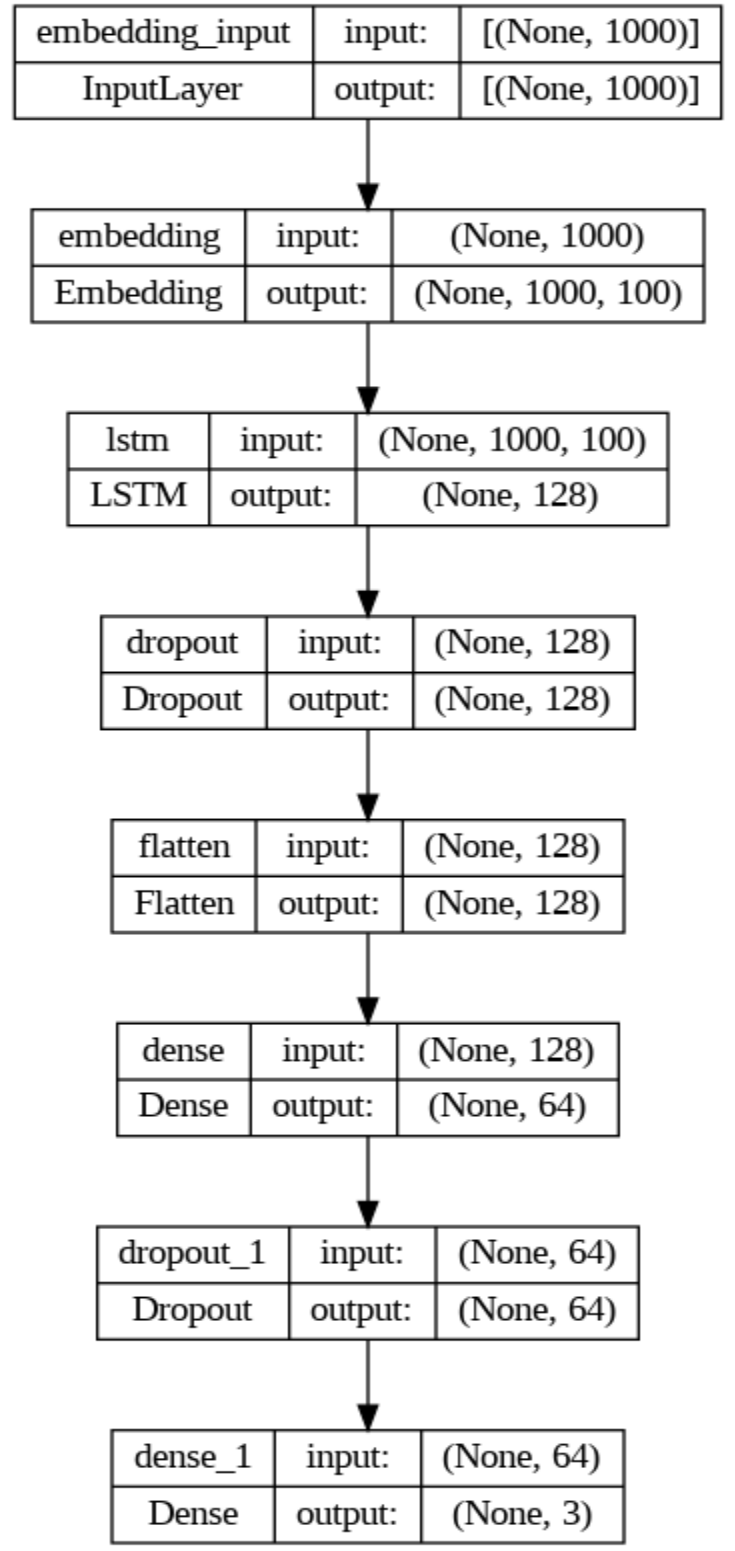


This graph shows that data is balanced

Model

```
model = Sequential()

model.add(Embedding(max_words, 100, input_length = max_Text_length))
model.add(LSTM(128))
# model.add(BatchNormalization())
model.add(Dropout(0.25))

model.add(Flatten())
model.add(Dense(64, activation = 'relu'))
model.add(Dropout(0.25))

model.add(Dense(3, activation = 'softmax'))

model.compile(optimizer = 'adam', loss = 'sparse_categorical_crossentropy', metrics = ['accuracy'])
history = model.fit(X_train, y_train, validation_data = (X_test, y_test), epochs = 10)

y_pred = model.predict(X_test)

model.summary()
```

Block Diagram:



Steps of our Algorithm:

Preprocessing: We removed all stopwords, We removed words of length equal or less than 2, We have used Regular Expression to made all data sets without numbers or strange symbols and make them in lowercase letters, We use Lemmtizations to make every word in base dictionary form, We have made most frequent words equal to 25000, We have made all words contain 1,000 words of fixed length to prepare data before feeding them into the network.

LSTM Architecture: The LSTM architecture is defined and consists of 128 Units followed by two layers, and we add batch normalization and dropout (type of regularization) to avoid overfitting.

Training: The LSTM model is trained on a dataset of 6056 text belonging to three different types of Cancer
(Thyroid, Lung, Colon).

Testing: The final step is testing the model on new unseen 1514 text to classify them into one of the three Cancer types.

Results: Finally, we get the Accuracy = 96.24%

Hyper-parameters:

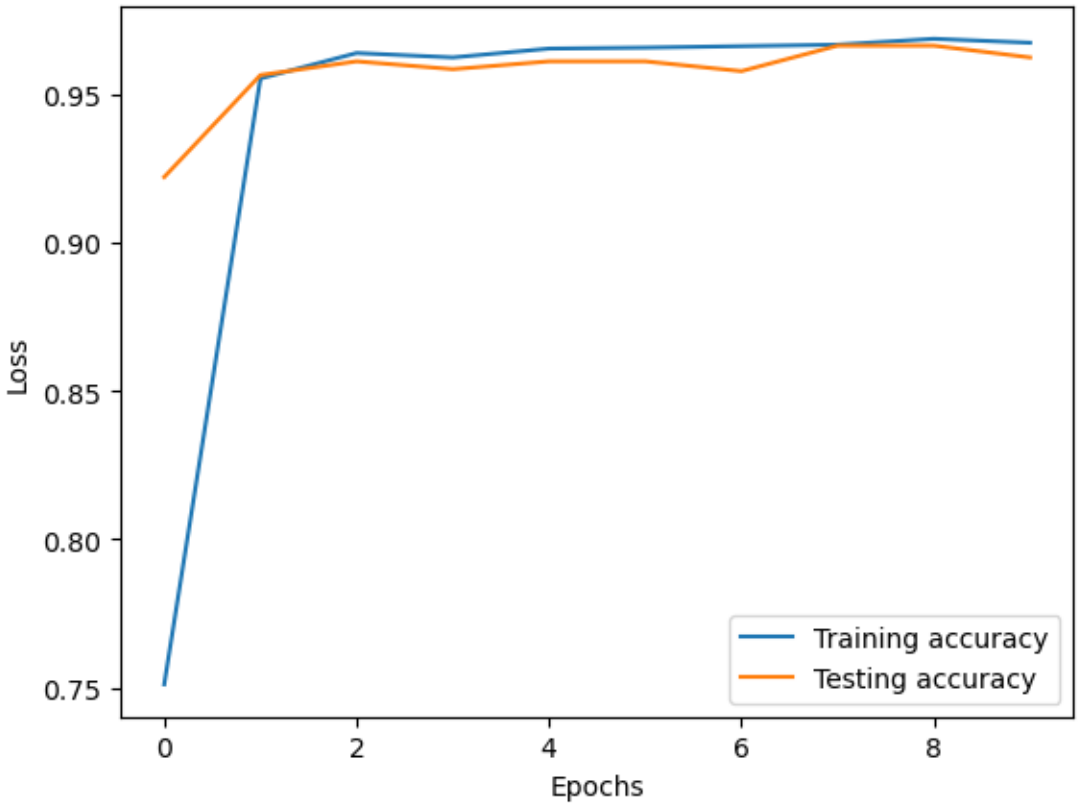
```
numOf(LSTM)Layers = 1
numOf(units_in_LSTM) = 128
numOfDenseLayers = 2 & Activation_functhion = ‘relu’, ‘softmax’ for output
numOf(units_in_FirstDenseLayer) = 64
optimizer = 'adam'
loss = 'sparse_categorical_crossentropy'
epochs = 10
batch_size = 32 (Defualt)
maxWord_in_Tokenizer = 25000
maxTextLength = 1000
```

We have used LSTM once, and another once we have used Bidirectional with LSTM.

We have changed the hyperparameters in model many times to get the best results.

Result Details:

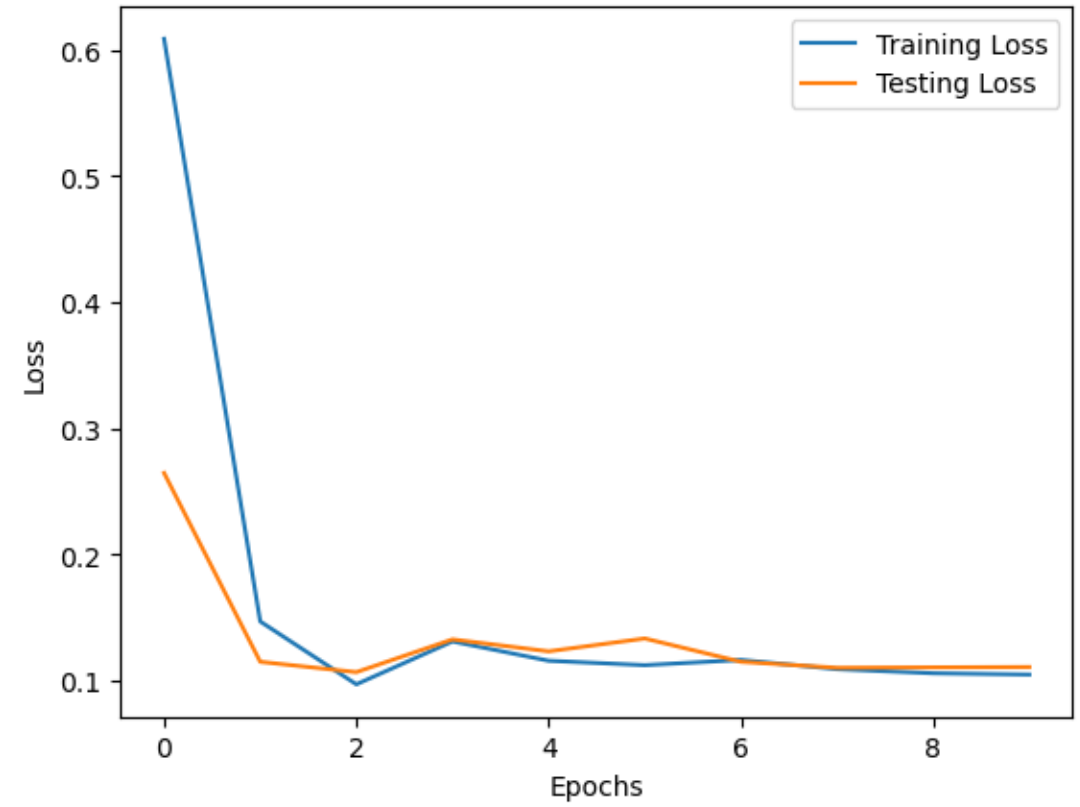
1) Accuracy Graph:



Training Accuracy = 96.73 %

Validation Accuracy = 96.24 %

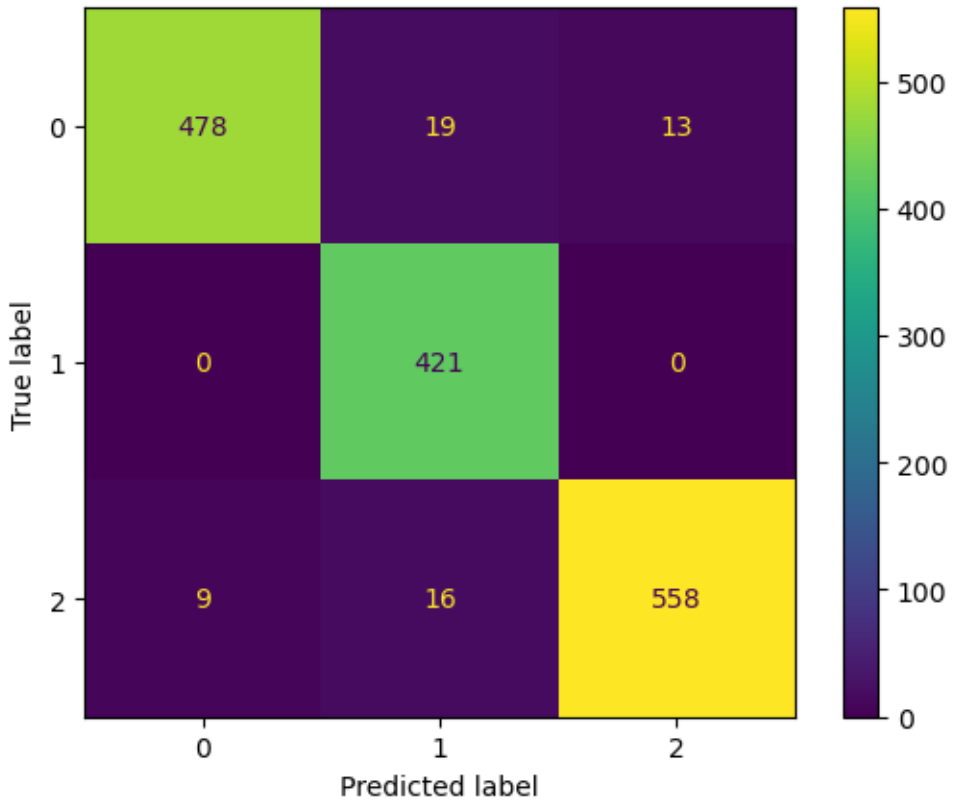
2) Loss Graph:



Training Loss = 10.47 %

Validation Loss = 11.07 %

3) Confusion Matrix:



4) Zero One Loss: -> Only 57 of 1514 image

There are 1457 of 1514 text that Model Predicted Correctly.

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