MovieReview

May 4, 2025

[1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import tensorflow as tf
from tensorflow.keras.preprocessing.text import Tokenizer
from tensorflow.keras.preprocessing.sequence import pad_sequences
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification_report, confusion_matrix

# 2. Load dataset
df = pd.read_csv("IMDB_Dataset.csv")
print("Shape:", df.shape)
df.head()
```

```
Shape: (50000, 2)
```

[1]:

```
                                              review sentiment
0  One of the other reviewers has mentioned that …  positive
1  A wonderful little production. <br /><br />The…  positive
2  I thought this was a wonderful way to spend ti…  positive
3  Basically there's a family where a little boy …  negative
4  Petter Mattei's "Love in the Time of Money" is…  positive
```

[2]:

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# 3. Encode target variable (positive -> 1, negative -> 0)
df['sentiment'] = df['sentiment'].map({'positive': 1, 'negative': 0})

# 4. Split data
X_train, X_test, y_train, y_test = train_test_split(
    df['review'], df['sentiment'], test_size=0.2, random_state=42)
```

[3]:

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# 5. Tokenize and pad text
tokenizer = Tokenizer(num_words=10000, oov_token="<OOV>")
tokenizer.fit_on_texts(X_train)

X_train_seq = tokenizer.texts_to_sequences(X_train)
X_test_seq = tokenizer.texts_to_sequences(X_test)
```

```
max_len = 200
X_train_pad = pad_sequences(X_train_seq, maxlen=max_len, padding='post',␣
 ↪truncating='post')
X_test_pad = pad_sequences(X_test_seq, maxlen=max_len, padding='post',␣
 ↪truncating='post')
```

[4]:

```
# 6. Build DNN model
model = tf.keras.Sequential([
    tf.keras.layers.Embedding(input_dim=10000, output_dim=16,␣
 ↪input_length=max_len),
    tf.keras.layers.GlobalAveragePooling1D(),
    tf.keras.layers.Dense(16, activation='relu'),
    tf.keras.layers.Dense(1, activation='sigmoid')
])

model.compile(optimizer='adam', loss='binary_crossentropy',␣
 ↪metrics=['accuracy'])

# 7. Train the model
history = model.fit(X_train_pad, y_train, epochs=10,␣
 ↪validation_data=(X_test_pad, y_test), verbose=2)
```

```
c:\Users\darsh\AppData\Local\Programs\Python\Python310\lib\site-
packages\keras\src\layers\core\embedding.py:90: UserWarning: Argument
`input_length` is deprecated. Just remove it.
  warnings.warn(
```

```
Epoch 1/10
1250/1250 - 6s - 5ms/step - accuracy: 0.7761 - loss: 0.4751 - val_accuracy:
0.8428 - val_loss: 0.3452
Epoch 2/10
1250/1250 - 5s - 4ms/step - accuracy: 0.8798 - loss: 0.2935 - val_accuracy:
0.8763 - val_loss: 0.2921
Epoch 3/10
1250/1250 - 5s - 4ms/step - accuracy: 0.8993 - loss: 0.2533 - val_accuracy:
0.8695 - val_loss: 0.3044
Epoch 4/10
1250/1250 - 5s - 4ms/step - accuracy: 0.9081 - loss: 0.2315 - val_accuracy:
0.8791 - val_loss: 0.2943
Epoch 5/10
1250/1250 - 4s - 3ms/step - accuracy: 0.9158 - loss: 0.2147 - val_accuracy:
0.8753 - val_loss: 0.3068
Epoch 6/10
1250/1250 - 5s - 4ms/step - accuracy: 0.9219 - loss: 0.2010 - val_accuracy:
0.8672 - val_loss: 0.3319
Epoch 7/10
1250/1250 - 9s - 8ms/step - accuracy: 0.9273 - loss: 0.1911 - val_accuracy:
0.8705 - val_loss: 0.3303
```

```
Epoch 8/10
1250/1250 - 4s - 3ms/step - accuracy: 0.9273 - loss: 0.1881 - val_accuracy:
0.8658 - val_loss: 0.3397
Epoch 9/10
1250/1250 - 5s - 4ms/step - accuracy: 0.9348 - loss: 0.1734 - val_accuracy:
0.8623 - val_loss: 0.3607
Epoch 10/10
1250/1250 - 5s - 4ms/step - accuracy: 0.9351 - loss: 0.1726 - val_accuracy:
0.8655 - val_loss: 0.3454
```

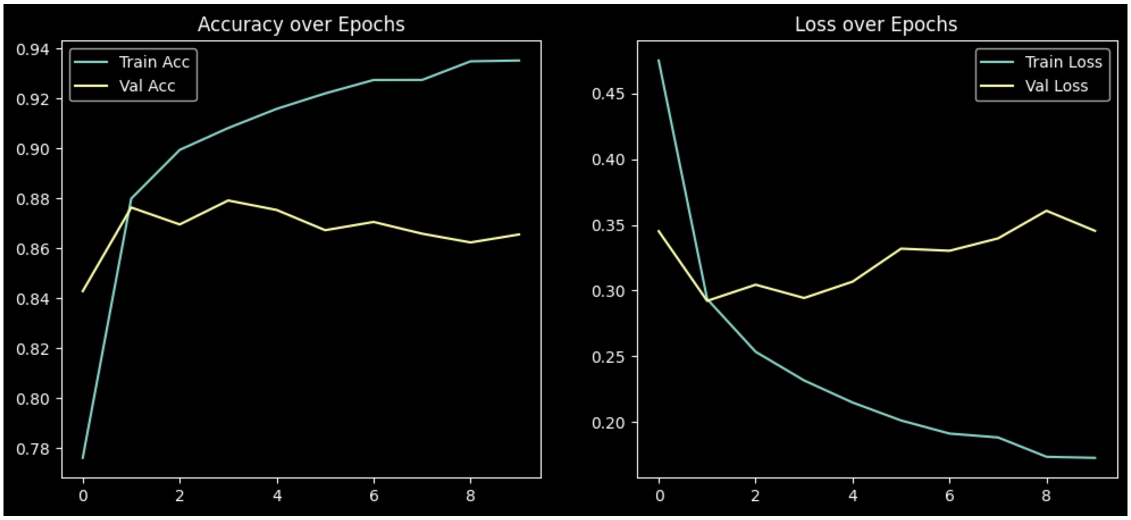
[5]:

```
# 8. Plot accuracy and loss
plt.figure(figsize=(12,5))

plt.subplot(1,2,1)
plt.plot(history.history['accuracy'], label='Train Acc')
plt.plot(history.history['val_accuracy'], label='Val Acc')
plt.title('Accuracy over Epochs')
plt.legend()

plt.subplot(1,2,2)
plt.plot(history.history['loss'], label='Train Loss')
plt.plot(history.history['val_loss'], label='Val Loss')
plt.title('Loss over Epochs')
plt.legend()

plt.show()
```



[6]:

```
# 9. Predictions and thresholding
y_pred_prob = model.predict(X_test_pad)
y_pred = (y_pred_prob >= 0.5).astype(int).flatten()
```

```
313/313              1s 1ms/step
```

[7]:

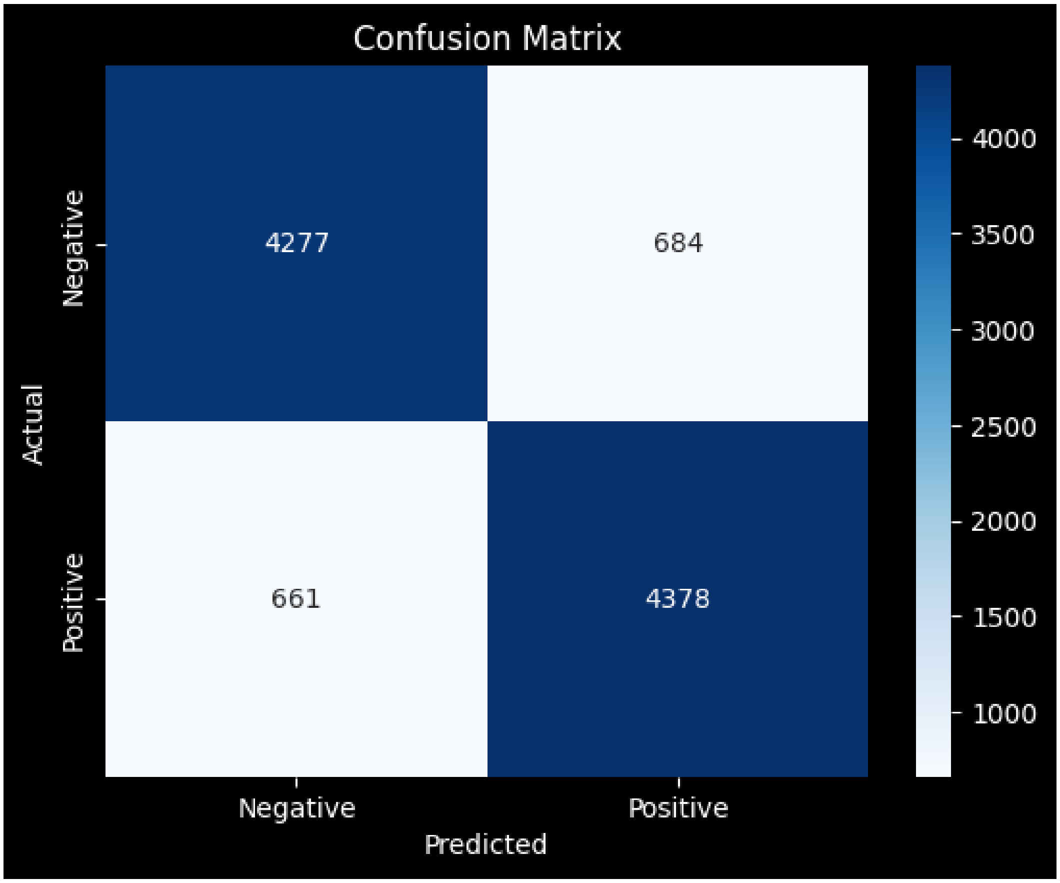
```python
# 10. Evaluation metrics
print("Classification Report:")
print(classification_report(y_test, y_pred, target_names=['Negative',␣
 ↪'Positive']))

# Confusion Matrix
conf_mat = confusion_matrix(y_test, y_pred)
sns.heatmap(conf_mat, annot=True, fmt='d', cmap='Blues',␣
 ↪xticklabels=['Negative', 'Positive'], yticklabels=['Negative', 'Positive'])
plt.title('Confusion Matrix')
plt.xlabel('Predicted')
plt.ylabel('Actual')
plt.show()
```

```
Classification Report:
              precision    recall  f1-score   support

    Negative       0.87      0.86      0.86      4961
    Positive       0.86      0.87      0.87      5039

    accuracy                           0.87     10000
   macro avg       0.87      0.87      0.87     10000
weighted avg       0.87      0.87      0.87     10000
```



```
[8]: # 11. Show 10 actual reviews and predicted sentiment
     sample_reviews = X_test.reset_index(drop=True)[:10]
     sample_preds = y_pred[:10]
     sample_true = y_test.reset_index(drop=True)[:10]

     for i in range(10):
         print(f"\nReview {i+1}:\n{sample_reviews[i][:300]}...")  # print only first␣
       ↪300 chars
         print(f"Actual Sentiment   : {'Positive' if sample_true[i] == 1 else␣
       ↪'Negative'}")
         print(f"Predicted Sentiment: {'Positive' if sample_preds[i] == 1 else␣
       ↪'Negative'}")
```

```
Review 1:
I really liked this Summerslam due to the look of the arena, the curtains and
just the look overall was interesting to me for some reason. Anyways, this could
have been one of the best Summerslam's ever if the WWF didn't have Lex Luger in
the main event against Yokozuna, now for it's time it was ok …
Actual Sentiment   : Positive
```

```
Predicted Sentiment: Negative

Review 2:
Not many television shows appeal to quite as many different kinds of fans like
Farscape does…I know youngsters and 30/40+ years old;fans both Male and Female
in as many different countries as you can think of that just adore this T.V
miniseries. It has elements that can be found in almost every ot…
Actual Sentiment   : Positive
Predicted Sentiment: Positive

Review 3:
The film quickly gets to a major chase scene with ever increasing destruction.
The first really bad thing is the guy hijacking Steven Seagal would have been
beaten to pulp by Seagal's driving, but that probably would have ended the whole
premise for the movie.<br /><br />It seems like they decided t…
Actual Sentiment   : Negative
Predicted Sentiment: Negative

Review 4:
Jane Austen would definitely approve of this one!<br /><br />Gwyneth Paltrow
does an awesome job capturing the attitude of Emma. She is funny without being
excessively silly, yet elegant. She puts on a very convincing British accent
(not being British myself, maybe I'm not the best judge, but she fo…
Actual Sentiment   : Positive
Predicted Sentiment: Positive

Review 5:
Expectations were somewhat high for me when I went to see this movie, after all
I thought Steve Carell could do no wrong coming off of great movies like
Anchorman, The 40 Year-Old Virgin, and Little Miss Sunshine. Boy, was I
wrong.<br /><br />I'll start with what is right with this movie: at certain…
Actual Sentiment   : Negative
Predicted Sentiment: Positive

Review 6:
I've watched this movie on a fairly regular basis for most of my life, and it
never gets old. For all the snide remarks and insults (mostly from David Spade),
"Tommy Boy" has a giant heart. And that's what keeps this movie funny after all
these years.<br /><br />Tommy Callahan (Chris Farley) is the …
Actual Sentiment   : Positive
Predicted Sentiment: Positive

Review 7:
For once a story of hope highlighted over the tragic reality our youth face.
Favela Rising draws one into a scary, unsafe and unfair world and shows through
beautiful color and moving music how one man and his dedicated friends choose
not to accept that world and change it through action and art. An…
Actual Sentiment   : Positive
```

```
Predicted Sentiment: Positive

Review 8:
Okay, I didn't get the Purgatory thing the first time I watched this episode. It
seemed like something significant was going on that I couldn't put my finger on.
This time those Costa Mesa fires on TV really caught my attention- and it helped
that I was just writing an essay on Inferno! But let me s…
Actual Sentiment   : Positive
Predicted Sentiment: Positive

Review 9:
I was very disappointed with this series. It had lots of cool graphics and
that's about it. The level of detail it went into was minimal, and I always got
the feeling the audience was being patronized -- there was a lot of what seemed
to me as "This is extremely cool but we're not going to explain i…
Actual Sentiment   : Negative
Predicted Sentiment: Positive

Review 10:
The first 30 minutes of Tinseltown had my finger teetering on the remote, poised
to flick around to watch something else. The premise of two writers, down on
their luck, living in a self-storage-space "bin" was mildly amusing, but,
painfully bland.<br /><br />The introduction of the character, playe…
Actual Sentiment   : Negative
Predicted Sentiment: Negative
```