IMPORTING LIBRARIES

In [2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')
```

IMPORTING DATASET

In [3]:
```
df=pd.read_csv("/content/stress.csv")
df
```

Out[3]:

| | subreddit | post_id | sentence_range | text | id | label | confidence | social_timestamp |
|---|---|---|---|---|---|---|---|---|
| **0** | ptsd | 8601tu | (15, 20) | He said he had not felt that way before, sugge... | 33181 | 1 | 0.800000 | 1521614353 |
| **1** | assistance | 8lbrx9 | (0, 5) | Hey there r/assistance, Not sure if this is th... | 2606 | 0 | 1.000000 | 1527009817 |
| **2** | ptsd | 9ch1zh | (15, 20) | My mom then hit me with the newspaper and it s... | 38816 | 1 | 0.800000 | 1535935605 |
| **3** | relationships | 7rorpp | [5, 10] | until i met my new boyfriend, he is amazing, h... | 239 | 1 | 0.600000 | 1516429555 |
| **4** | survivorsofabuse | 9p2gbc | [0, 5] | October is Domestic Violence Awareness Month a... | 1421 | 1 | 0.800000 | 1539809005 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... |
| **1093** | ptsd | 8u4olb | (10, 15) | His mom came, he freaked out and got angry. He... | 27516 | 0 | 0.800000 | 1530055048 |
| **1094** | almosthomeless | 94uaui | [10, 15] | They took me to a Bar and bought me a beer.. ‘... | 1393 | 0 | 0.571429 | 1533496123 |
| **1095** | anxiety | 8d2b2z | [0, 5] | It's something that I continually come back to... | 1818 | 0 | 0.800000 | 1524018866 |
| **1096** | assistance | 764xo3 | (0, 5) | My mom is living on borrowed time and she need... | 11122 | 1 | 1.000000 | 1507903006 |
| **1097** | survivorsofabuse | 7gxpn8 | (87, 92) | I am 26 but I have many years ahead of me stil... | 5001 | 0 | 1.000000 | 1512159284 |

1098 rows × 116 columns

DATA EXPLORATION

In [4]:
```
df.shape
```
Out[4]:
```
(1098, 116)
```

In [5]:
```
df.columns
```

Out[5]:
```
Index(['subreddit', 'post_id', 'sentence_range', 'text', 'id', 'label',
       'confidence', 'social_timestamp', 'social_karma', 'syntax_ari',
       ...
       'lex_dal_min_pleasantness', 'lex_dal_min_activation',
       'lex_dal_min_imagery', 'lex_dal_avg_activation', 'lex_dal_avg_imagery',
       'lex_dal_avg_pleasantness', 'social_upvote_ratio',
       'social_num_comments', 'syntax_fk_grade', 'sentiment'],
      dtype='object', length=116)
```

In [6]:
```
df.dtypes
```

Out[6]:
```
subreddit                    object
post_id                      object
sentence_range               object
text                         object
id                            int64
                             ...
lex_dal_avg_pleasantness    float64
social_upvote_ratio         float64
social_num_comments         float64
syntax_fk_grade             float64
sentiment                   float64
Length: 116, dtype: object
```

In [7]:
```
df.head()
```

Out[7]:

| | subreddit | post_id | sentence_range | text | id | label | confidence | social_timestamp | soc |
|---|---|---|---|---|---|---|---|---|---|
| **0** | ptsd | 8601tu | (15, 20) | He said he had not felt that way before, sugge... | 33181 | 1 | 0.8 | 1521614353 | |
| **1** | assistance | 8lbrx9 | (0, 5) | Hey there r/assistance, Not sure if this is th... | 2606 | 0 | 1.0 | 1527009817 | |
| **2** | ptsd | 9ch1zh | (15, 20) | My mom then hit me with the newspaper and it s... | 38816 | 1 | 0.8 | 1535935605 | |
| **3** | relationships | 7rorpp | [5, 10] | until i met my new boyfriend, he is amazing, h... | 239 | 1 | 0.6 | 1516429555 | |
| **4** | survivorsofabuse | 9p2gbc | [0, 5] | October is Domestic Violence Awareness Month a... | 1421 | 1 | 0.8 | 1539809005 | |

5 rows × 116 columns

In [8]:
```
df.tail()
```

Out[8]:

| | subreddit | post_id | sentence_range | text | id | label | confidence | social_timestamp | s |
|---|---|---|---|---|---|---|---|---|---|
| **1093** | ptsd | 8u4olb | (10, 15) | His mom came, he freaked out and got angry. He... | 27516 | 0 | 0.800000 | 1530055048 | |
| **1094** | almosthomeless | 94uaui | [10, 15] | They took me to a Bar and bought me a beer.. '... | 1393 | 0 | 0.571429 | 1533496123 | |
| **1095** | anxiety | 8d2b2z | [0, 5] | It's something that I continually come back to... | 1818 | 0 | 0.800000 | 1524018866 | |
| **1096** | assistance | 764xo3 | (0, 5) | My mom is living on borrowed time and she need... | 11122 | 1 | 1.000000 | 1507903006 | |
| **1097** | survivorsofabuse | 7gxpn8 | (87, 92) | I am 26 but I have many years ahead of me stil... | 5001 | 0 | 1.000000 | 1512159284 | |

5 rows × 116 columns

**CONCLUSION: we actually only need columns text and label for stress detection nlp modelling**

In [9]:
```
df=df[['text','label']]
df
```

Out[9]:

| | text | label |
|---|---|---|
| **0** | He said he had not felt that way before, sugge... | 1 |
| **1** | Hey there r/assistance, Not sure if this is th... | 0 |
| **2** | My mom then hit me with the newspaper and it s... | 1 |
| **3** | until i met my new boyfriend, he is amazing, h... | 1 |
| **4** | October is Domestic Violence Awareness Month a... | 1 |
| **...** | ... | ... |
| **1093** | His mom came, he freaked out and got angry. He... | 0 |
| **1094** | They took me to a Bar and bought me a beer.. '... | 0 |
| **1095** | It's something that I continually come back to... | 0 |
| **1096** | My mom is living on borrowed time and she need... | 1 |
| **1097** | I am 26 but I have many years ahead of me stil... | 0 |

1098 rows × 2 columns

**DATA WRANGLING**

In [10]:
```
# MISSING VALUES
df.isna().sum()
```

```
Out[10]: text     0
         label    0
         dtype: int64
```

```
In [11]: # DUPLICATE VALUES
         df.duplicated().sum()
```

```
Out[11]: 1
```

```
In [12]: df.drop_duplicates(inplace=True)
         df
```

Out[12]:

| | text | label |
|---|---|---|
| **0** | He said he had not felt that way before, sugge... | 1 |
| **1** | Hey there r/assistance, Not sure if this is th... | 0 |
| **2** | My mom then hit me with the newspaper and it s... | 1 |
| **3** | until i met my new boyfriend, he is amazing, h... | 1 |
| **4** | October is Domestic Violence Awareness Month a... | 1 |
| **...** | ... | ... |
| **1093** | His mom came, he freaked out and got angry. He... | 0 |
| **1094** | They took me to a Bar and bought me a beer.. '... | 0 |
| **1095** | It's something that I continually come back to... | 0 |
| **1096** | My mom is living on borrowed time and she need... | 1 |
| **1097** | I am 26 but I have many years ahead of me stil... | 0 |

1097 rows × 2 columns

```
In [13]: # CORRECTING THE INDEX VALUE
         df.reset_index(drop=True,inplace=True)
         df
```

Out[13]:

| | text | label |
|---|---|---|
| **0** | He said he had not felt that way before, sugge... | 1 |
| **1** | Hey there r/assistance, Not sure if this is th... | 0 |
| **2** | My mom then hit me with the newspaper and it s... | 1 |
| **3** | until i met my new boyfriend, he is amazing, h... | 1 |
| **4** | October is Domestic Violence Awareness Month a... | 1 |
| **...** | ... | ... |
| **1092** | His mom came, he freaked out and got angry. He... | 0 |
| **1093** | They took me to a Bar and bought me a beer.. '... | 0 |
| **1094** | It's something that I continually come back to... | 0 |
| **1095** | My mom is living on borrowed time and she need... | 1 |
| **1096** | I am 26 but I have many years ahead of me stil... | 0 |

1097 rows × 2 columns

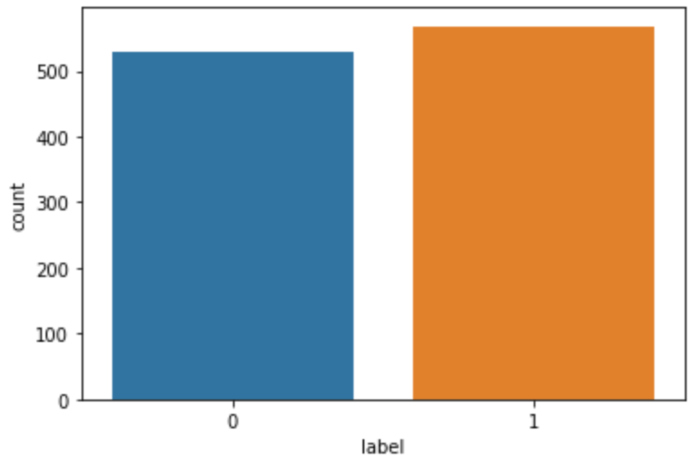
DATA ANALYSIS

```
In [14]: # OBSERVING THE OUTPUT LABEL
         df['label'].value_counts()
```

```
Out[14]: 1    568
         0    529
         Name: label, dtype: int64
```

```
In [15]: sns.countplot(x='label',data=df)
```

```
Out[15]: <Axes: xlabel='label', ylabel='count'>
```



```
In [16]: # MAPPING COLUMN LABEL
         df['label']=df['label'].map({0:'NO STRESS',1:'STRESS'})
         df
```

Out[16]:

| | text | label |
|---|---|---|
| **0** | He said he had not felt that way before, sugge... | STRESS |
| **1** | Hey there r/assistance, Not sure if this is th... | NO STRESS |
| **2** | My mom then hit me with the newspaper and it s... | STRESS |
| **3** | until i met my new boyfriend, he is amazing, h... | STRESS |
| **4** | October is Domestic Violence Awareness Month a... | STRESS |
| **...** | ... | ... |
| **1092** | His mom came, he freaked out and got angry. He... | NO STRESS |
| **1093** | They took me to a Bar and bought me a beer.. '... | NO STRESS |
| **1094** | It's something that I continually come back to... | NO STRESS |
| **1095** | My mom is living on borrowed time and she need... | STRESS |
| **1096** | I am 26 but I have many years ahead of me stil... | NO STRESS |

1097 rows × 2 columns

DOWNLOADING PACKAGES FOR NLP

```
In [17]: import nltk
         nltk.download('wordnet')
         nltk.download('stopwords')
         nltk.download('punkt')
```

```
[nltk_data] Downloading package wordnet to /root/nltk_data...
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Unzipping corpora/stopwords.zip.
[nltk_data] Downloading package punkt to /root/nltk_data...
[nltk_data]   Unzipping tokenizers/punkt.zip.
Out[17]: True
```

NLP PREPROCESSING

```
In [18]: from nltk import TweetTokenizer
         tk=TweetTokenizer()
         import re
         from nltk import word_tokenize
         from nltk import SnowballStemmer
         snow=SnowballStemmer('english')
         from nltk.corpus import stopwords
         stop=stopwords.words('english')
```

```
In [19]: def nlp(text):
           text=str(text).lower()
           text=re.sub('[^a-zA-Z0-9]+',' ',text)
           text=[words for words in text.split(' ') if len(words)>=3]
           text=' '.join(text)
           text=[words for words in text.split(' ') if words not in stop]
           text=' '.join(text)
           text=[snow.stem(word) for word in text.split(" ")]
           text=' '.join(text)
           return text
```

```
In [20]: df['text']=df['text'].apply(nlp)
         df
```

```
Out[20]:                                                 text      label
            0      said felt way sugget rest trigger ahead youi h...     STRESS
            1      hey assist sure right place post goe current s...  NO STRESS
            2      mom hit newspap shock would know like play hit...     STRESS
            3      met new boyfriend amaz kind sweet good student...     STRESS
            4      octob domest violenc awar month domest violenc...     STRESS
          ...                                                    ...        ...
         1092   mom came freak got angri almost slam door mom ...  NO STRESS
         1093      took bar bought beer tonight sleep mime sleep ...  NO STRESS
         1094      someth continu come back think anxieti manifes...  NO STRESS
         1095      mom live borrow time need cardiac surgeri whol...     STRESS
         1096      mani year ahead still alway question pleas ask...  NO STRESS

         1097 rows × 2 columns
```

```
In [21]: # VECTORIZATION
         from sklearn.feature_extraction.text import TfidfVectorizer
         vec=TfidfVectorizer()
         train_data=vec.fit_transform(df.text)
         print(train_data)
```

```
  (0, 2083)	0.09803824803511313
  (0, 3103)	0.10598983379531493
  (0, 1954)	0.08273881617563474
  (0, 1990)	0.11408643280103052
  (0, 4716)	0.10041241120759288
  (0, 1837)	0.17857090176966361
  (0, 4314)	0.12356135176957204
  (0, 3262)	0.1686634996498786
  (0, 2918)	0.06781837355304687
  (0, 204)	0.17857090176966361
  (0, 1982)	0.10934229657185789
  (0, 4524)	0.1517266838581468
  (0, 2182)	0.1686634996498786
  (0, 3686)	0.12230801755317774
  (0, 3373)	0.09803824803511313
  (0, 1423)	0.09276748236639656
  (0, 3550)	0.12933743122512456
  (0, 2401)	0.1369159614924429
  (0, 1480)	0.06729846755308619
  (0, 974)	0.07695000701927272
  (0, 3873)	0.07812309597421503
  (0, 190)	0.12230801755317774
  (0, 2820)	0.09276748236639656
  (0, 4212)	0.13102324859276235
  (0, 3283)	0.17857090176966361
  :	:
  (1096, 3895)	0.1703598603578534
  (1096, 1706)	0.1556323268713743
  (1096, 2198)	0.15684456316347392
  (1096, 3141)	0.1319377968185832
  (1096, 3293)	0.1787368800311366
  (1096, 2827)	0.26625676277812105
  (1096, 4626)	0.1163444270086122
  (1096, 1824)	0.12508976892966592
  (1096, 985)	0.15118134842708764
  (1096, 240)	0.11784278372071746
  (1096, 1523)	0.14056638617100659
  (1096, 1435)	0.16522158283675717
  (1096, 2551)	0.0951235854224154
  (1096, 3999)	0.10657252497382802
  (1096, 1841)	0.09795352366239281
  (1096, 4750)	0.0879971046300664
  (1096, 4241)	0.09287557706141465
  (1096, 342)	0.1054971793228531
  (1096, 4155)	0.1068468707551632
  (1096, 326)	0.12105807682215511
  (1096, 2564)	0.13436307158855387
  (1096, 3373)	0.1337400100037116
  (1096, 1480)	0.09180598291149197
  (1096, 2064)	0.13312838138906052
  (1096, 202)	0.1899524499646662
```

SEPERATING INPUT AND OUTPUT

In [22]:
```
x=train_data
y=df['label'].values
```

SEPERATING TRAINING AND TESTING DATA

In [23]:
```
# TRAIN TEST SPLIT
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.30,random_state=42)
```

In [24]:
```
print(x_train.shape,x_test.shape,y_train.shape,y_test.shape)
```

```
(767, 4771) (330, 4771) (767,) (330,)
```

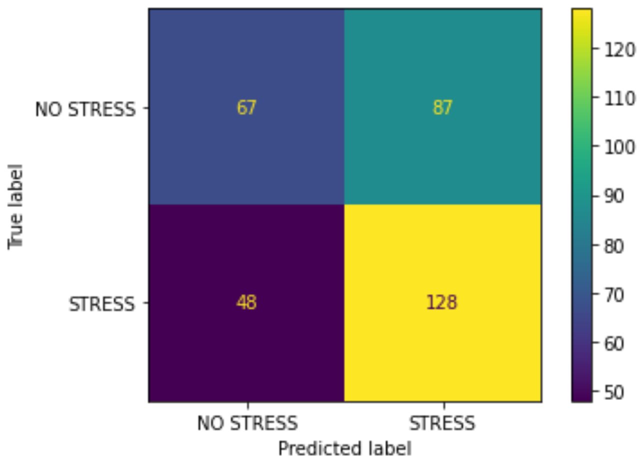
MODEL CREATION AND PERFORMANCE EVALUATION

In [25]:
```
# CLASSIFICATION MODEL
from sklearn.neighbors import KNeighborsClassifier
from sklearn.naive_bayes import MultinomialNB
from sklearn.svm import SVC
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
```

In [26]:
```
from sklearn.metrics import confusion_matrix,accuracy_score,classification_report,C
```

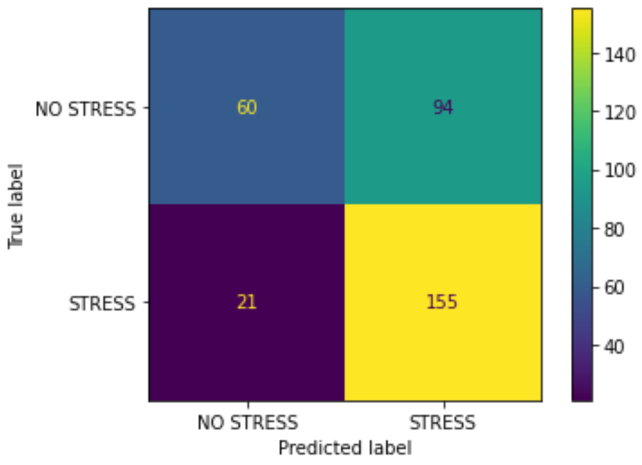
In [27]:
```
print("KNN CLASSIFIER")
model_knn=KNeighborsClassifier()
model_knn.fit(x_train,y_train)
y_knn=model_knn.predict(x_test)
print("CONFUSION MATRIX:\n",confusion_matrix(y_test,y_knn))
print(ConfusionMatrixDisplay.from_predictions(y_test,y_knn))
print("ACCURACY SCORE:",accuracy_score(y_test,y_knn))
print("CLASSIFICATION REPORT:\n",classification_report(y_test,y_knn))
```

```
KNN CLASSIFIER
CONFUSION MATRIX:
 [[ 67  87]
 [ 48 128]]
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay object at 0x7fcb662
631f0>
ACCURACY SCORE: 0.5909090909090909
CLASSIFICATION REPORT:
               precision    recall  f1-score   support

   NO STRESS       0.58      0.44      0.50       154
      STRESS       0.60      0.73      0.65       176

    accuracy                           0.59       330
   macro avg       0.59      0.58      0.58       330
weighted avg       0.59      0.59      0.58       330
```



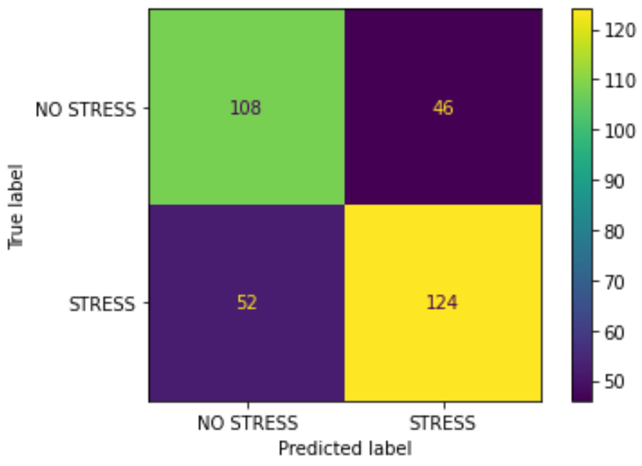
In [28]:
```
print("NAIVE-BAYES")
model_nb=MultinomialNB()
model_nb.fit(x_train,y_train)
y_nb=model_nb.predict(x_test)
print("CONFUSION MATRIX:\n",confusion_matrix(y_test,y_nb))
print(ConfusionMatrixDisplay.from_predictions(y_test,y_nb))
print("ACCURACY SCORE:",accuracy_score(y_test,y_nb))
print("CLASSIFICATION REPORT:\n",classification_report(y_test,y_nb))
```

```
NAIVE-BAYES
CONFUSION MATRIX:
 [[ 60  94]
 [ 21 155]]
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay object at 0x7fcb658
7bb80>
ACCURACY SCORE: 0.6515151515151515
CLASSIFICATION REPORT:
               precision    recall  f1-score   support

   NO STRESS       0.74      0.39      0.51       154
      STRESS       0.62      0.88      0.73       176

    accuracy                           0.65       330
   macro avg       0.68      0.64      0.62       330
weighted avg       0.68      0.65      0.63       330
```



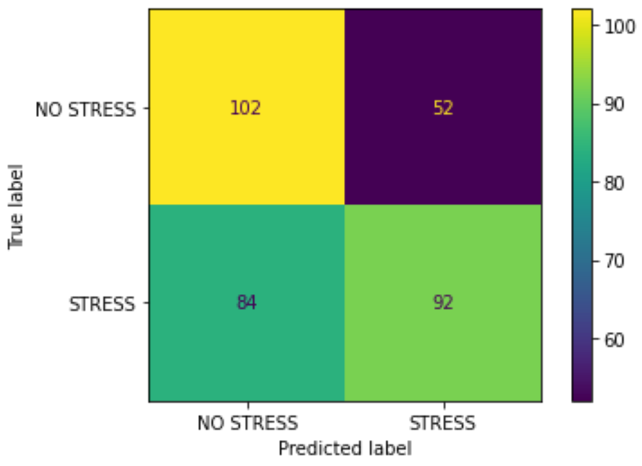
In [29]:
```
print("SUPPORT VECTOR")
model_svm=SVC()
model_svm.fit(x_train,y_train)
y_svm=model_svm.predict(x_test)
print("CONFUSION MATRIX:\n",confusion_matrix(y_test,y_svm))
print(ConfusionMatrixDisplay.from_predictions(y_test,y_svm))
print("ACCURACY SCORE:",accuracy_score(y_test,y_svm))
print("CLASSIFICATION REPORT:\n",classification_report(y_test,y_svm))
```

```
SUPPORT VECTOR
CONFUSION MATRIX:
 [[108  46]
 [ 52 124]]
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay object at 0x7fcb6bc
d6160>
ACCURACY SCORE: 0.703030303030303
CLASSIFICATION REPORT:
               precision    recall  f1-score   support

   NO STRESS       0.68      0.70      0.69       154
      STRESS       0.73      0.70      0.72       176

    accuracy                           0.70       330
   macro avg       0.70      0.70      0.70       330
weighted avg       0.70      0.70      0.70       330
```



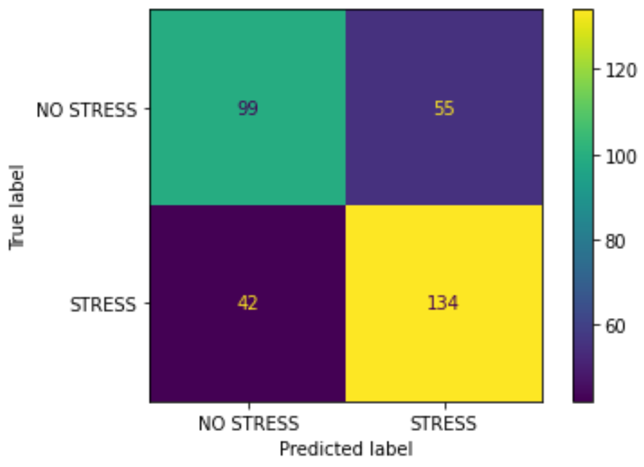
In [30]:
```
print("DECISION TREE")
model_dt=DecisionTreeClassifier()
model_dt.fit(x_train,y_train)
y_dt=model_dt.predict(x_test)
print("CONFUSION MATRIX:\n",confusion_matrix(y_test,y_dt))
print(ConfusionMatrixDisplay.from_predictions(y_test,y_dt))
print("ACCURACY SCORE:",accuracy_score(y_test,y_dt))
print("CLASSIFICATION REPORT:\n",classification_report(y_test,y_dt))
```

```
DECISION TREE
CONFUSION MATRIX:
 [[102  52]
 [ 84  92]]
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay object at 0x7fcb6bb
2a100>
ACCURACY SCORE: 0.5878787878787879
CLASSIFICATION REPORT:
               precision    recall  f1-score   support

   NO STRESS       0.55      0.66      0.60       154
      STRESS       0.64      0.52      0.57       176

    accuracy                           0.59       330
   macro avg       0.59      0.59      0.59       330
weighted avg       0.60      0.59      0.59       330
```



In [31]:
```python
print("RANDOM FOREST")
model_rf=RandomForestClassifier()
model_rf.fit(x_train,y_train)
y_rf=model_rf.predict(x_test)
print("CONFUSION MATRIX:\n",confusion_matrix(y_test,y_rf))
print(ConfusionMatrixDisplay.from_predictions(y_test,y_rf))
print("ACCURACY SCORE:",accuracy_score(y_test,y_rf))
print("CLASSIFICATION REPORT:\n",classification_report(y_test,y_rf))
```

```
RANDOM FOREST
CONFUSION MATRIX:
 [[ 99  55]
 [ 42 134]]
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay object at 0x7fcb656
da280>
ACCURACY SCORE: 0.706060606060606
CLASSIFICATION REPORT:
               precision    recall  f1-score   support

   NO STRESS       0.70      0.64      0.67       154
      STRESS       0.71      0.76      0.73       176

    accuracy                           0.71       330
   macro avg       0.71      0.70      0.70       330
weighted avg       0.71      0.71      0.70       330
```



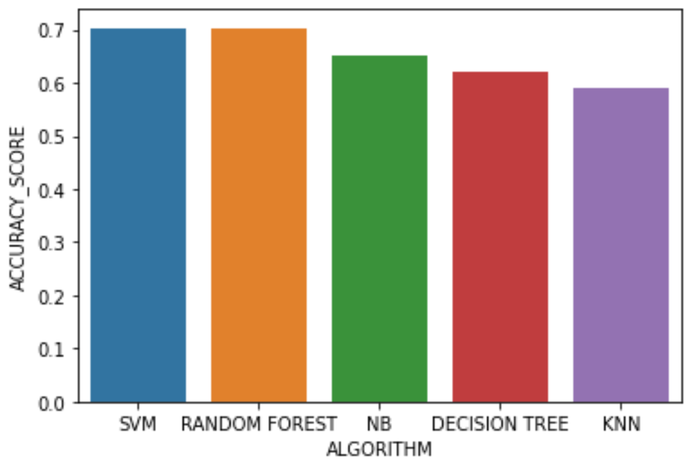
In [32]:
```python
# COMPARING THE ACCURACY SCORES OF ALL THE CLASSIFIERS
lst=[model_knn,model_nb,model_svm,model_dt,model_rf]
model=['KNN','NB','SVM','DECISION TREE','RANDOM FOREST']
lst_acc=[]
for i in lst:
  i.fit(x_train,y_train)
  y_pred=i.predict(x_test)
  lst_acc.append(accuracy_score(y_test,y_pred))

acc_df=pd.DataFrame({'ALGORITHM':model,'ACCURACY_SCORE':lst_acc})
acc_df.sort_values(by='ACCURACY_SCORE',ascending=False,inplace=True)
acc_df
```

Out[32]:

| | ALGORITHM | ACCURACY_SCORE |
|---|---|---|
| **2** | SVM | 0.703030 |
| **4** | RANDOM FOREST | 0.703030 |
| **1** | NB | 0.651515 |
| **3** | DECISION TREE | 0.621212 |
| **0** | KNN | 0.590909 |

```
In [33]: sns.barplot(x='ALGORITHM',y='ACCURACY_SCORE',data=acc_df)
```

```
Out[33]: <Axes: xlabel='ALGORITHM', ylabel='ACCURACY_SCORE'>
```



**FINAL VERIFICATION WITH SVM: using input text from online users**

```
In [37]: person1=input('ENTER THE TEXT:')
         data=vec.transform([person1]).toarray()
```

```
ENTER THE TEXT:I AM HAPPY
```

```
In [38]: y_out=model_svm.predict(data)
         print(y_out)
```

```
['NO STRESS']
```

```
In [40]: person2=input('ENTER THE TEXT:')
         data1=vec.transform([person2]).toarray()
```

```
ENTER THE TEXT:I FEEL LIKE CRYING
```

```
In [41]: y_out1=model_svm.predict(data1)
         print(y_out1)
```

```
['STRESS']
```