October 21, 2020

[11]:
```
import pandas as pd

raw_covid = pd.read_csv('./data/covid.csv', dtype={'datacommons_id': str})

selected_fields = ['date', 'new_confirmed', 'new_recovered',␣
 ↪'cumulative_confirmed', 'cumulative_recovered']
selected_covid = raw_covid[selected_fields]

truncated_covid = selected_covid.head(283);

truncated_covid['new_recovered'] = truncated_covid['new_recovered'].fillna(0)
truncated_covid['cumulative_recovered'] =␣
 ↪truncated_covid['cumulative_recovered'].fillna(0)

truncated_covid.to_csv('./Stage2/covid.csv', index=False)
```

```
<ipython-input-11-b3d1071a5684>:10: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  truncated_covid['new_recovered'] = truncated_covid['new_recovered'].fillna(0)
<ipython-input-11-b3d1071a5684>:11: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  truncated_covid['cumulative_recovered'] =
truncated_covid['cumulative_recovered'].fillna(0)
```

[12]:
```
import pandas as pd

raw_govcanhealth = pd.read_csv('./data/govcanhealth.csv')
raw_cdcgov = pd.read_csv('./data/cdcgov.csv')
```

```python
raw_cbcnews = pd.read_csv('./data/cbcnews.csv')
raw_globalnews = pd.read_csv('./data/globalnews.csv')

selected_fields = ['date', 'tweet', 'hashtags',]
selected_govcanhealth = raw_govcanhealth[selected_fields]
selected_cdcgov = raw_cdcgov[selected_fields]
selected_cbcnews = raw_cbcnews[selected_fields]
selected_globalnews = raw_globalnews[selected_fields]

selected_govcanhealth['date'] = pd.to_datetime(selected_govcanhealth['date'])
selected_cdcgov['date'] = pd.to_datetime(selected_cdcgov['date'])
selected_cbcnews['date'] = pd.to_datetime(selected_cbcnews['date'])
selected_globalnews['date'] = pd.to_datetime(selected_globalnews['date'])

start_date = '11-01-2019'
end_date = '10-09-2020'
mask_govcanhealth = (selected_govcanhealth['date'] >= start_date) &␣
 ↪(selected_govcanhealth['date'] <= end_date)
mask_cdcgov = (selected_cdcgov['date'] >= start_date) &␣
 ↪(selected_cdcgov['date'] <= end_date)
mask_cbcnews = (selected_cbcnews['date'] >= start_date) &␣
 ↪(selected_cbcnews['date'] <= end_date)
mask_globalnews = (selected_globalnews['date'] >= start_date) &␣
 ↪(selected_globalnews['date'] <= end_date)

truncated_govcanhealth = selected_govcanhealth.loc[mask_govcanhealth]
truncated_cdcgov = selected_cdcgov.loc[mask_cdcgov]
truncated_cbcnews = selected_cbcnews.loc[mask_cbcnews]
truncated_globalnews = selected_globalnews.loc[mask_globalnews]

truncated_govcanhealth.to_csv('./Stage2/govcanhealth.csv', index=False)
truncated_cdcgov.to_csv('./Stage2/cdcgov.csv', index=False)
truncated_cbcnews.to_csv('./Stage2/cbcnews.csv', index=False)
truncated_globalnews.to_csv('./Stage2/globalnews.csv', index=False)
```

```
<ipython-input-12-fb08c914852e>:14: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  selected_govcanhealth['date'] = pd.to_datetime(selected_govcanhealth['date'])
<ipython-input-12-fb08c914852e>:15: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
```

```
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  selected_cdcgov['date'] = pd.to_datetime(selected_cdcgov['date'])
<ipython-input-12-fb08c914852e>:16: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  selected_cbcnews['date'] = pd.to_datetime(selected_cbcnews['date'])
<ipython-input-12-fb08c914852e>:17: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  selected_globalnews['date'] = pd.to_datetime(selected_globalnews['date'])
```

[13]:

```python
import pandas as pd

raw_govcanhealth = pd.read_csv('./Stage2/govcanhealth.csv')
raw_cdcgov = pd.read_csv('./Stage2/cdcgov.csv')
raw_cbcnews = pd.read_csv('./Stage2/cbcnews.csv')
raw_globalnews = pd.read_csv('./Stage2/globalnews.csv')

keywords = ['covid', 'physicaldistancing', 'publichealth', 'coronavirus',␣
 ↪'pandemic', 'mask']
pattern = '|'.join(keywords)

filtered_govcanhealth = raw_govcanhealth[raw_govcanhealth['tweet'].str.
 ↪contains(pattern, case=False)]
filtered_cdcgov = raw_cdcgov[raw_cdcgov['tweet'].str.contains(pattern,␣
 ↪case=False)]
filtered_cbcnews = raw_cbcnews[raw_cbcnews['tweet'].str.contains(pattern,␣
 ↪case=False)]
filtered_globalnews = raw_globalnews[raw_globalnews['tweet'].str.
 ↪contains(pattern, case=False)]

filtered_govcanhealth.to_csv('./Stage3/govcanhealth.csv', index=False)
filtered_cdcgov.to_csv('./Stage3/cdcgov.csv', index=False)
filtered_cbcnews.to_csv('./Stage3/cbcnews.csv', index=False)
filtered_globalnews.to_csv('./Stage3/globalnews.csv', index=False)
```

[35]:

```python
import pandas as pd
from datetime import timedelta

covid = pd.read_csv('./Stage2/covid.csv')
govcanhealth = pd.read_csv('./Stage3/govcanhealth.csv')
```

```
cdcgov = pd.read_csv('./Stage3/cdcgov.csv')
cbcnews = pd.read_csv('./Stage3/cbcnews.csv')
globalnews = pd.read_csv('./Stage3/globalnews.csv')

covid['date'] = pd.to_datetime(covid['date'])
govcanhealth['date'] = pd.to_datetime(govcanhealth['date'])
cdcgov['date'] = pd.to_datetime(cdcgov['date'])
cbcnews['date'] = pd.to_datetime(cbcnews['date'])
globalnews['date'] = pd.to_datetime(globalnews['date'])

start_date = '01-01-2020'
end_date = '10-08-2020'
mask_govcanhealth = (govcanhealth['date'] >= start_date) &␣
 ↪(govcanhealth['date'] <= end_date)
mask_cdcgov = (cdcgov['date'] >= start_date) & (cdcgov['date'] <= end_date)
mask_cbcnews = (cbcnews['date'] >= start_date) & (cbcnews['date'] <= end_date)
mask_globalnews = (globalnews['date'] >= start_date) & (globalnews['date'] <=␣
 ↪end_date)
mask_covid = (covid['date'] >= start_date) & (covid['date'] <= end_date)
govcanhealth = govcanhealth.loc[mask_govcanhealth]
cdcgov = cdcgov.loc[mask_cdcgov]
cbcnews = cbcnews.loc[mask_cbcnews]
globalnews = globalnews.loc[mask_globalnews]
covid1 = covid.loc[mask_covid]
column_names = ['date', 'tweet', 'hashtags', 'account', 'Mylabel']
column_Covidnames = ['date','Changes']
data = pd.DataFrame(columns=column_names)
coviddata = pd.DataFrame(columns=column_Covidnames)
counter = 0
CovidDay= 0

print(covid1)

for index, row in covid1.iterrows():
    next_day_cases = covid['new_confirmed'].loc[covid['date'] == row['date'] +␣
 ↪timedelta(days=1)].values[0]
    same_day_cases = covid['new_confirmed'].loc[covid['date'] == row['date']].
 ↪values[0]

    coviddata.loc[CovidDay] = row
    coviddata.loc[CovidDay, 'Changes'] = next_day_cases - same_day_cases

    CovidDay = CovidDay + 1

for index, row in govcanhealth.iterrows():
    next_day_cases = covid['new_confirmed'].loc[covid['date'] == row['date'] +␣
 ↪timedelta(days=1)].values[0]
```

```
    same_day_cases = covid['new_confirmed'].loc[covid['date'] == row['date']].
 ↪values[0]

    data.loc[counter] = row
    data.loc[counter, 'account'] = 'govcanhealth'
    if next_day_cases - same_day_cases > 50:
        data.loc[counter, 'Mylabel'] = 'increas'
    elif next_day_cases - same_day_cases < -50:
        data.loc[counter, 'Mylabel'] = 'decreas'
    else:
         data.loc[counter, 'Mylabel'] = 'NoChange'
    counter = counter + 1


for index, row in cdcgov.iterrows():
    next_day_cases = covid['new_confirmed'].loc[covid['date'] == row['date'] +␣
 ↪timedelta(days=1)].values[0]
    same_day_cases = covid['new_confirmed'].loc[covid['date'] == row['date']].
 ↪values[0]

    data.loc[counter] = row
    data.loc[counter, 'account'] = 'cdcgov'
    if next_day_cases - same_day_cases > 50:
        data.loc[counter, 'Mylabel'] = 'increas'
    elif next_day_cases - same_day_cases < -50:
        data.loc[counter, 'Mylabel'] = 'decreas'
    else:
        data.loc[counter, 'Mylabel'] = 'NoChange'

    counter = counter + 1

for index, row in cbcnews.iterrows():
    next_day_cases = covid['new_confirmed'].loc[covid['date'] == row['date'] +␣
 ↪timedelta(days=1)].values[0]
    same_day_cases = covid['new_confirmed'].loc[covid['date'] == row['date']].
 ↪values[0]

    data.loc[counter] = row
    data.loc[counter, 'account'] = 'cbcnews'

    if next_day_cases - same_day_cases > 50:
        data.loc[counter, 'Mylabel'] = 'increas'
    elif next_day_cases - same_day_cases < -50:
        data.loc[counter, 'Mylabel'] = 'decreas'
    else:
        data.loc[counter, 'Mylabel'] = 'NoChange'
    counter = counter + 1

for index, row in globalnews.iterrows():
    next_day_cases = covid['new_confirmed'].loc[covid['date'] == row['date'] +␣
 ↪timedelta(days=1)].values[0]
    same_day_cases = covid['new_confirmed'].loc[covid['date'] == row['date']].
 ↪values[0]

    data.loc[counter] = row
    data.loc[counter, 'account'] = 'globalnews'

    if next_day_cases - same_day_cases > 50:
        data.loc[counter, 'Mylabel'] = 'increas'
    elif next_day_cases - same_day_cases < -50:
        data.loc[counter, 'Mylabel'] = 'decreas'
    else:
        data.loc[counter, 'Mylabel'] = 'NoChange'

    counter = counter + 1

data.to_csv('./Dataset/data1day.csv', index=False)
coviddata.to_csv('./Dataset/covid1day.csv', index=False)
```

```
           date  new_confirmed  new_recovered  cumulative_confirmed  \
0    2020-01-01            0.0            0.0                   0.0
1    2020-01-02            0.0            0.0                   0.0
2    2020-01-03            0.0            0.0                   0.0
3    2020-01-04            0.0            0.0                   0.0
4    2020-01-05            0.0            0.0                   0.0
..          ...            ...            ...                   ...
277  2020-10-04         1685.0         1376.0              166156.0
278  2020-10-05         2804.0         2091.0              168960.0
279  2020-10-06         2363.0         1660.0              171323.0
280  2020-10-07         1800.0         1672.0              173123.0
281  2020-10-08         2436.0         1842.0              175559.0

     cumulative_recovered
0                     0.0
1                     0.0
2                     0.0
3                     0.0
4                     0.0
..                    ...
277              140243.0
278              142334.0
279              143994.0
280              145666.0
```

```
281              147508.0

[282 rows x 5 columns]
```

[36]:
```
import pandas as pd
from datetime import timedelta

covid = pd.read_csv('./Stage2/covid.csv')
govcanhealth = pd.read_csv('./Stage3/govcanhealth.csv')
cdcgov = pd.read_csv('./Stage3/cdcgov.csv')
cbcnews = pd.read_csv('./Stage3/cbcnews.csv')
globalnews = pd.read_csv('./Stage3/globalnews.csv')


covid['date'] = pd.to_datetime(covid['date'])
govcanhealth['date'] = pd.to_datetime(govcanhealth['date'])
cdcgov['date'] = pd.to_datetime(cdcgov['date'])
cbcnews['date'] = pd.to_datetime(cbcnews['date'])
globalnews['date'] = pd.to_datetime(globalnews['date'])

start_date = '01-01-2020'
end_date = '09-25-2020'
mask_govcanhealth = (govcanhealth['date'] >= start_date) &␣
 ↪(govcanhealth['date'] <= end_date)
mask_cdcgov = (cdcgov['date'] >= start_date) & (cdcgov['date'] <= end_date)
mask_cbcnews = (cbcnews['date'] >= start_date) & (cbcnews['date'] <= end_date)
mask_globalnews = (globalnews['date'] >= start_date) & (globalnews['date'] <=␣
 ↪end_date)
covid_mask = (covid['date'] >= start_date) & (covid['date'] <= end_date)
govcanhealth = govcanhealth.loc[mask_govcanhealth]
cdcgov = cdcgov.loc[mask_cdcgov]
cbcnews = cbcnews.loc[mask_cbcnews]
globalnews = globalnews.loc[mask_globalnews]
covid1 = covid.loc[covid_mask]
column_names = ['date', 'tweet', 'hashtags', 'account']
column_Covidnames = ['date','Changes']
data = pd.DataFrame(columns=column_names)
coviddata = pd.DataFrame(columns=column_Covidnames)
counter = 0
CovidDay= 0



def next_14_cases(date):
    addition = 0
    for i in range(14):
        addition = addition + covid['new_confirmed'].loc[covid['date'] == date␣
 ↪+ timedelta(days=i+1)].values[0]

    return addition


def Current_case(date):
    addition = 0

    addition =  covid['new_confirmed'].loc[covid['date'] == date -␣
 ↪timedelta(days=0)].values[0]

    return addition


for index, row in covid1.iterrows():
    next_cases = next_14_cases(row['date'])
    previous_cases = Current_case(row['date'])
    coviddata.loc[CovidDay] = row
    coviddata.loc[CovidDay, 'Changes'] = next_cases/14 - previous_cases

    CovidDay = CovidDay + 1


for index, row in govcanhealth.iterrows():
    next_cases = next_14_cases(row['date'])
    previous_cases = Current_case(row['date'])

    data.loc[counter] = row
    data.loc[counter, 'account'] = 'govcanhealth'

    if next_cases/14 - previous_cases > 50:
        data.loc[counter, 'Mylabel'] = 'increas'
    elif next_cases/14 - previous_cases < -50:
        data.loc[counter, 'Mylabel'] = 'decreas'
    else:
        data.loc[counter, 'Mylabel'] = 'NoChange'

    counter = counter + 1


for index, row in cdcgov.iterrows():
    next_cases = next_14_cases(row['date'])
    previous_cases = Current_case(row['date'])

    data.loc[counter] = row
    data.loc[counter, 'account'] = 'cdcgov'
    if next_cases/14 - previous_cases > 50:
        data.loc[counter, 'Mylabel'] = 'increas'
    elif next_cases/14 - previous_cases < -50:
        data.loc[counter, 'Mylabel'] = 'decreas'
    else:
        data.loc[counter, 'Mylabel'] = 'NoChange'

    counter = counter + 1

for index, row in cbcnews.iterrows():
    next_cases = next_14_cases(row['date'])
    previous_cases = Current_case(row['date'])

    data.loc[counter] = row
    data.loc[counter, 'account'] = 'cbcnews'

    if next_cases/14 - previous_cases > 50:
        data.loc[counter, 'Mylabel'] = 'increas'
    elif next_cases/14 - previous_cases < -50:
        data.loc[counter, 'Mylabel'] = 'decreas'
    else:
        data.loc[counter, 'Mylabel'] = 'NoChange'

    counter = counter + 1

for index, row in globalnews.iterrows():
    next_cases = next_14_cases(row['date'])
    previous_cases = Current_case(row['date'])

    data.loc[counter] = row
    data.loc[counter, 'account'] = 'globalnews'

    if next_cases/14 - previous_cases > 50:
        data.loc[counter, 'Mylabel'] = 'increas'
    elif next_cases/14 - previous_cases < -50:
        data.loc[counter, 'Mylabel'] = 'decreas'
    else:
        data.loc[counter, 'Mylabel'] = 'NoChange'

    counter = counter + 1

data.to_csv('./Dataset/data14day.csv', index=False)

coviddata.to_csv('./Dataset/Covid14day.csv', index=False)
```

[37]:
```
import pandas as pd
from sklearn.cluster import KMeans
from sklearn import preprocessing
from sklearn.preprocessing import MinMaxScaler
kmeans = KMeans(n_clusters=3, random_state=0)
kmeans14 = KMeans(n_clusters=3, random_state=0)
file = 'Dataset/covid1day.csv'
file14 = 'Dataset/covid14day.csv'
data_df14 = pd.read_csv(file14)
data_df = pd.read_csv(file)
data_Change14 = data_df14['Changes']
data_Change = data_df['Changes']
scaler14 = MinMaxScaler()
scaler = MinMaxScaler()
scaler.fit(data_Change.to_numpy().reshape(-1,1))
scaler14.fit(data_Change14.to_numpy().reshape(-1,1))
normalized_Change = scaler.transform(data_Change.to_numpy().reshape(-1,1))
normalized_Change14 = scaler14.transform(data_Change14.to_numpy().reshape(-1,1))
data_df14['NormalChange'] =normalized_Change14
data_df['NormalChange'] =normalized_Change

data_df14
```

[37]:
```
           date     Changes  NormalChange
0    2020-01-01    0.000000      0.625485
1    2020-01-02    0.000000      0.625485
2    2020-01-03    0.000000      0.625485
3    2020-01-04    0.000000      0.625485
4    2020-01-05    0.000000      0.625485
..          ...         ...           ...
264  2020-09-21  -84.214286      0.590555
265  2020-09-22  513.428571      0.838444
266  2020-09-23  722.142857      0.925014
267  2020-09-24  549.357143      0.853346
268  2020-09-25  613.785714      0.880070

[269 rows x 3 columns]
```

[38]:
```
data_df
```

[38]:
```
           date  Changes  NormalChange
0    2020-01-01      0.0      0.518256
1    2020-01-02      0.0      0.518256
2    2020-01-03      0.0      0.518256
3    2020-01-04      0.0      0.518256
4    2020-01-05      0.0      0.518256
..          ...      ...           ...
277  2020-10-04   1119.0      0.914924
```

```
278  2020-10-05   -441.0      0.361928
279  2020-10-06   -563.0      0.318681
280  2020-10-07    636.0      0.743708
281  2020-10-08    122.0      0.561503

[282 rows x 3 columns]
```

[39]:
```
from collections import Counter
preds = kmeans.fit_predict(data_df['NormalChange'].to_numpy().reshape(-1,1))
preds14 = kmeans14.fit_predict(data_df14['NormalChange'].to_numpy().
 ↪reshape(-1,1))
```

[40]:
```
centroids14 = kmeans14.cluster_centers_
centroids = kmeans.cluster_centers_
print('centroids for 1 days')
print(centroids)
print('centroids for 14 days')
print(centroids14)
```

```
centroids for 1 days
[[0.51880838]
 [0.74148853]
 [0.36271332]]
centroids for 14 days
[[0.506748  ]
 [0.63974867]
 [0.82060081]]
```

[41]:
```
data_df['Label'] =preds
data_df.to_csv('./Dataset/FulDataset1day.csv', index=False)
data_df14['Label'] =preds14
data_df14.to_csv('./Dataset/FulDataset14day.csv', index=False)
```

[44]:
```
import pandas as pd
from datetime import timedelta

covid = pd.read_csv('./Dataset/FulDataset1day.csv')
Data = pd.read_csv('./Dataset/data1day.csv')

covid['date'] = pd.to_datetime(covid['date'])
Data['date'] = pd.to_datetime(Data['date'])
column_names = ['date', 'tweet', 'hashtags', 'account', 'Mylabel']
FullDataSet = pd.DataFrame(columns=column_names)
dataModel = pd.DataFrame(columns=column_names)
dataApply = pd.DataFrame(columns=column_names)
dataValidate = pd.DataFrame(columns=column_names)
counter = 0

dataset = Data
```

```python
start_date = pd.to_datetime('01-01-2020')
firstend_date = pd.to_datetime('08-01-2020')
second_date = pd.to_datetime('08-02-2020')
secondend_date = pd.to_datetime('09-01-2020')
valstart_date = pd.to_datetime('09-02-2020')
end_date = pd.to_datetime('10-08-2020')
dataset['date'] = pd.to_datetime(dataset['date'])
for index, row in dataset.iterrows():

    label = covid['Label'].loc[covid['date'] == row['date']].values[0]

    if  row['date'] >= start_date and row['date'] <= firstend_date:
        dataModel.loc[counter] = row
        FullDataSet.loc[counter] = row
        if label == 1:
            dataModel.loc[counter, 'label'] = 'increase'
            FullDataSet.loc[counter, 'label'] = 'increase'
        elif label == 0:
            dataModel.loc[counter, 'label'] = 'equal'
            FullDataSet.loc[counter, 'label'] = 'equal'
        else:
            dataModel.loc[counter, 'label'] = 'decrease'
            FullDataSet.loc[counter, 'label'] = 'decrease'
    elif row['date'] >= second_date and  row['date'] <= secondend_date:
        dataApply.loc[counter] = row
        FullDataSet.loc[counter] = row
        if label == 1:
            dataApply.loc[counter, 'label'] = 'increase'
            FullDataSet.loc[counter, 'label'] = 'increase'
        elif label == 0:
            dataApply.loc[counter, 'label'] = 'equal'
            FullDataSet.loc[counter, 'label'] = 'equal'
        else:
            dataApply.loc[counter, 'label'] = 'decrease'
            FullDataSet.loc[counter, 'label'] = 'decrease'
    else:
        dataValidate.loc[counter] = row
        FullDataSet.loc[counter] = row
        if label == 1:
            dataValidate.loc[counter, 'label'] = 'increase'
            FullDataSet.loc[counter, 'label'] = 'increase'
        elif label == 0:
            dataValidate.loc[counter, 'label'] = 'equal'
            FullDataSet.loc[counter, 'label'] = 'equal'
        else:
            dataValidate.loc[counter, 'label'] = 'decrease'
            FullDataSet.loc[counter, 'label'] = 'decrease'
    counter = counter + 1
FullDataSet.to_csv('./ModelDataset/FullModelDay1.csv', index=False)
dataModel.to_csv('./ModelDataset/data1dayModel.csv', index=False)
dataApply.to_csv('./ModelDataset/data1dayApply.csv', index=False)
dataValidate.to_csv('./ModelDataset/data1dayValidate.csv', index=False)
```

[68]:
```
import pandas as pd
from datetime import timedelta

covid = pd.read_csv('./Dataset/FulDataset14day.csv')
Data = pd.read_csv('./Dataset/data14day.csv')

covid['date'] = pd.to_datetime(covid['date'])
Data['date'] = pd.to_datetime(Data['date'])

column_names = ['date', 'tweet', 'hashtags', 'account', 'Mylabel']
FullDataSet14 = pd.DataFrame(columns=column_names)
dataModel14 = pd.DataFrame(columns=column_names)
dataApply14 = pd.DataFrame(columns=column_names)
dataValidate14 = pd.DataFrame(columns=column_names)
counter = 0

dataset = Data
start_date = pd.to_datetime('01-01-2020')
firstend_date = pd.to_datetime('08-01-2020')
second_date = pd.to_datetime('08-02-2020')
secondend_date = pd.to_datetime('09-01-2020')
dataset['date'] = pd.to_datetime(dataset['date'])
for index, row in dataset.iterrows():

    label = covid['Label'].loc[covid['date'] == row['date']].values[0]
    FullDataSet14.loc[counter] = row
    if label == 1:
        FullDataSet14.loc[counter, 'label'] = 'increase'
    elif label == 0:
        FullDataSet14.loc[counter, 'label'] = 'equal'
    else:
        FullDataSet14.loc[counter, 'label'] = 'decrease'

    if  row['date'] >= start_date and row['date'] <= firstend_date:
        dataModel14.loc[counter] = row

        if label == 1:
            dataModel14.loc[counter, 'label'] = 'increase'
        elif label == 0:
            dataModel14.loc[counter, 'label'] = 'equal'
        else:
            dataModel14.loc[counter, 'label'] = 'decrease'
    elif row['date'] >= second_date and  row['date'] <= secondend_date:
        dataApply14.loc[counter] = row
        if label == 1:
            dataApply14.loc[counter, 'label'] = 'increase'
        elif label == 0:
            dataApply14.loc[counter, 'label'] = 'equal'
        else:
            dataApply14.loc[counter, 'label'] = 'decrease'
    else:
        dataValidate14.loc[counter] = row
        if label == 1:
            dataValidate14.loc[counter, 'label'] = 'increase'
        elif label == 0:
            dataValidate14.loc[counter, 'label'] = 'equal'
        else:
            dataValidate14.loc[counter, 'label'] = 'decrease'

    counter = counter + 1
FullDataSet14.to_csv('./ModelDataset/FullModel14.csv', index=False)
dataModel14.to_csv('./ModelDataset/data14dayModel.csv', index=False)
dataApply14.to_csv('./ModelDataset/data14dayApply.csv', index=False)
dataValidate14.to_csv('./ModelDataset/dataday14Validate.csv', index=False)
```

[69]:
```
import os
import re
import pandas as pd
import nltk
from nltk import tokenize
nltk.download('punkt')
from nltk.corpus import stopwords
nltk.download('stopwords')
from sklearn.feature_extraction.text import TfidfVectorizer


stop_words = set(stopwords.words('english'))
file = './ModelDataset/FullModelDay1.csv'
filemodel = './ModelDataset/data1dayModel.csv'
filevalidate= './ModelDataset/data1dayApply.csv'
filetest= './ModelDataset/data1dayValidate.csv'
data_df = pd.read_csv(file, header=0)
data_model = pd.read_csv(filemodel, header=0)
data_test = pd.read_csv(filetest, header=0)
data_validate = pd.read_csv(filevalidate, header=0)

file14 = './ModelDataset/FullModel14.csv'
```

```
filemodel14 = './ModelDataset/data14dayModel.csv'
filevalidate14= './ModelDataset/data14dayApply.csv'
filetest14= './ModelDataset/dataday14Validate.csv'
data_df14 = pd.read_csv(file14, header=0)
data_model14 = pd.read_csv(filemodel14, header=0)
data_test14 = pd.read_csv(filetest14, header=0)
data_validate14 = pd.read_csv(filevalidate14, header=0)

vectorizer = TfidfVectorizer(token_pattern=r'(?u)\b\w+\b', ngram_range=(1, 1),)
```

```
[nltk_data] Downloading package punkt to
[nltk_data]     C:\Users\reza\AppData\Roaming\nltk_data...
[nltk_data]   Package punkt is already up-to-date!
[nltk_data] Downloading package stopwords to
[nltk_data]     C:\Users\reza\AppData\Roaming\nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
```

[70]:
```
df = data_df[['tweet','label']]
df_train = data_model[['tweet','label']]
df_test= data_test[['tweet','label']]
df_validate= data_validate[['tweet','label']]


df14 = data_df14[['tweet','label']]
df_train14 = data_model14[['tweet','label']]
df_test14= data_test14[['tweet','label']]
df_validate14= data_validate14[['tweet','label']]
```

[71]:
```
def cleaning(Data):
    Data = Data.rstrip('\n')
    Data = Data.rstrip('\t')
    Data = re.sub('<[^<]+?>', '', Data)
    Data = re.sub(r'\d+', '', Data)
    Data = re.sub('[^0-9a-zA-Z\w.]', ' ', Data)
    Data = re.sub('\s+', ' ', Data, flags=re.I)
    Data = re.sub('\.\.+', ' ', Data)
    DataReturn = ""
    token = tokenize.sent_tokenize(Data)
    for j in range(len(token)):
        s = tokenize.word_tokenize(token[j])
        clean_word = [
            w.lower() for w in s
            if w.lower() not in stop_words and w.isalnum() and len(w)>2
        ]
        DataReturn = DataReturn + ' '.join(clean_word) + ' . '
    return DataReturn
```

[72]:
```
articles = []
n = df.shape[0]
data_cleaned = df.copy()
for i in range(n):
    temp = cleaning(df.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_cleaned.loc[:, 'tweet'] = pd.Series(articles, index=data_df.index)

articles = []
n = df_train.shape[0]
data_train_cleaned = df_train.copy()
for i in range(n):
    temp = cleaning(df_train.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_train_cleaned.loc[:, 'tweet'] = pd.Series(articles, index=data_model.index)

articles = []
n = df_test.shape[0]
data_test_cleaned = df_test.copy()
for i in range(n):
    temp = cleaning(df_test.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_test_cleaned.loc[:, 'tweet'] = pd.Series(articles, index=data_test.index)

articles = []
n = df_validate.shape[0]
data_validate_cleaned = df_validate.copy()
for i in range(n):
    temp = cleaning(df_validate.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_validate_cleaned.loc[:, 'tweet'] = pd.Series(articles, index=data_validate.
 ↪index)
```

```
All 11384 articles are cleaned.
All 9380 articles are cleaned.
All 1081 articles are cleaned.
All 923 articles are cleaned.
```

[74]:
```
articles = []
n = df14.shape[0]
data_cleaned14 = df14.copy()
for i in range(n):
    temp = cleaning(df14.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_cleaned14.loc[:, 'tweet'] = pd.Series(articles, index=data_df14.index)

articles = []
n = df_train14.shape[0]
data_train_cleaned14 = df_train14.copy()
for i in range(n):
    temp = cleaning(df_train14.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_train_cleaned14.loc[:, 'tweet'] = pd.Series(articles, index=data_model14.
 ↪index)

articles = []
n = df_test14.shape[0]
data_test_cleaned14 = df_test14.copy()
for i in range(n):
    temp = cleaning(df_test14.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_test_cleaned14.loc[:, 'tweet'] = pd.Series(articles, index=data_test14.
 ↪index)

articles = []
n = df_validate14.shape[0]
data_validate_cleaned14 = df_validate14.copy()
for i in range(n):
    temp = cleaning(df_validate14.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_validate_cleaned14.loc[:, 'tweet'] = pd.Series(articles,␣
 ↪index=data_validate14.index)
```

```
All 11022 articles are cleaned.
All 9380 articles are cleaned.
All 719 articles are cleaned.
All 923 articles are cleaned.
```

[75]:
```
data_validate_cleaned14
```

[75]:
```
                                                 tweet     label
0    live federal health officials provide covid up...  increase
1    canborder arrive canada amp started day mandat...  increase
2    canborder emergency order requires persons ent...  increase
3    canborder arrive canada amp started day mandat...  increase
4    canborder emergency order requires persons ent...  increase
..                                                 ...       ...
```

```
918  commentary discomfort wearing masks midst pand...  increase
919  tropical storm isaias approaches coronavirus h...  increase
920  according health canada without guidance healt...  increase
921  like teachers experts worry effect pandemic ki...  increase
922  gyms begin reopen experts recommend gymgoers w...  increase

[923 rows x 2 columns]
```

[76]:
```
vectors = vectorizer.fit(data_cleaned['tweet'])
```

[77]:
```
train_vectors= vectors.transform(data_train_cleaned['tweet'])
test_vectors= vectors.transform(data_test_cleaned['tweet'])
validate_vectors= vectors.transform(data_validate_cleaned['tweet'])
```

[78]:
```
train_vectors14= vectors.transform(data_train_cleaned14['tweet'])
test_vectors14= vectors.transform(data_test_cleaned14['tweet'])
validate_vectors14= vectors.transform(data_validate_cleaned14['tweet'])
```

[85]:
```
import numpy as np
import matplotlib.pyplot as plt
from matplotlib.colors import ListedColormap
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.datasets import make_moons, make_circles, make_classification
from sklearn.neural_network import MLPClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.svm import SVC
from sklearn.gaussian_process import GaussianProcessClassifier
from sklearn.gaussian_process.kernels import RBF
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier, AdaBoostClassifier
from sklearn.naive_bayes import GaussianNB
from sklearn.discriminant_analysis import QuadraticDiscriminantAnalysis

h = .02  # step size in the mesh

names = [
         "Decision Tree", "Random Forest", "Naive Bayes"
         ]
classifiers = [

    DecisionTreeClassifier(max_depth=10),
    RandomForestClassifier(max_depth=14, n_estimators=40, max_features=1),
    GaussianNB()
    ]
valid_scores= []
day1_test_scores = []
day14_test_scores = []
```

```
for name, clf in zip(names, classifiers):

    clf.fit(train_vectors.toarray(), data_train_cleaned['label'])
    valid_scores.append(clf.score(validate_vectors.toarray(),␣
 ↪data_validate_cleaned['label']))
    day1_test_scores.append(clf.score(test_vectors.toarray(),␣
 ↪data_test_cleaned['label']))
    day14_test_scores.append(clf.score(test_vectors14.toarray(),␣
 ↪data_test_cleaned14['label']))
```

[86]:
```
valid_scores
```

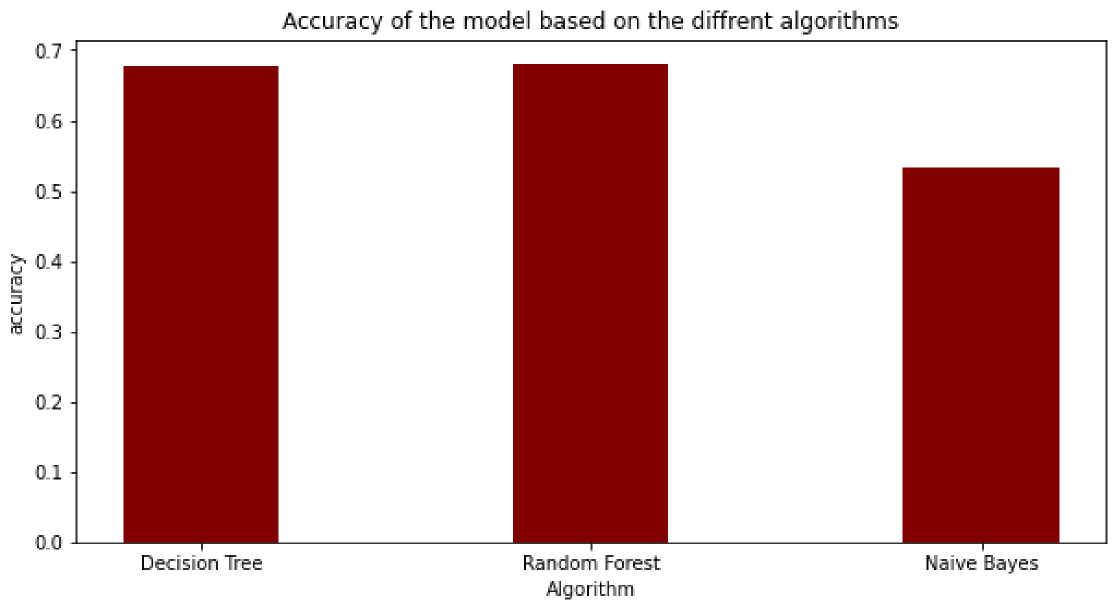
[86]:
```
[0.6782231852654388, 0.6803900325027086, 0.5330444203683641]
```

[87]:
```
day1_test_scores
```

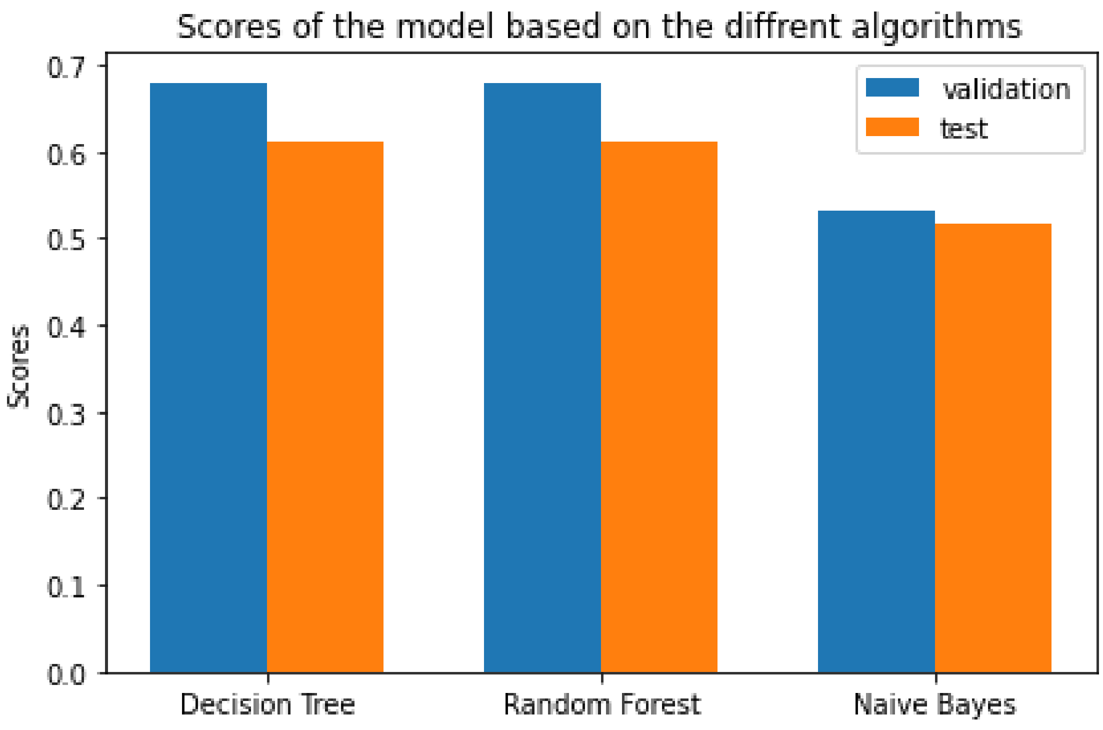
[87]:
```
[0.61054579093432, 0.6114708603145236, 0.5180388529139686]
```

[ ]:
```

```

[88]:
```
import numpy as np
import matplotlib.pyplot as plt



Tags = list(names)
values = list(valid_scores)

fig = plt.figure(figsize = (10, 5))

# creating the bar plot
plt.bar(Tags, values, color ='maroon',
        width = 0.4)

plt.xlabel("Algorithm")
plt.ylabel("accuracy")
plt.title("Accuracy of the model based on the diffrent algorithms")
plt.show()
```



[89]:
```python
import matplotlib
import matplotlib.pyplot as plt
import numpy as np


labels = names


x = np.arange(len(labels))  # the label locations
width = 0.35  # the width of the bars

fig, ax = plt.subplots()
rects1 = ax.bar(x - width/2, valid_scores, width, label='validation')
rects2 = ax.bar(x + width/2, day1_test_scores, width, label='test')

# Add some text for labels, title and custom x-axis tick labels, etc.
ax.set_ylabel('Scores')
ax.set_title('Scores of the model based on the diffrent algorithms')
ax.set_xticks(x)
ax.set_xticklabels(labels)
ax.legend()


def autolabel(rects):
    """Attach a text label above each bar in *rects*, displaying its height."""
    for rect in rects:
        height = rect.get_height()
        ax.annotate('{}'.format(height),
                    xy=(rect.get_x() + rect.get_width() / 2, height),
                    xytext=(0, 3),  # 3 points vertical offset
                    textcoords="offset points",
                    ha='center', va='bottom')




fig.tight_layout()

plt.show()
```



[18]:
```
#we Chose random forest based on the scores that we recived
```

[100]:
```
import numpy as np
import matplotlib.pyplot as plt
from matplotlib.colors import ListedColormap
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.datasets import make_moons, make_circles, make_classification
from sklearn.neural_network import MLPClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.svm import SVC
from sklearn.gaussian_process import GaussianProcessClassifier
from sklearn.gaussian_process.kernels import RBF
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier, AdaBoostClassifier
from sklearn.naive_bayes import GaussianNB
from sklearn.discriminant_analysis import QuadraticDiscriminantAnalysis

h = .02

names = [
         "Decision Tree", "Random Forest", "Naive Bayes"
         ]
classifiers = [

    DecisionTreeClassifier(max_depth=5),
    RandomForestClassifier(max_depth=8, n_estimators=20, max_features=1),
    GaussianNB()
    ]
valid_scores14= []
day14_test_scores = []




for name, clf in zip(names, classifiers):

    clf.fit(train_vectors14.toarray(), data_train_cleaned14['label'])
    valid_scores14.append(clf.score(validate_vectors14.toarray(),␣
 ↪data_validate_cleaned14['label']))
    day14_test_scores.append(clf.score(test_vectors14.toarray(),␣
 ↪data_test_cleaned14['label']))
```

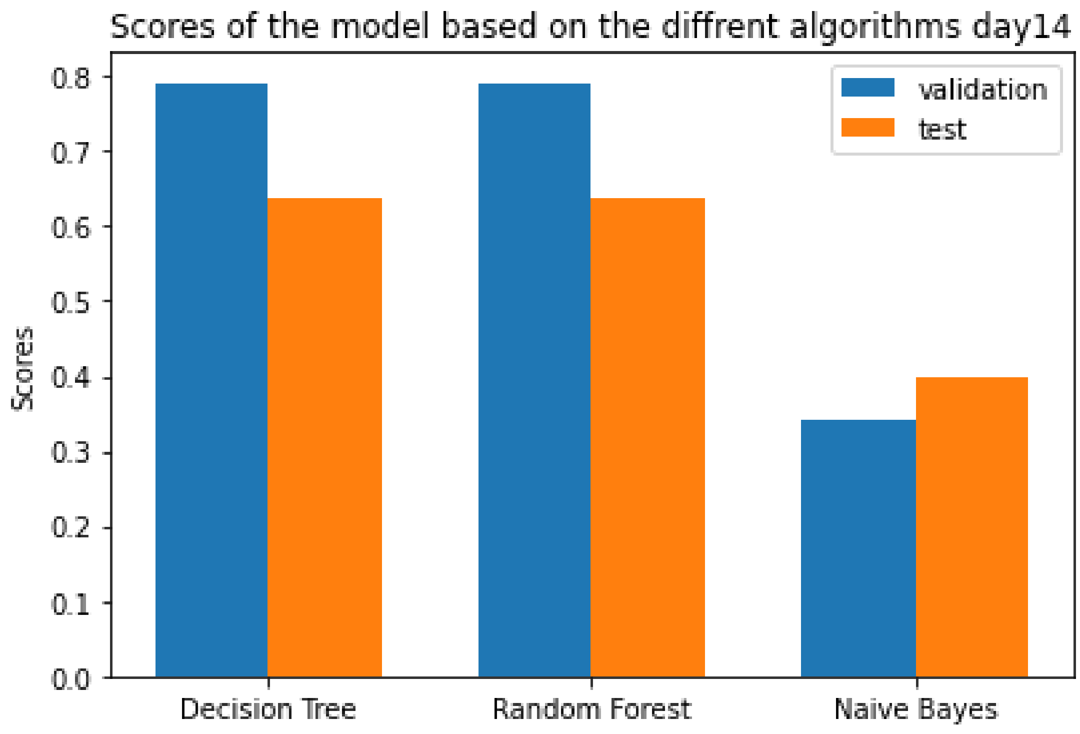
[101]:
```
valid_scores14
```

[101]:
```
[0.7908992416034669, 0.7919826652221018, 0.3412784398699892]
```

[103]:
```

```

[104]:
```
import matplotlib
import matplotlib.pyplot as plt
import numpy as np


labels = names


x = np.arange(len(labels))  # the label locations
width = 0.35  # the width of the bars
fig, ax = plt.subplots()
```

```
rects1 = ax.bar(x - width/2, valid_scores14, width, label='validation')
rects2 = ax.bar(x + width/2, day14_test_scores, width, label='test')

# Add some text for labels, title and custom x-axis tick labels, etc.
ax.set_ylabel('Scores')
ax.set_title('Scores of the model based on the diffrent algorithms day14')
ax.set_xticks(x)
ax.set_xticklabels(labels)
ax.legend()


def autolabel(rects):
    """Attach a text label above each bar in *rects*, displaying its height."""
    for rect in rects:
        height = rect.get_height()
        ax.annotate('{}'.format(height),
                    xy=(rect.get_x() + rect.get_width() / 2, height),
                    xytext=(0, 3),  # 3 points vertical offset
                    textcoords="offset points",
                    ha='center', va='bottom')




fig.tight_layout()

plt.show()
```



[105]:
```
#Now Based On our tags we are running and create two models
```

[106]:
```
df = data_df[['tweet','Mylabel']]
df_train = data_model[['tweet','Mylabel']]
df_test= data_test[['tweet','Mylabel']]
df_validate= data_validate[['tweet','Mylabel']]


df14 = data_df14[['tweet','Mylabel']]
df_train14 = data_model14[['tweet','Mylabel']]
df_test14= data_test14[['tweet','Mylabel']]
df_validate14= data_validate14[['tweet','Mylabel']]
```

[107]:
```
def cleaning(Data):
    Data = Data.rstrip('\n')
    Data = Data.rstrip('\t')
    Data = re.sub('<[^<]+?>', '', Data)
    Data = re.sub(r'\d+', '', Data)
    Data = re.sub('[^0-9a-zA-Z\w.]', ' ', Data)
    Data = re.sub('\s+', ' ', Data, flags=re.I)
    Data = re.sub('\.\.+', ' ', Data)
    DataReturn = ""
    token = tokenize.sent_tokenize(Data)
    for j in range(len(token)):
        s = tokenize.word_tokenize(token[j])
        clean_word = [
            w.lower() for w in s
            if w.lower() not in stop_words and w.isalnum() and len(w)>2
        ]
        DataReturn = DataReturn + ' '.join(clean_word) + ' . '
    return DataReturn
```

[108]:
```
articles = []
n = df.shape[0]
data_cleaned = df.copy()
for i in range(n):
    temp = cleaning(df.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_cleaned.loc[:, 'tweet'] = pd.Series(articles, index=data_df.index)

articles = []
n = df_train.shape[0]
data_train_cleaned = df_train.copy()
for i in range(n):
    temp = cleaning(df_train.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_train_cleaned.loc[:, 'tweet'] = pd.Series(articles, index=data_model.index)

articles = []
n = df_test.shape[0]
data_test_cleaned = df_test.copy()
for i in range(n):
    temp = cleaning(df_test.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_test_cleaned.loc[:, 'tweet'] = pd.Series(articles, index=data_test.index)

articles = []
n = df_validate.shape[0]
data_validate_cleaned = df_validate.copy()
for i in range(n):
    temp = cleaning(df_validate.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_validate_cleaned.loc[:, 'tweet'] = pd.Series(articles, index=data_validate.
 ↪index)
```

```
All 11384 articles are cleaned.
All 9380 articles are cleaned.
All 1081 articles are cleaned.
All 923 articles are cleaned.
```

[109]:
```
articles = []
n = df14.shape[0]
data_cleaned14 = df14.copy()
for i in range(n):
    temp = cleaning(df14.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_cleaned14.loc[:, 'tweet'] = pd.Series(articles, index=data_df14.index)

articles = []
n = df_train14.shape[0]
data_train_cleaned14 = df_train14.copy()
for i in range(n):
    temp = cleaning(df_train14.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_train_cleaned14.loc[:, 'tweet'] = pd.Series(articles, index=data_model14.
 ↪index)

articles = []
n = df_test14.shape[0]
data_test_cleaned14 = df_test14.copy()
for i in range(n):
    temp = cleaning(df_test14.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_test_cleaned14.loc[:, 'tweet'] = pd.Series(articles, index=data_test14.
 ↪index)

articles = []
n = df_validate14.shape[0]
data_validate_cleaned14 = df_validate14.copy()
for i in range(n):
    temp = cleaning(df_validate14.iloc[i]['tweet'])
    articles.append(temp)
print("All {} articles are cleaned.".format(n))
data_validate_cleaned14.loc[:, 'tweet'] = pd.Series(articles,␣
 ↪index=data_validate14.index)
```

```
All 11022 articles are cleaned.
All 9380 articles are cleaned.
All 719 articles are cleaned.
All 923 articles are cleaned.
```

[110]:
```
data_validate_cleaned14
```

[110]:
```
                                                 tweet  Mylabel
0    live federal health officials provide covid up...  increas
1    canborder arrive canada amp started day mandat...  increas
2    canborder emergency order requires persons ent...  increas
3    canborder arrive canada amp started day mandat...  increas
4    canborder emergency order requires persons ent...  increas
..                                                 ...      ...
918  commentary discomfort wearing masks midst pand...  increas
919  tropical storm isaias approaches coronavirus h...  increas
920  according health canada without guidance healt...  increas
921  like teachers experts worry effect pandemic ki...  increas
922  gyms begin reopen experts recommend gymgoers w...  increas

[923 rows x 2 columns]
```

[111]:
```python
vectors = vectorizer.fit(data_cleaned['tweet'])
```

[112]:
```python
train_vectors= vectors.transform(data_train_cleaned['tweet'])
test_vectors= vectors.transform(data_test_cleaned['tweet'])
validate_vectors= vectors.transform(data_validate_cleaned['tweet'])
```

[113]:
```python
train_vectors14= vectors.transform(data_train_cleaned14['tweet'])
test_vectors14= vectors.transform(data_test_cleaned14['tweet'])
validate_vectors14= vectors.transform(data_validate_cleaned14['tweet'])
```

[132]:
```python
import numpy as np
import matplotlib.pyplot as plt
from matplotlib.colors import ListedColormap
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.datasets import make_moons, make_circles, make_classification
from sklearn.neural_network import MLPClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.svm import SVC
from sklearn.gaussian_process import GaussianProcessClassifier
from sklearn.gaussian_process.kernels import RBF
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier, AdaBoostClassifier
from sklearn.naive_bayes import GaussianNB
from sklearn.discriminant_analysis import QuadraticDiscriminantAnalysis

h = .02  # step size in the mesh

names = [
         "Decision Tree", "Random Forest", "Naive Bayes"
         ]
classifiers = [

    DecisionTreeClassifier(max_depth=10),
    RandomForestClassifier(max_depth=14, n_estimators=40, max_features=1),
    GaussianNB()
    ]
valid_scores= []
day1_test_scores = []
day14_test_scores = []



for name, clf in zip(names, classifiers):

    clf.fit(train_vectors.toarray(), data_train_cleaned['Mylabel'])
    valid_scores.append(clf.score(validate_vectors.toarray(),␣
 ↪data_validate_cleaned['Mylabel']))
    day1_test_scores.append(clf.score(test_vectors.toarray(),␣
 ↪data_test_cleaned['Mylabel']))
```

[137]:
```
valid_scores
```

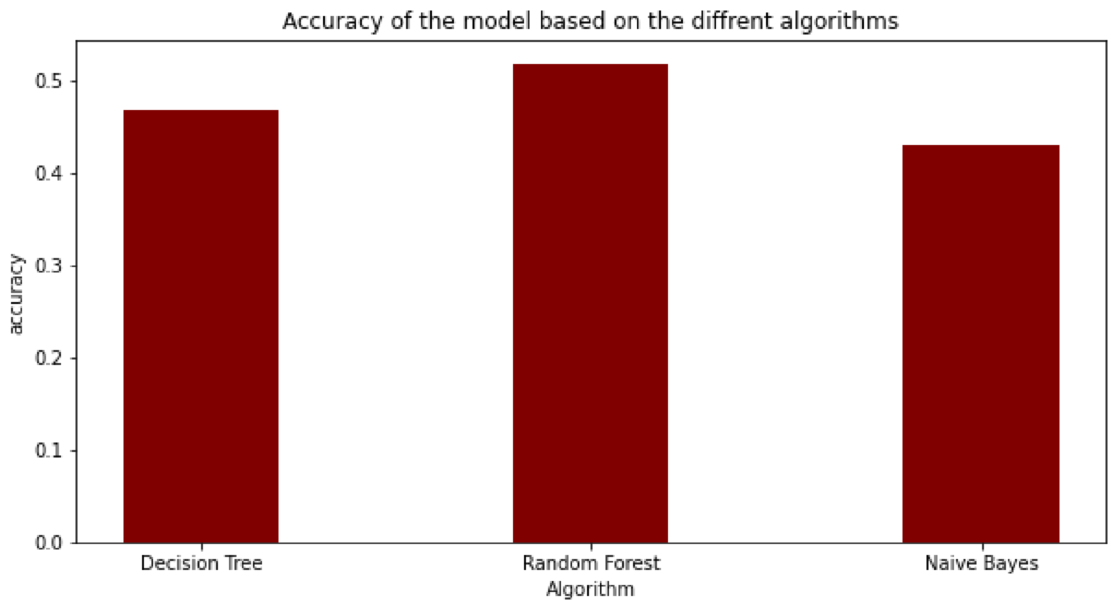
[137]:
```
[0.4680390032502708, 0.5184182015167931, 0.4297941495124594]
```

[143]:
```
day1_test_scores
```

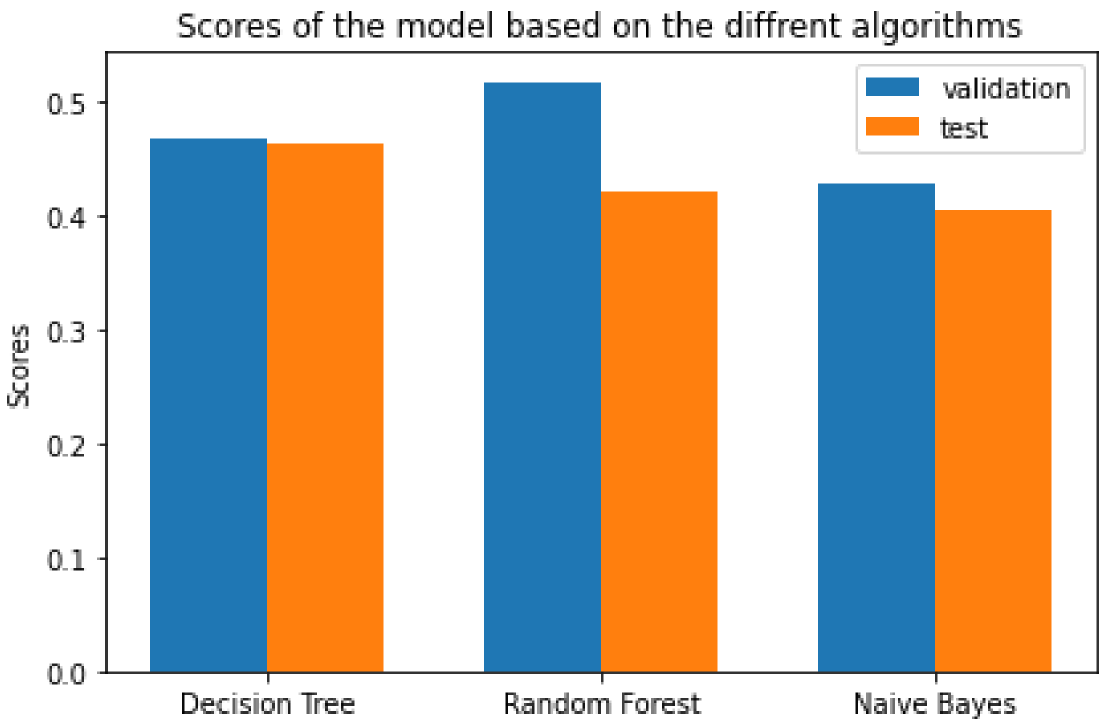
[143]:
```
[0.46345975948196116, 0.42096207215541165, 0.4052101955168328]
```

[ ]:
```

```

[144]:
```
import numpy as np
import matplotlib.pyplot as plt



Tags = list(names)
values = list(valid_scores)

fig = plt.figure(figsize = (10, 5))

# creating the bar plot
plt.bar(Tags, values, color ='maroon',
        width = 0.4)

plt.xlabel("Algorithm")
plt.ylabel("accuracy")
plt.title("Accuracy of the model based on the diffrent algorithms")
plt.show()
```



[145]:
```
import matplotlib
import matplotlib.pyplot as plt
import numpy as np


labels = names


x = np.arange(len(labels))  # the label locations
width = 0.35  # the width of the bars

fig, ax = plt.subplots()
rects1 = ax.bar(x - width/2, valid_scores, width, label='validation')
rects2 = ax.bar(x + width/2, day1_test_scores, width, label='test')

ax.set_ylabel('Scores')
ax.set_title('Scores of the model based on the diffrent algorithms')
ax.set_xticks(x)
ax.set_xticklabels(labels)
ax.legend()


def autolabel(rects):
    """Attach a text label above each bar in *rects*, displaying its height."""
    for rect in rects:
        height = rect.get_height()
        ax.annotate('{}'.format(height),
                    xy=(rect.get_x() + rect.get_width() / 2, height),
                    xytext=(0, 3),  # 3 points vertical offset
                    textcoords="offset points",
                    ha='center', va='bottom')




fig.tight_layout()

plt.show()
```



[147]:
```
#we Chose random forest based on the scores that we recived
```

[149]:
```
import numpy as np
import matplotlib.pyplot as plt
from matplotlib.colors import ListedColormap
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.datasets import make_moons, make_circles, make_classification
from sklearn.neural_network import MLPClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.svm import SVC
from sklearn.gaussian_process import GaussianProcessClassifier
from sklearn.gaussian_process.kernels import RBF
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier, AdaBoostClassifier
from sklearn.naive_bayes import GaussianNB
from sklearn.discriminant_analysis import QuadraticDiscriminantAnalysis

h = .02

names = [
         "Decision Tree", "Random Forest", "Naive Bayes"
         ]
classifiers = [

    DecisionTreeClassifier(max_depth=5),
    RandomForestClassifier(max_depth=8, n_estimators=20, max_features=1),
    GaussianNB()
    ]
valid_scores14= []
day14_test_scores = []




for name, clf in zip(names, classifiers):

    clf.fit(train_vectors14.toarray(), data_train_cleaned14['Mylabel'])
    valid_scores14.append(clf.score(validate_vectors14.toarray(),␣
 ↪data_validate_cleaned14['Mylabel']))
    day14_test_scores.append(clf.score(test_vectors14.toarray(),␣
 ↪data_test_cleaned14['Mylabel']))
```

[150]:
```
valid_scores14
```

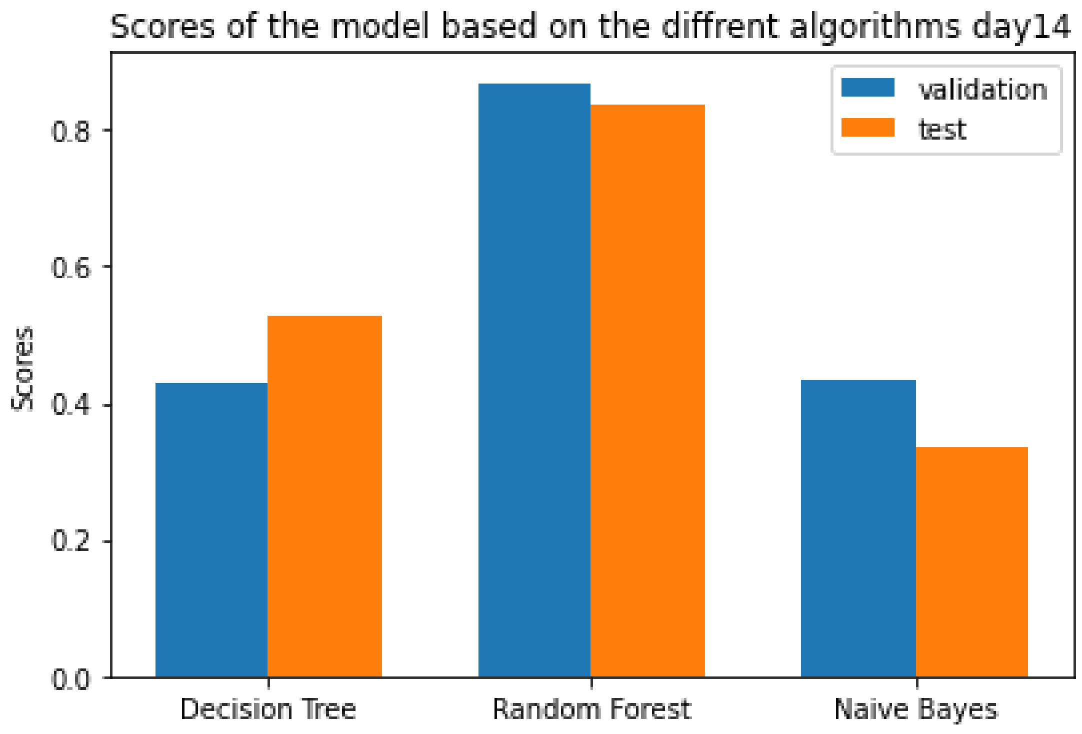
[150]:
```
[0.43066088840736727, 0.8694474539544963, 0.43391115926327195]
```

[162]:
```
day14_test_scores
```

[162]:
```
[0.527816411682893, 0.8350904033379692, 0.3337969401947149]
```

[163]:
```
import matplotlib
import matplotlib.pyplot as plt
import numpy as np


labels = names


x = np.arange(len(labels))  # the label locations
width = 0.35  # the width of the bars
```

```python
fig, ax = plt.subplots()
rects1 = ax.bar(x - width/2, valid_scores14, width, label='validation')
rects2 = ax.bar(x + width/2, day14_test_scores, width, label='test')

# Add some text for labels, title and custom x-axis tick labels, etc.
ax.set_ylabel('Scores')
ax.set_title('Scores of the model based on the diffrent algorithms day14')
ax.set_xticks(x)
ax.set_xticklabels(labels)
ax.legend()


def autolabel(rects):
    """Attach a text label above each bar in *rects*, displaying its height."""
    for rect in rects:
        height = rect.get_height()
        ax.annotate('{}'.format(height),
                    xy=(rect.get_x() + rect.get_width() / 2, height),
                    xytext=(0, 3),  # 3 points vertical offset
                    textcoords="offset points",
                    ha='center', va='bottom')




fig.tight_layout()

plt.show()
```


Scores of the model based on the diffrent algorithms day14
validation
test
Scores
0.0
0.2
0.4
0.6
0.8
Decision Tree
Random Forest
Naive Bayes