datetime

July 26, 2022

1 Datetime Function Example

1.1 Dependency Package

[ ]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

[ ]:
```
# read file to DataFrame to show example
df=pd.read_csv('../../data/partial_data.csv')
df['harvested_at'] = pd.to_datetime(df['harvested_at'], utc=True)
```

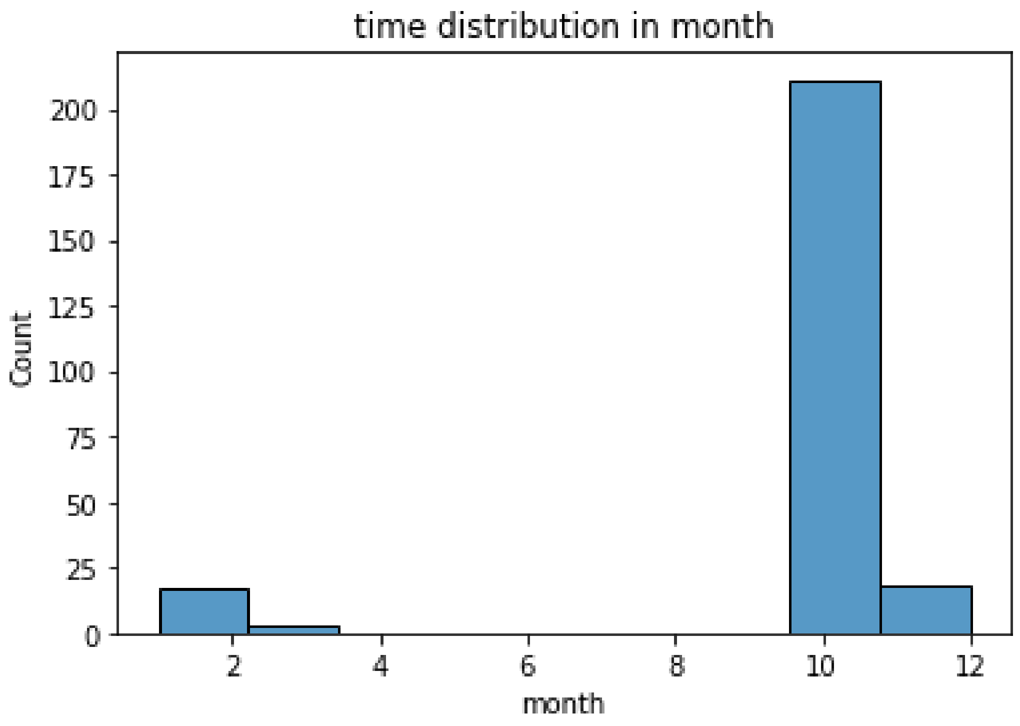
1.2 get_unit

[ ]:
```
# helper function for all the functions below
def get_unit(unit="day"):

    """
    For a given unit type, return the function that get the
    corresponding unit value of a datetime object.

    Parameters
    ----------
    unit : str
        The time unit for the returned function to get the corresponding value.
        The set of possible unit is:
        'year' : the year of the datetime object.
        'month' : the month of the datetime object.
        'day' : the day in month of the datetime object.
        'hour' : the hour of the datetime object.
        'minute' : the minute of the datetime object.
        'day_of_week' : the day in week of the datetime object, range in [0, 6].
        'day_of_year' : the day in year of the datetime object, range in [0,␣
 ↪355].

    Returns
    -------
    get_time : function
        The function to get corresponding unit time from datetime object.
    """

    if unit=="year":
        get_time = lambda x:x.year
    elif unit=="month":
        get_time = lambda x:x.month
    elif unit=="day":
        get_time = lambda x:x.day
    elif unit=="hour":
        get_time = lambda x:x.hour
    elif unit=="minute":
        get_time = lambda x:x.minute
    elif unit=="day_of_week":
        get_time = lambda x:x.day_of_week
    elif unit=="day_of_year":
        get_time = lambda x:x.day_of_year
    else:
        raise ValueError("Wrong Parameter")
    return get_time
```

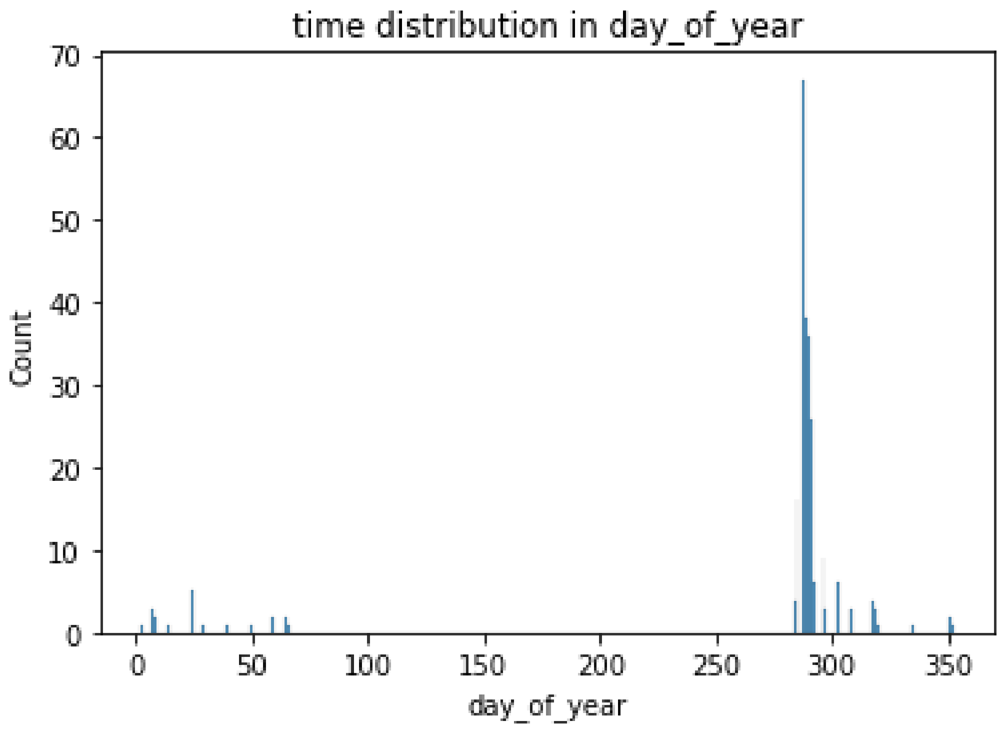
1.3 time_dist

```
[ ]: def time_dist(df, column, unit="day"):

         """
         For a given column that is in datetime datatype, plot the time distribution␣
      ↪in the given unit.

         Parameters
         ----------
         df : DataFrame
             The data frame that contains target datetime column.
         column: str
             The column name of the target datetime column.
         unit : str, default 'day'
             Please refer to the get_unit function.
         """

         get_time = get_unit(unit)
         sns.histplot(x=df[column].apply(get_time))
         plt.title(f"time distribution in {unit}")
         plt.xlabel(unit)
         plt.show()
```

```
[ ]: time_dist(df, "harvested_at", unit="month")
```



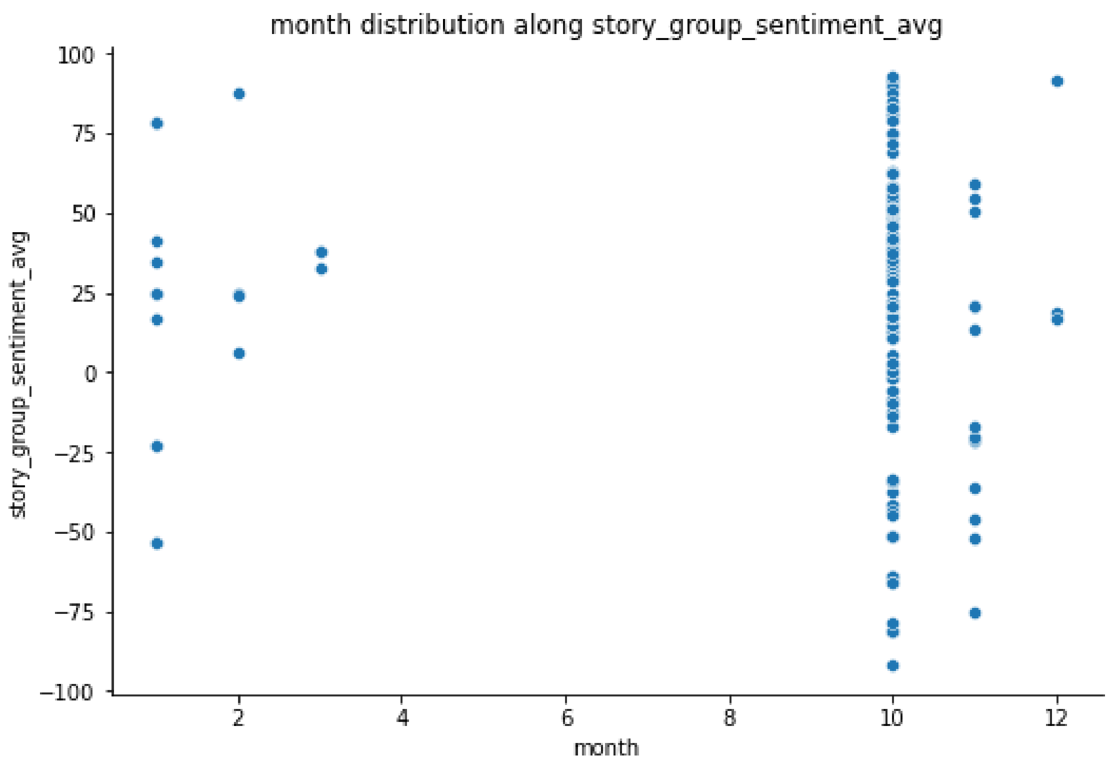
```
[ ]: time_dist(df, "harvested_at", unit="day_of_year")
```



1.4 time_dist_along

```
[ ]: def time_dist_along(df, column, time_col, unit="day"):

         """
         For a given datetime column and a numerical column, plot the
         time distribution in the given unit along the numeric column.

         Parameters
         ----------
         df : DataFrame
             The data frame that contains target datetime column.
         column : str
             The column name of the numerical column.
         time_col: str
             The column name of the target datetime column.
         unit : str, default 'day'
             Please refer to the get_unit function.
         """

         get_time = get_unit(unit)
         sns.relplot(x=df[time_col].apply(get_time), y=df[column], aspect=1.5)
         plt.title(f'{unit} distribution along {column}')
         plt.xlabel(unit)
```

```
[ ]: time_dist_along(df, "story_group_sentiment_avg", 'harvested_at', unit="month")
```

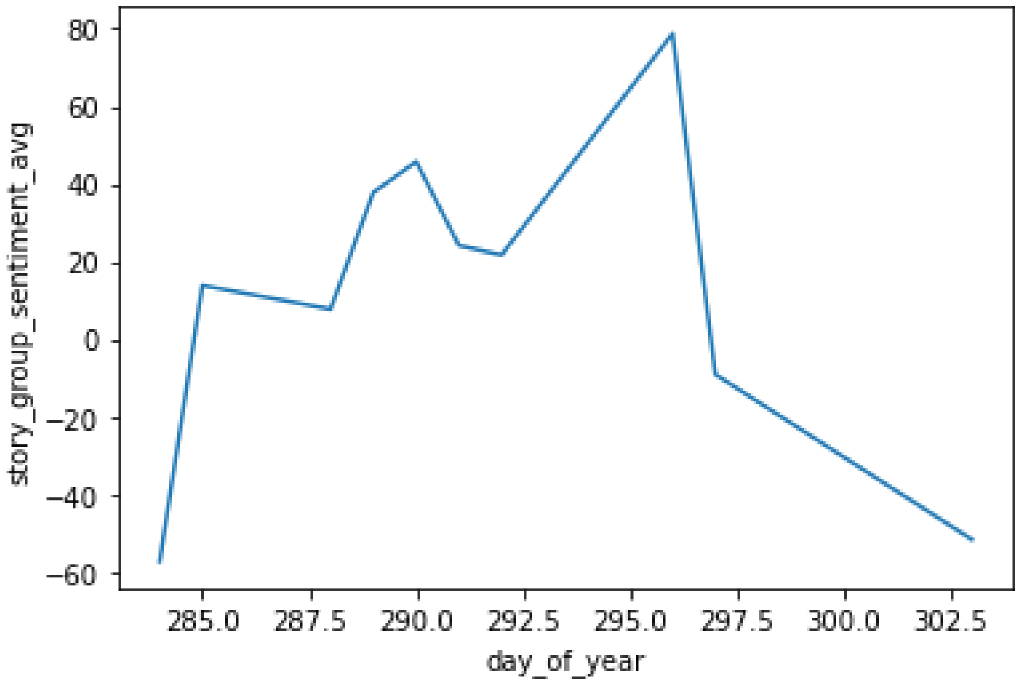


1.5 agg_time_along

[ ]:
```
def agg_time_along(df, column, time_col, start, end, agg_unit="day_of_year"):

    """
    For a given DataFrame contains datetime column and another numeric column,␣
↪in the given time interval,
    groupby the datetime column with the given unit and aggregate the numeric␣
↪column by mean value,
    then with time as x axis, plot the trend line of the numeric column value.

    Parameters
    ----------
    df : DataFrame
        The DataFrame that contains the datetime column and numerical column.
    column : str
        The column name of the numerical column.
    time_col : str
        The column name of the datetime column.
    start : str
        The string in datetime format that indicates the start time of the␣
↪selected time interval.
```

```
    end : str
        The string in datetime format that indicates the end time of the␣
↪selected time interval
    agg_unit : str
        The unit of the datetime column to aggregate and plot distribution.
        Please refer to get_unit for potential values.
    """
    start = pd.to_datetime(start, utc=True)
    end = pd.to_datetime(end, utc=True)
    idx = df[time_col][(df[time_col]>=start) & (df[time_col]<=end)].index
    new_df = df[[time_col, column]].copy()

    get_time = get_unit(agg_unit)
    new_df.loc[:,agg_unit] = df[time_col].apply(get_time)

    sns.lineplot(x=new_df.loc[idx,[agg_unit,column]].groupby([agg_unit]).
↪mean()[column].index, y=new_df.loc[idx,[agg_unit,column]].
↪groupby([agg_unit]).mean()[column])
```

[ ]:
```
agg_time_along(df, "story_group_sentiment_avg", 'harvested_at',␣
↪start="2018-10-1", end="2018-10-31")
```



[ ]: