fitbit-analysis-part2-1

February 2, 2024

1 FITBIT DATA ANALYSIS (DIPEN PRADHAN & ROSHANI SING) PART 2

[1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import altair as alt
```

[2]:
```
dailyActivity = pd.read_csv("C:\\Users\\avili\\Downloads\\dailyActivity_merged.
 ↪csv")
dailycalories = pd.read_csv("C:\\Users\\avili\\Downloads\\dailyCalories_merged.
 ↪csv")
dailyIntensities  = pd.read_csv("C:
 ↪\\Users\\avili\\Downloads\\dailyIntensities_merged.csv")
dailySteps = pd.read_csv("C:\\Users\\avili\\Downloads\\dailySteps_merged.csv")
heartrate_seconds = pd.read_csv("C:
 ↪\\Users\\avili\\Downloads\\heartrate_seconds_merged (1).csv")
hourlyCalories = pd.read_csv("C:
 ↪\\Users\\avili\\Downloads\\hourlyCalories_merged.csv")
hourlyIntensities = pd.read_csv("C:
 ↪\\Users\\avili\\Downloads\\hourlyIntensities_merged.csv")
hourlySteps = pd.read_csv("C:\\Users\\avili\\Downloads\\hourlySteps_merged.csv")
minuteCaloriesNarrow = pd.read_csv("C:
 ↪\\Users\\avili\\Downloads\\minuteCaloriesNarrow_merged (2).csv")
minuteCaloriesWide = pd.read_csv("C:
 ↪\\Users\\avili\\Downloads\\minuteCaloriesWide_merged.csv")
minuteIntensitiesNarrow = pd.read_csv("C:
 ↪\\Users\\avili\\Downloads\\minuteIntensitiesNarrow_merged.csv")
minuteIntensitiesWide = pd.read_csv("C:
 ↪\\Users\\avili\\Downloads\\minuteIntensitiesWide_merged.csv")
minuteMETsNarrow = pd.read_csv("C:
 ↪\\Users\\avili\\Downloads\\minuteMETsNarrow_merged.csv")
minuteSleep = pd.read_csv("C:\\Users\\avili\\Downloads\\minuteSleep_merged.csv")
minuteStepsNarrow = pd.read_csv("C:
 ↪\\Users\\avili\\Downloads\\minuteStepsNarrow_merged.csv")
```

```
minuteStepsWide = pd.read_csv("C:
↪\\Users\\avili\\Downloads\\minuteStepsWide_merged.csv")
sleepDay = pd.read_csv("C:\\Users\\avili\\Downloads\\sleepDay_merged (1).csv")
weightLogInfo = pd.read_csv("C:\\Users\\avili\\Downloads\\weightLogInfo_merged␣
↪(1).csv")
```

[3]:
```
minuteIntensitiesWide.head()
```

[3]:
```
           Id           ActivityHour  Intensity00  Intensity01  Intensity02  \
0  1503960366  4/13/2016 12:00:00 AM            1            1            0
1  1503960366   4/13/2016 1:00:00 AM            0            0            0
2  1503960366   4/13/2016 2:00:00 AM            0            0            0
3  1503960366   4/13/2016 3:00:00 AM            0            0            0
4  1503960366   4/13/2016 4:00:00 AM            0            0            0

   Intensity03  Intensity04  Intensity05  Intensity06  Intensity07  …  \
0            0            0            1            0            1  …
1            0            0            0            0            0  …
2            0            0            0            0            0  …
3            0            0            0            0            0  …
4            0            0            0            0            0  …

   Intensity50  Intensity51  Intensity52  Intensity53  Intensity54  \
0            0            1            1            0            1
1            0            0            0            0            0
2            0            0            0            0            0
3            0            0            0            0            0
4            0            0            0            0            0

   Intensity55  Intensity56  Intensity57  Intensity58  Intensity59
0            1            0            0            0            0
1            0            0            0            0            0
2            0            0            0            0            0
3            0            0            0            0            0
4            0            0            0            0            0

[5 rows x 62 columns]
```

[4]:
```
# creating a column named total_intensity by summing row wise intensity 00 to 59
minuteIntensitiesWide['total_intensity'] = minuteIntensitiesWide.iloc[:,2:].
↪sum(axis=1)
minuteIntensitiesWide.head()
```

[4]:
```
           Id           ActivityHour  Intensity00  Intensity01  Intensity02  \
0  1503960366  4/13/2016 12:00:00 AM            1            1            0
1  1503960366   4/13/2016 1:00:00 AM            0            0            0
2  1503960366   4/13/2016 2:00:00 AM            0            0            0
```

```
3  1503960366   4/13/2016 3:00:00 AM            0            0            0
4  1503960366   4/13/2016 4:00:00 AM            0            0            0

   Intensity03  Intensity04  Intensity05  Intensity06  Intensity07  …  \
0            0            0            1            0            1  …
1            0            0            0            0            0  …
2            0            0            0            0            0  …
3            0            0            0            0            0  …
4            0            0            0            0            0  …

   Intensity51  Intensity52  Intensity53  Intensity54  Intensity55  \
0            1            1            0            1            1
1            0            0            0            0            0
2            0            0            0            0            0
3            0            0            0            0            0
4            0            0            0            0            0

   Intensity56  Intensity57  Intensity58  Intensity59  total_intensity
0            0            0            0            0               14
1            0            0            0            0                0
2            0            0            0            0                0
3            0            0            0            0                4
4            0            0            0            0                0

[5 rows x 63 columns]
```

[5]:
```
# create a new columns by slicing the ActivityHour Column
minuteIntensitiesWide['Date'] = minuteIntensitiesWide['ActivityHour'].str.
 ↪slice(0,9)
minuteIntensitiesWide['Time'] = minuteIntensitiesWide['ActivityHour'].str.
 ↪slice(9,-3)
minuteIntensitiesWide['am/pm'] = minuteIntensitiesWide['ActivityHour'].str.
 ↪slice(-2,)
# to remove extra spaces from the begining and end
minuteIntensitiesWide = minuteIntensitiesWide.apply(lambda x: x.str.strip() if␣
 ↪x.dtype=="object" else x)
minuteIntensitiesWide.head()
```

[5]:
```
           Id           ActivityHour  Intensity00  Intensity01  Intensity02  \
0  1503960366  4/13/2016 12:00:00 AM            1            1            0
1  1503960366   4/13/2016 1:00:00 AM            0            0            0
2  1503960366   4/13/2016 2:00:00 AM            0            0            0
3  1503960366   4/13/2016 3:00:00 AM            0            0            0
4  1503960366   4/13/2016 4:00:00 AM            0            0            0

   Intensity03  Intensity04  Intensity05  Intensity06  Intensity07  …  \
0            0            0            1            0            1  …
```

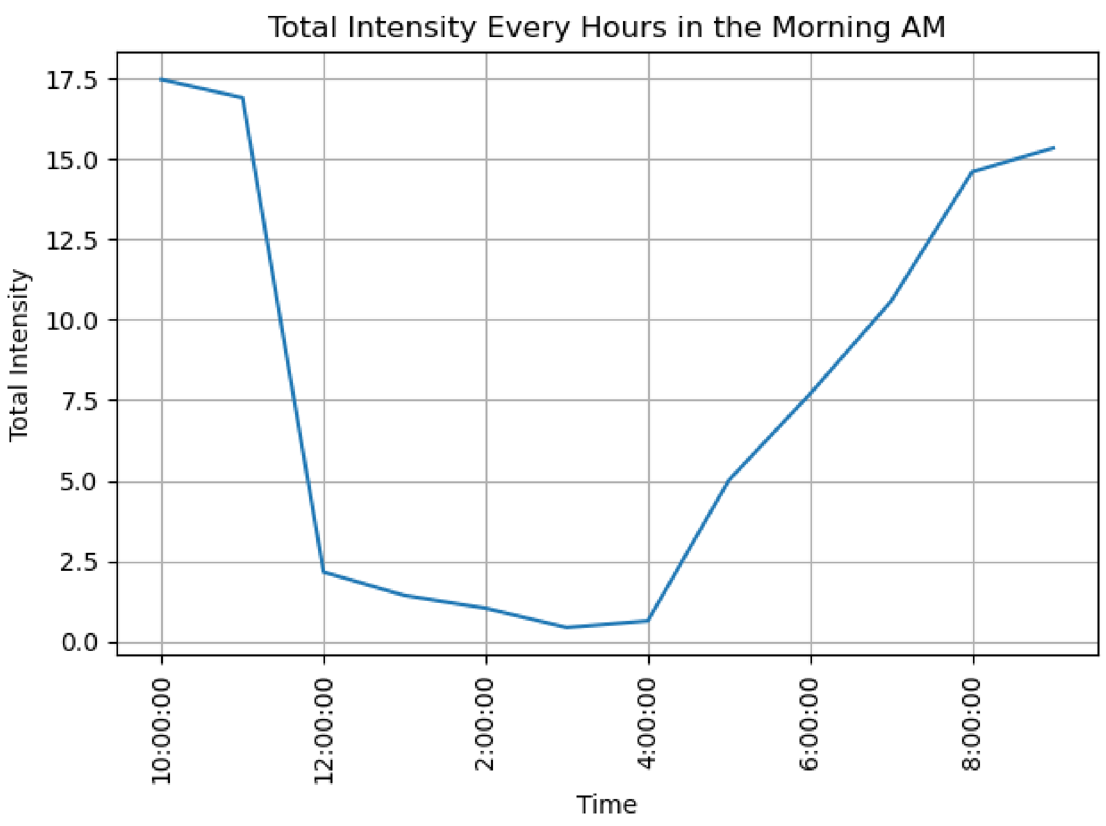
```
1              0              0              0              0              0  …
2              0              0              0              0              0  …
3              0              0              0              0              0  …
4              0              0              0              0              0  …

   Intensity54  Intensity55  Intensity56  Intensity57  Intensity58  \
0            1            1            0            0            0
1            0            0            0            0            0
2            0            0            0            0            0
3            0            0            0            0            0
4            0            0            0            0            0

   Intensity59  total_intensity       Date      Time  am/pm
0            0               14  4/13/2016  12:00:00     AM
1            0                0  4/13/2016   1:00:00     AM
2            0                0  4/13/2016   2:00:00     AM
3            0                4  4/13/2016   3:00:00     AM
4            0                0  4/13/2016   4:00:00     AM

[5 rows x 66 columns]
```

[6]:
```
# create a new dataframe with only morning data which is 'AM'
df_am = minuteIntensitiesWide[minuteIntensitiesWide['am/pm']=='AM']
df_am
```

[6]:
```
               Id           ActivityHour  Intensity00  Intensity01  \
0      1503960366  4/13/2016 12:00:00 AM            1            1
1      1503960366   4/13/2016 1:00:00 AM            0            0
2      1503960366   4/13/2016 2:00:00 AM            0            0
3      1503960366   4/13/2016 3:00:00 AM            0            0
4      1503960366   4/13/2016 4:00:00 AM            0            0
…             …                      …          …            …
21640  8877689391   5/13/2016 3:00:00 AM            0            0
21641  8877689391   5/13/2016 4:00:00 AM            0            0
21642  8877689391   5/13/2016 5:00:00 AM            0            0
21643  8877689391   5/13/2016 6:00:00 AM            0            0
21644  8877689391   5/13/2016 7:00:00 AM            1            1

       Intensity02  Intensity03  Intensity04  Intensity05  Intensity06  \
0                0            0            0            1            0
1                0            0            0            0            0
2                0            0            0            0            0
3                0            0            0            0            0
4                0            0            0            0            0
…             …          …          …          …          …
21640            0            0            0            0            0
21641            0            0            0            0            0
```

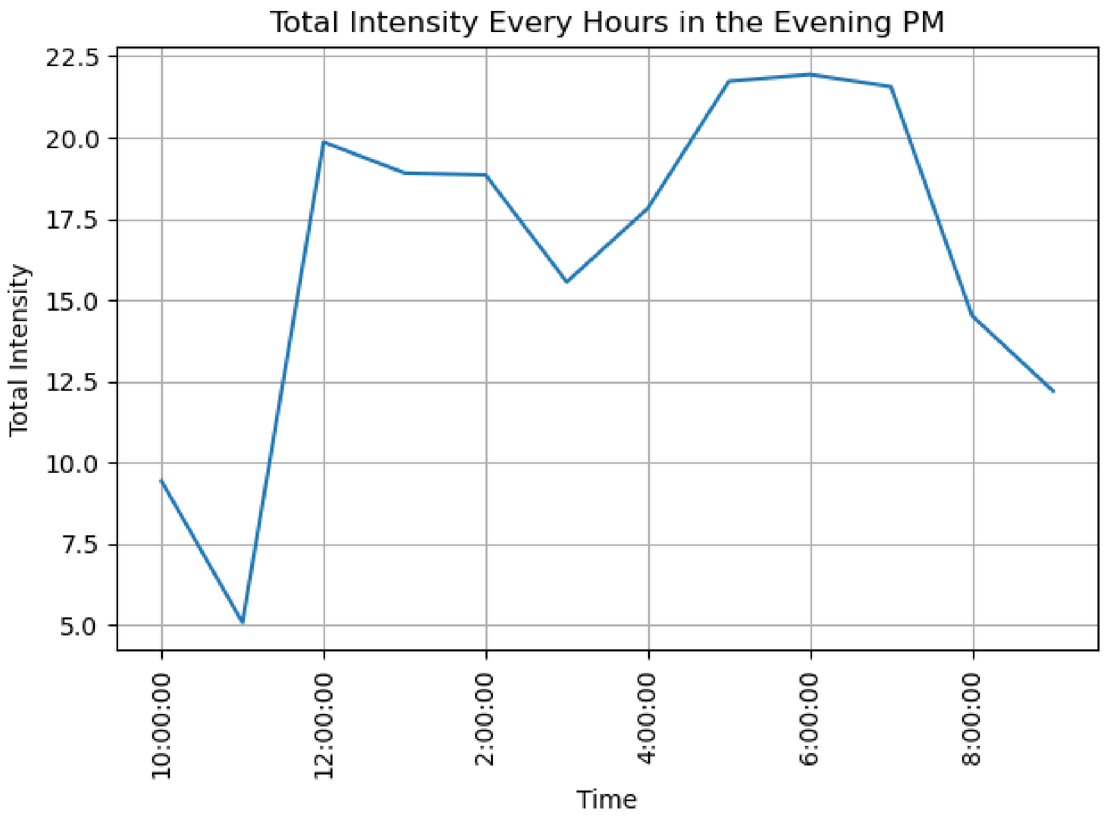
```
21642            0           0           0           0           0
21643            0           0           0           0           0
21644            1           0           1           0           0

       Intensity07  …  Intensity54  Intensity55  Intensity56  Intensity57  \
0                1  …            1            1            0            0
1                0  …            0            0            0            0
2                0  …            0            0            0            0
3                0  …            0            0            0            0
4                0  …            0            0            0            0
…              …  …          …          …          …          …
21640            0  …            0            0            0            0
21641            0  …            0            0            0            0
21642            0  …            0            0            0            0
21643            0  …            1            0            0            1
21644            0  …            0            0            0            0

       Intensity58  Intensity59  total_intensity       Date      Time  am/pm
0                0            0               14  4/13/2016  12:00:00     AM
1                0            0                0  4/13/2016   1:00:00     AM
2                0            0                0  4/13/2016   2:00:00     AM
3                0            0                4  4/13/2016   3:00:00     AM
4                0            0                0  4/13/2016   4:00:00     AM
…              …          …              …        …       …    …
21640            0            0                0  5/13/2016   3:00:00     AM
21641            0            0                0  5/13/2016   4:00:00     AM
21642            0            0                0  5/13/2016   5:00:00     AM
21643            1            1                8  5/13/2016   6:00:00     AM
21644            0            0               23  5/13/2016   7:00:00     AM

[10928 rows x 66 columns]
```

[7]:
```python
# group the data by each hour
df_am = df_am.groupby('Time')['total_intensity'].mean()
df_am.plot(kind="line", x='Time',y='total_intensity',grid=True)
plt.title('Total Intensity Every Hours in the Morning AM')
plt.ylabel('Total Intensity')
plt.xticks(rotation=90)
plt.tight_layout()
```



[ ]:
```
#The activity drops at night after midnight becuase most of the users take␣
↪rest,
#and it increases after 4 am when people start to wake up in the morning till␣
↪9am.
#It shows that most of the users are active during the early morning before␣
↪they go to work.
```

[8]:
```
df_pm = minuteIntensitiesWide[minuteIntensitiesWide['am/pm']=='PM']
# group the data by each hour
df_pm = df_pm.groupby('Time')['total_intensity'].mean()
df_pm.plot(kind="line", x='Time',y='total_intensity',grid=True)
plt.title('Total Intensity Every Hours in the Evening PM')
plt.ylabel('Total Intensity')
plt.xticks(rotation=90)
plt.tight_layout()
```



[ ]:
```
#The Intensity increases after 3pm and reamains high from 5 till 7 pm for most␣
  ↪of the users.
#It may be people going to walk or gym after work.
```

[9]:
```
minuteStepsWide.head()
```

[9]:
```
           Id           ActivityHour  Steps00  Steps01  Steps02  Steps03  \
0  1503960366  4/13/2016 12:00:00 AM        4       16        0        0
1  1503960366   4/13/2016 1:00:00 AM        0        0        0        0
2  1503960366   4/13/2016 2:00:00 AM        0        0        0        0
3  1503960366   4/13/2016 3:00:00 AM        0        0        0        0
4  1503960366   4/13/2016 4:00:00 AM        0        0        0        0

   Steps04  Steps05  Steps06  Steps07  …  Steps50  Steps51  Steps52  \
0        0        9        0       17  …        0        9        8
1        0        0        0        0  …        0        0        0
2        0        0        0        0  …        0        0        0
3        0        0        0        0  …        0        0        0
4        0        0        0        0  …        0        0        0

   Steps53  Steps54  Steps55  Steps56  Steps57  Steps58  Steps59
```

```
0         0        20         1         0         0         0         0
1         0         0         0         0         0         0         0
2         0         0         0         0         0         0         0
3         0         0         0         0         0         0         0
4         0         0         0         0         0         0         0

[5 rows x 62 columns]
```

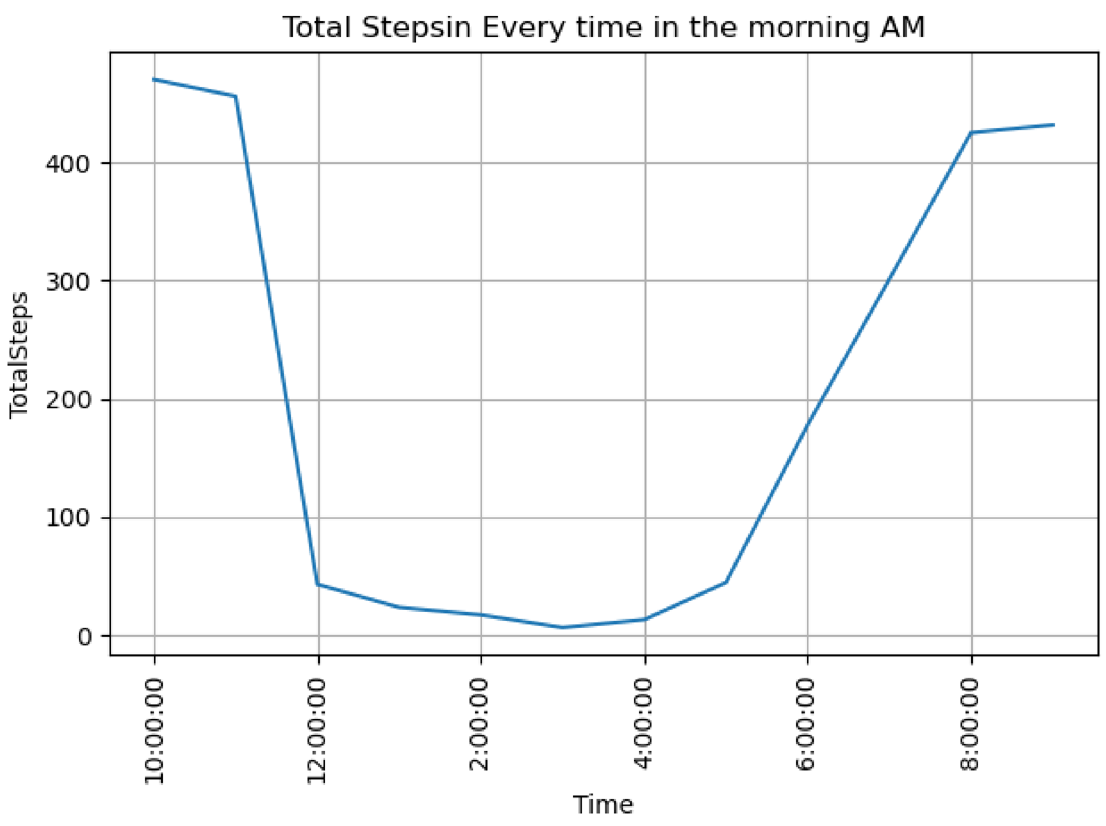
[10]:
```
# add a column named total_steps by summing row wise steps 00 to 59
minuteStepsWide['total_steps'] =minuteStepsWide.iloc[:,2:].sum(axis=1)
minuteStepsWide.head()
```

[10]:
```
           Id           ActivityHour  Steps00  Steps01  Steps02  Steps03  \
0  1503960366  4/13/2016 12:00:00 AM        4       16        0        0
1  1503960366   4/13/2016 1:00:00 AM        0        0        0        0
2  1503960366   4/13/2016 2:00:00 AM        0        0        0        0
3  1503960366   4/13/2016 3:00:00 AM        0        0        0        0
4  1503960366   4/13/2016 4:00:00 AM        0        0        0        0

   Steps04  Steps05  Steps06  Steps07  …  Steps51  Steps52  Steps53  \
0        0        9        0       17  …        9        8        0
1        0        0        0        0  …        0        0        0
2        0        0        0        0  …        0        0        0
3        0        0        0        0  …        0        0        0
4        0        0        0        0  …        0        0        0

   Steps54  Steps55  Steps56  Steps57  Steps58  Steps59  total_steps
0       20        1        0        0        0        0          144
1        0        0        0        0        0        0            0
2        0        0        0        0        0        0            0
3        0        0        0        0        0        0           36
4        0        0        0        0        0        0            0

[5 rows x 63 columns]
```

[11]:
```
# create a new column named 'Date' by slicing the ActivityHour Column
minuteStepsWide['Date'] = minuteStepsWide['ActivityHour'].str.slice(0,9)
minuteStepsWide['Time'] = minuteStepsWide['ActivityHour'].str.slice(9,-3)
minuteStepsWide['am/pm'] = minuteStepsWide['ActivityHour'].str.slice(-2,)
# to remove extra spaces from the begining and end
minuteStepsWide = minuteStepsWide.apply(lambda x: x.str.strip() if x.
  ↪dtype=="object" else x)
minuteStepsWide['Hour'] = minuteStepsWide['Time'].str.slice(0,2)
minuteStepsWide['Hour'] = minuteStepsWide['Hour'].apply(lambda x: x.strip(':'))
minuteStepsWide.head()
```

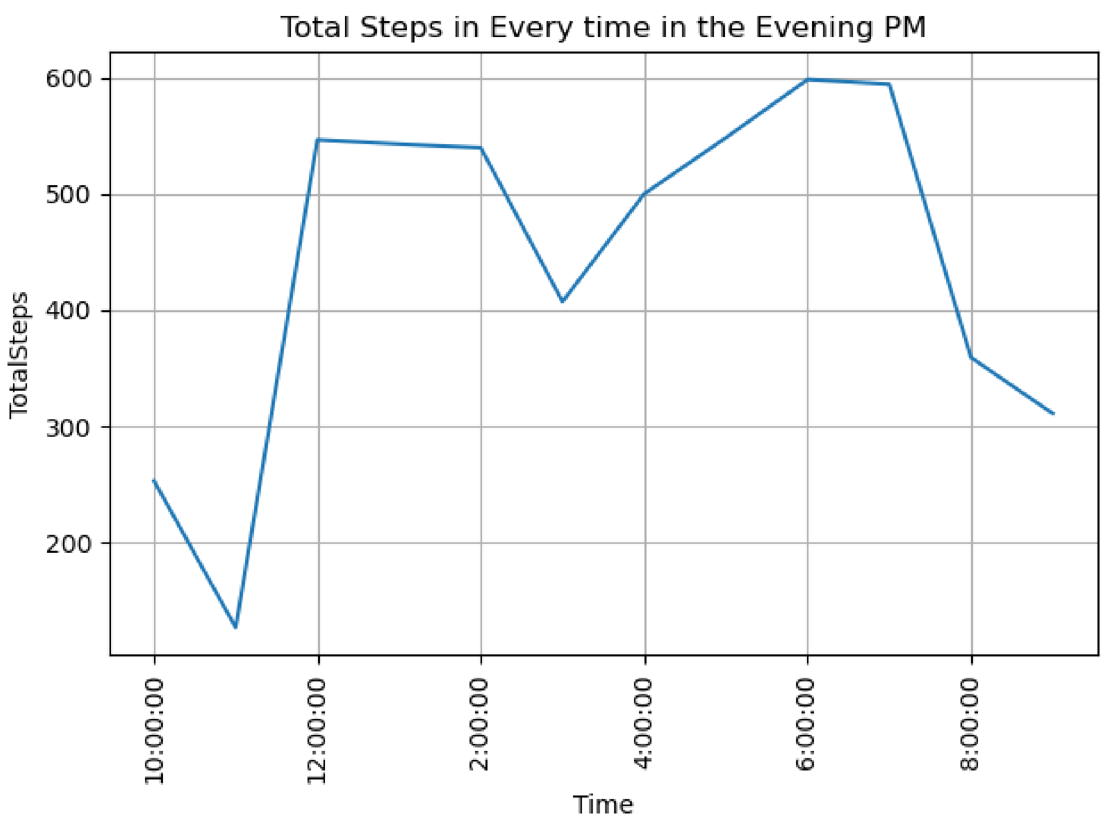
[11]:
```
           Id           ActivityHour  Steps00  Steps01  Steps02  Steps03  \
0  1503960366  4/13/2016 12:00:00 AM        4       16        0        0
1  1503960366   4/13/2016 1:00:00 AM        0        0        0        0
2  1503960366   4/13/2016 2:00:00 AM        0        0        0        0
3  1503960366   4/13/2016 3:00:00 AM        0        0        0        0
4  1503960366   4/13/2016 4:00:00 AM        0        0        0        0

   Steps04  Steps05  Steps06  Steps07  …  Steps55  Steps56  Steps57  \
0        0        9        0       17  …        1        0        0
1        0        0        0        0  …        0        0        0
2        0        0        0        0  …        0        0        0
3        0        0        0        0  …        0        0        0
4        0        0        0        0  …        0        0        0

   Steps58  Steps59  total_steps       Date      Time  am/pm  Hour
0        0        0          144  4/13/2016  12:00:00     AM    12
1        0        0            0  4/13/2016   1:00:00     AM     1
2        0        0            0  4/13/2016   2:00:00     AM     2
3        0        0           36  4/13/2016   3:00:00     AM     3
4        0        0            0  4/13/2016   4:00:00     AM     4

[5 rows x 67 columns]
```

[12]:
```python
# create a new dataframe with only morning data which is 'AM' and ploting  the␣
↪graph of morning(AM) wise Total Steps
df_am = minuteStepsWide[minuteStepsWide['am/pm']=='AM']
# group the data by each hour
df_am = df_am.groupby('Time')['total_steps'].mean()
df_am.plot(kind="line", x='Time',y='total_steps',grid=True)
plt.title('Total Stepsin Every time in the morning AM')
plt.ylabel('TotalSteps')
plt.xticks(rotation=90)
plt.tight_layout()
```



```
[ ]: #It shows that the users starts activity after 4am in the morning with highest␣
      ↪activity peak at 10 am.
```

```
[13]: # create a new dataframe with only morning data which is 'AM' and ploting  the␣
       ↪graph of evening(PM) wise Total Steps
      df_pm = minuteStepsWide[minuteStepsWide['am/pm']=='PM']
      # group the data by each hour
      df_pm = df_pm.groupby('Time')['total_steps'].mean()
      df_pm.plot(kind="line", x='Time',y='total_steps',grid=True)
      plt.title('Total Steps in Every time in the Evening PM')
      plt.ylabel('TotalSteps')
      plt.xticks(rotation=90)
      plt.tight_layout()
```



```
[ ]: #In the evening, maximum steps are taken from 5pm to 8pm or above.
```

```
[14]: minuteCaloriesWide.head()
```

```
[14]:            Id           ActivityHour  Calories00  Calories01  Calories02  \
      0  1503960366  4/13/2016 12:00:00 AM      1.8876      2.2022      0.9438
      1  1503960366   4/13/2016 1:00:00 AM      0.7865      0.7865      0.7865
      2  1503960366   4/13/2016 2:00:00 AM      0.7865      0.7865      0.7865
      3  1503960366   4/13/2016 3:00:00 AM      0.7865      0.7865      0.7865
      4  1503960366   4/13/2016 4:00:00 AM      0.7865      0.7865      0.7865

         Calories03  Calories04  Calories05  Calories06  Calories07  …  \
      0      0.9438      0.9438      2.0449      0.9438      2.2022  …
      1      0.7865      0.9438      0.9438      0.9438      0.7865  …
      2      0.7865      0.7865      0.7865      0.7865      0.7865  …
      3      0.7865      0.7865      0.7865      0.7865      0.7865  …
      4      0.7865      0.7865      0.7865      0.7865      0.7865  …

         Calories50  Calories51  Calories52  Calories53  Calories54  Calories55  \
      0      0.9438      2.0449      2.0449      0.9438      2.3595      1.8876
      1      0.7865      0.7865      0.7865      0.7865      0.7865      0.7865
```

```
2      0.7865      0.7865      0.7865      0.7865      0.7865      0.7865
3      0.7865      0.7865      0.7865      0.7865      0.7865      0.7865
4      0.7865      0.7865      0.7865      0.7865      0.7865      0.7865

   Calories56  Calories57  Calories58  Calories59
0      0.9438      0.9438      0.9438      0.9438
1      0.7865      0.7865      0.7865      0.7865
2      0.7865      0.7865      0.7865      0.7865
3      0.7865      0.7865      0.7865      0.7865
4      0.7865      0.7865      0.7865      0.7865

[5 rows x 62 columns]
```

[15]:
```
# add a column named total_steps by summing row wise steps 00 to 59
minuteCaloriesWide['total_calories'] =minuteCaloriesWide.iloc[:,2:].sum(axis=1)
minuteCaloriesWide.head()
```

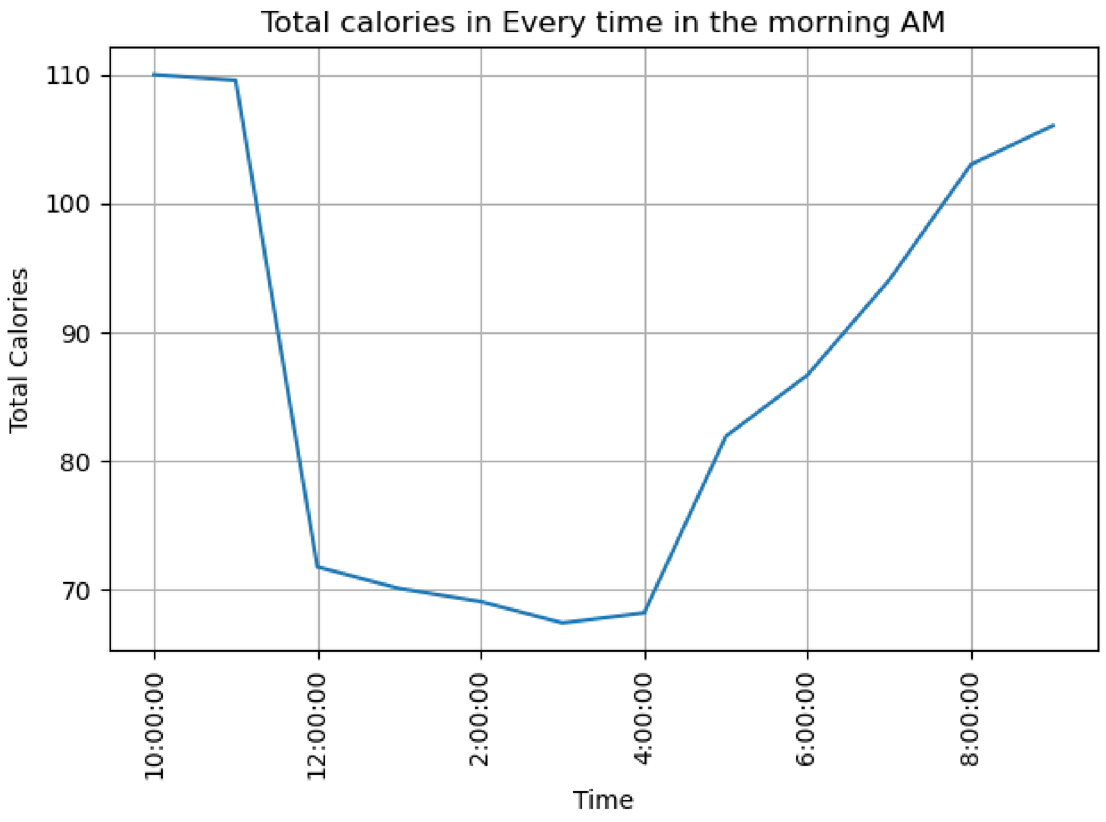
[15]:
```
           Id           ActivityHour  Calories00  Calories01  Calories02  \
0  1503960366  4/13/2016 12:00:00 AM      1.8876      2.2022      0.9438
1  1503960366   4/13/2016 1:00:00 AM      0.7865      0.7865      0.7865
2  1503960366   4/13/2016 2:00:00 AM      0.7865      0.7865      0.7865
3  1503960366   4/13/2016 3:00:00 AM      0.7865      0.7865      0.7865
4  1503960366   4/13/2016 4:00:00 AM      0.7865      0.7865      0.7865

   Calories03  Calories04  Calories05  Calories06  Calories07  …  \
0      0.9438      0.9438      2.0449      0.9438      2.2022  …
1      0.7865      0.9438      0.9438      0.9438      0.7865  …
2      0.7865      0.7865      0.7865      0.7865      0.7865  …
3      0.7865      0.7865      0.7865      0.7865      0.7865  …
4      0.7865      0.7865      0.7865      0.7865      0.7865  …

   Calories51  Calories52  Calories53  Calories54  Calories55  Calories56  \
0      2.0449      2.0449      0.9438      2.3595      1.8876      0.9438
1      0.7865      0.7865      0.7865      0.7865      0.7865      0.7865
2      0.7865      0.7865      0.7865      0.7865      0.7865      0.7865
3      0.7865      0.7865      0.7865      0.7865      0.7865      0.7865
4      0.7865      0.7865      0.7865      0.7865      0.7865      0.7865

   Calories57  Calories58  Calories59  total_calories
0      0.9438      0.9438      0.9438       68.740098
1      0.7865      0.7865      0.7865       48.133799
2      0.7865      0.7865      0.7865       47.189999
3      0.7865      0.7865      0.7865       52.695498
4      0.7865      0.7865      0.7865       47.347299

[5 rows x 63 columns]
```

[17]:
```python
# create  new columns named  by slicing the ActivityHour Column
minuteCaloriesWide['Date'] = minuteCaloriesWide['ActivityHour'].str.slice(0,9)
minuteCaloriesWide['Time'] = minuteCaloriesWide['ActivityHour'].str.slice(9,-3)
minuteCaloriesWide['am/pm'] = minuteCaloriesWide['ActivityHour'].str.slice(-2,)
# to remove extra spaces from the begining and end
minuteCaloriesWide = minuteCaloriesWide.apply(lambda x: x.str.strip() if x.
 ↪dtype=="object" else x)
minuteCaloriesWide['Hour'] = minuteCaloriesWide['Time'].str.slice(0,2)
minuteCaloriesWide['Hour'] = minuteCaloriesWide['Hour'].apply(lambda x: x.
 ↪strip(':'))
minuteCaloriesWide.head()
```

[17]:
```
           Id           ActivityHour  Calories00  Calories01  Calories02  \
0  1503960366  4/13/2016 12:00:00 AM      1.8876      2.2022      0.9438
1  1503960366   4/13/2016 1:00:00 AM      0.7865      0.7865      0.7865
2  1503960366   4/13/2016 2:00:00 AM      0.7865      0.7865      0.7865
3  1503960366   4/13/2016 3:00:00 AM      0.7865      0.7865      0.7865
4  1503960366   4/13/2016 4:00:00 AM      0.7865      0.7865      0.7865

   Calories03  Calories04  Calories05  Calories06  Calories07  …  \
0      0.9438      0.9438      2.0449      0.9438      2.2022  …
1      0.7865      0.9438      0.9438      0.9438      0.7865  …
2      0.7865      0.7865      0.7865      0.7865      0.7865  …
3      0.7865      0.7865      0.7865      0.7865      0.7865  …
4      0.7865      0.7865      0.7865      0.7865      0.7865  …

   Calories55  Calories56  Calories57  Calories58  Calories59  total_calories  \
0      1.8876      0.9438      0.9438      0.9438      0.9438       68.740098
1      0.7865      0.7865      0.7865      0.7865      0.7865       48.133799
2      0.7865      0.7865      0.7865      0.7865      0.7865       47.189999
3      0.7865      0.7865      0.7865      0.7865      0.7865       52.695498
4      0.7865      0.7865      0.7865      0.7865      0.7865       47.347299

        Date      Time  am/pm  Hour
0  4/13/2016  12:00:00     AM    12
1  4/13/2016   1:00:00     AM     1
2  4/13/2016   2:00:00     AM     2
3  4/13/2016   3:00:00     AM     3
4  4/13/2016   4:00:00     AM     4

[5 rows x 67 columns]
```

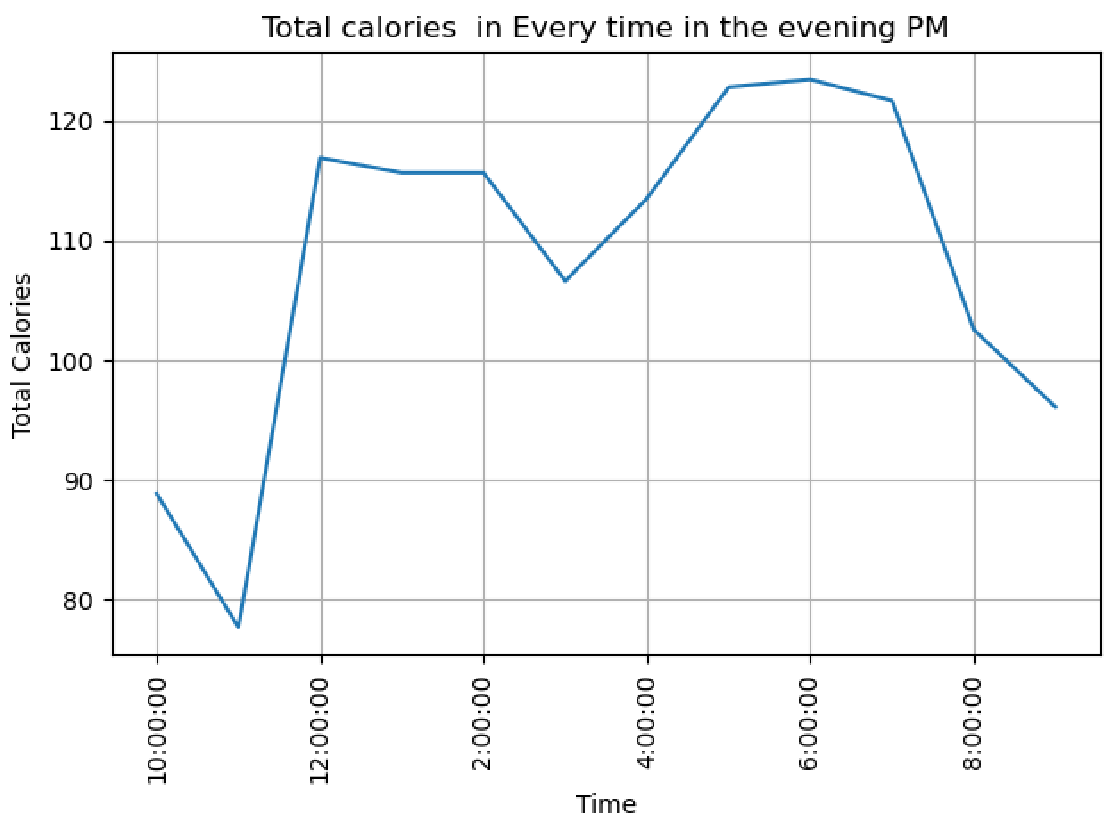
[18]:
```python
# create a new dataframe with only morning data which is 'AM' and ploting  the␣
 ↪graph of morning(AM) wise Total Steps
df_am = minuteCaloriesWide[minuteCaloriesWide['am/pm']=='AM']
# group the data by each hour
df_am = df_am.groupby('Time')['total_calories'].mean()
```

```
df_am.plot(kind="line", x='Time',y='total_calories',grid=True)
plt.title('Total calories in Every time in the morning AM')
plt.ylabel('Total Calories')
plt.xticks(rotation=90)
plt.tight_layout()
```



```
[ ]: #  Users are most active between 7:00 and 10:00 a.m., which is when most␣
     ↪calories are burned.
```

```
[19]: # create a new dataframe with only morning data which is 'AM' and ploting  the␣
      ↪graph of morning(AM) wise Total Steps
      df_pm = minuteCaloriesWide[minuteCaloriesWide['am/pm']=='PM']
      # group the data by each hour
      df_pm = df_pm.groupby('Time')['total_calories'].mean()
      df_pm.plot(kind="line", x='Time',y='total_calories',grid=True)
      plt.title('Total calories  in Every time in the evening PM')
      plt.ylabel('Total Calories')
      plt.xticks(rotation=90)
      plt.tight_layout()
```


Total calories in Every time in the evening PM
Total Calories
120
110
100
90
80
10:00:00
12:00:00
2:00:00
4:00:00
6:00:00
8:00:00
Time

```
[ ]:
```