hitter-in-ipl-till-2023-assignment

May 2, 2024

[ ]:
```
# @title
import math
import pandas as pd
import numpy as np
import seaborn as sns


import warnings
warnings.filterwarnings('ignore')

pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
pd.set_option('display.expand_frame_repr', False)
pd.set_option('max_colwidth', None)

import matplotlib.pyplot as plt
```

[ ]:
```
deliveries = pd.read_csv('C:\deliveries.csv')
matches = pd.read_csv('C:\matches.csv')
```

[ ]:
```
def balls_per_dismissals(balls, dismissals):
    if dismissals > 0:
      return balls/dismissals
    else:
      return balls/1

def balls_per_boundary(balls, boundaries):
    if boundaries > 0:
       return balls/boundaries
    else:
       return balls/1


def player_Statistics(df):


    df['isDot'] = df['batsman_runs'].apply(lambda x: 1 if x == 0 else 0)
```

```
    df['isOne'] = df['batsman_runs'].apply(lambda x: 1 if x == 1 else 0)
    df['isTwo'] = df['batsman_runs'].apply(lambda x: 1 if x == 2 else 0)
    df['isThree'] = df['batsman_runs'].apply(lambda x: 1 if x == 3 else 0)
    df['isFour'] = df['batsman_runs'].apply(lambda x: 1 if x == 4 else 0)
    df['isSix'] = df['batsman_runs'].apply(lambda x: 1 if x == 6 else 0)

    runs = pd.DataFrame(df.groupby(['batter', 'match_id'])['batsman_runs'].
↪sum().reset_index()).groupby(['batter'])['batsman_runs'].sum().reset_index().
↪rename(columns={'batsman_runs':'runs'})
    innings = pd.DataFrame(df.groupby(['batter'])['match_id'].apply(lambda x:␣
↪len(list(np.unique(x)))).reset_index()).rename(columns = {'match_id':
↪'innings'})
    balls = pd.DataFrame(df.groupby(['batter'])['match_id'].count()).
↪reset_index().rename(columns = {'match_id':'balls'})
    dismissals = pd.DataFrame(df.groupby(['batter'])['player_dismissed'].
↪count()).reset_index().rename(columns = {'player_dismissed':'dismissals'})

    dots = pd.DataFrame(df.groupby(['batter'])['isDot'].sum()).reset_index().
↪rename(columns = {'isDot':'dots'})
    ones = pd.DataFrame(df.groupby(['batter'])['isOne'].sum()).reset_index().
↪rename(columns = {'isOne':'ones'})
    twos = pd.DataFrame(df.groupby(['batter'])['isTwo'].sum()).reset_index().
↪rename(columns = {'isTwo':'twos'})
    threes = pd.DataFrame(df.groupby(['batter'])['isThree'].sum()).
↪reset_index().rename(columns = {'isThree':'threes'})
    fours = pd.DataFrame(df.groupby(['batter'])['isFour'].sum()).reset_index().
↪rename(columns = {'isFour':'fours'})
    sixes = pd.DataFrame(df.groupby(['batter'])['isSix'].sum()).reset_index().
↪rename(columns = {'isSix':'sixes'})

    df = pd.merge(innings, runs, on = 'batter').merge(balls, on = 'batter').
↪merge(dismissals, on = 'batter').merge(dots, on = 'batter').merge(ones, on =␣
↪'batter').merge(twos, on = 'batter').merge(threes, on = 'batter').
↪merge(fours, on = 'batter').merge(sixes, on = 'batter')

    #StrikeRate
    df['SR'] = df.apply(lambda x: 100*(x['runs']/x['balls']), axis = 1)

    #runs per innings
    df['RPI'] = df.apply(lambda x: x['runs']/x['innings'], axis = 1)

    #balls per dismissals
    df['BPD'] = df.apply(lambda x: balls_per_dismissals(x['balls'],␣
↪x['dismissals']), axis = 1)

    #balls per boundary
```

```
    df['BPB'] = df.apply(lambda x: balls_per_boundary(x['balls'], (x['fours'] +
↪x['sixes'])), axis = 1)

    return df
```

[ ]:
```
df = player_Statistics(deliveries)
```

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

[ ]:
```
           batter  innings  runs  balls  dismissals  dots  ones  twos  threes
fours  sixes          SR        RPI        BPD        BPB
0  A Ashish Reddy       23   280    196          15    61    83    20       1
16     15  142.857143  12.173913  13.066667   6.322581
1        A Badoni       23   399    325          18   127   124    28       3
24     19  122.769231  17.347826  18.055556   7.558140
2       A Chandila        2     4      7           1     3     4     0       0
0       0   57.142857   2.000000   7.000000   7.000000
3        A Chopra        6    53     75           5    45    21     2       0
7       0   70.666667   8.833333  15.000000  10.714286
4     A Choudhary        3    25     20           2     4    13     1       0
1       1  125.000000   8.333333  10.000000  10.000000
```

[ ]:
```
def phase(over):
    if over <= 6:
      return 'Powerplay'
    if over <= 15:
      return 'Middle_overs'
    else:
      return 'Death_overs'
```

[ ]:
```
deliveries['phase'] = deliveries['over'].apply(lambda x: phase(x))
```

[ ]:
```
def phasesOfplay(df,current_phase):


    df = df[df.phase == current_phase]
    df.reset_index(inplace = True, drop = True)

    df['isDot'] = df['batsman_runs'].apply(lambda x: 1 if x == 0 else 0)
    df['isOne'] = df['batsman_runs'].apply(lambda x: 1 if x == 1 else 0)
    df['isTwo'] = df['batsman_runs'].apply(lambda x: 1 if x == 2 else 0)
    df['isThree'] = df['batsman_runs'].apply(lambda x: 1 if x == 3 else 0)
    df['isFour'] = df['batsman_runs'].apply(lambda x: 1 if x == 4 else 0)
    df['isSix'] = df['batsman_runs'].apply(lambda x: 1 if x == 6 else 0)
```

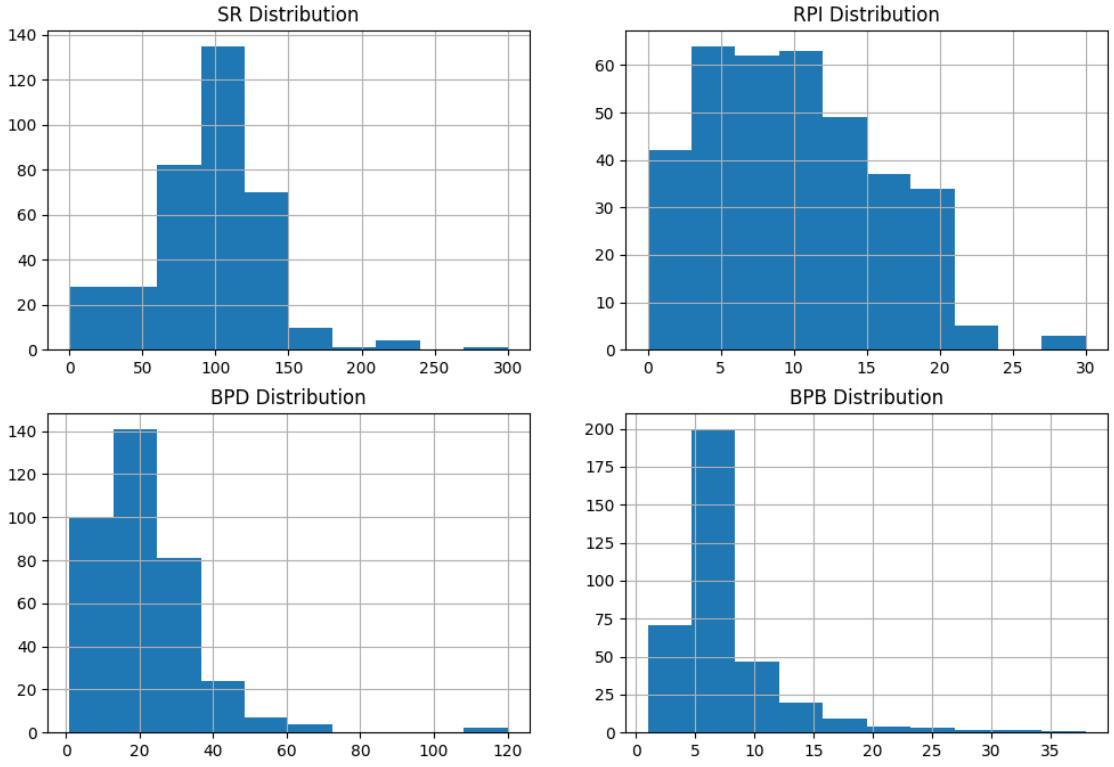
```
    runs = pd.DataFrame(df.groupby(['batter', 'match_id'])['batsman_runs'].
↪sum().reset_index()).groupby(['batter'])['batsman_runs'].sum().reset_index().
↪rename(columns={'batsman_runs':'runs'})
    innings = pd.DataFrame(df.groupby(['batter'])['match_id'].apply(lambda x:␣
↪len(list(np.unique(x)))).reset_index()).rename(columns = {'match_id':
↪'innings'})
    balls = pd.DataFrame(df.groupby(['batter'])['match_id'].count()).
↪reset_index().rename(columns = {'match_id':'balls'})
    dismissals = pd.DataFrame(df.groupby(['batter'])['player_dismissed'].
↪count()).reset_index().rename(columns = {'player_dismissed':'dismissals'})

    dots = pd.DataFrame(df.groupby(['batter'])['isDot'].sum()).reset_index().
↪rename(columns = {'isDot':'dots'})
    ones = pd.DataFrame(df.groupby(['batter'])['isOne'].sum()).reset_index().
↪rename(columns = {'isOne':'ones'})
    twos = pd.DataFrame(df.groupby(['batter'])['isTwo'].sum()).reset_index().
↪rename(columns = {'isTwo':'twos'})
    threes = pd.DataFrame(df.groupby(['batter'])['isThree'].sum()).
↪reset_index().rename(columns = {'isThree':'threes'})
    fours = pd.DataFrame(df.groupby(['batter'])['isFour'].sum()).reset_index().
↪rename(columns = {'isFour':'fours'})
    sixes = pd.DataFrame(df.groupby(['batter'])['isSix'].sum()).reset_index().
↪rename(columns = {'isSix':'sixes'})

    df = pd.merge(innings, runs, on = 'batter').merge(balls, on = 'batter').
↪merge(dismissals, on = 'batter').merge(dots, on = 'batter').merge(ones, on =␣
↪'batter').merge(twos, on = 'batter').merge(threes, on = 'batter').
↪merge(fours, on = 'batter').merge(sixes, on = 'batter')

     #StrikeRate
    df['SR'] = df.apply(lambda x: 100*(x['runs']/x['balls']), axis = 1)

    #runs per innings
    df['RPI'] = df.apply(lambda x: x['runs']/x['innings'], axis = 1)

    #balls per dismissals
    df['BPD'] = df.apply(lambda x: balls_per_dismissals(x['balls'],␣
↪x['dismissals']), axis = 1)

    #balls per boundary
    df['BPB'] = df.apply(lambda x: balls_per_boundary(x['balls'], (x['fours'] +␣
↪x['sixes'])), axis = 1)

    return df
```

[ ]:
```
pp_df = phasesOfplay(deliveries,'Powerplay')
mid_df = phasesOfplay(deliveries, 'Middle_overs')
dth_df = phasesOfplay(deliveries, 'Death_overs')
```

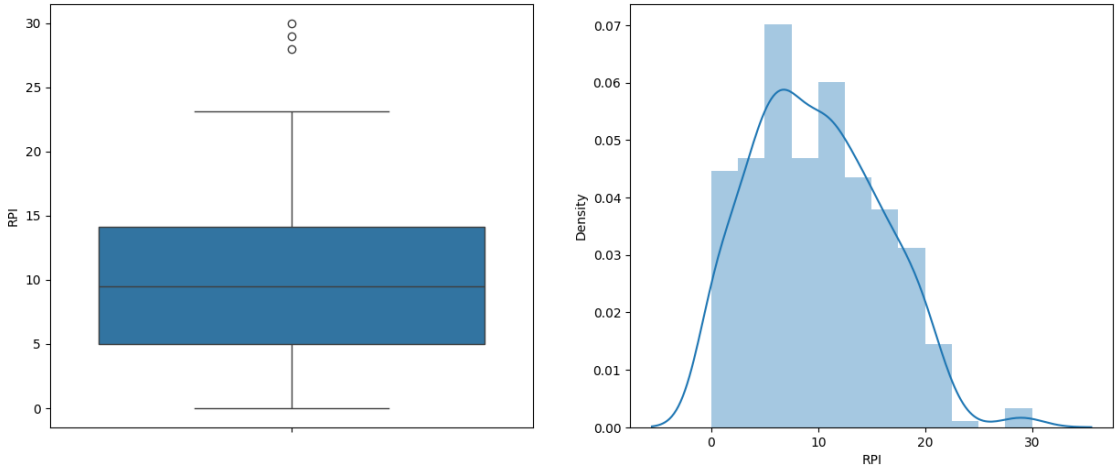
[ ]:
```
pp_df.head()
```

[ ]:
```
           batter  innings  runs  balls  dismissals  dots  ones  twos  threes
fours  sixes         SR   RPI   BPD    BPB
0  A Ashish Reddy        1     5      7           1     5     1     0       0
1      0  71.428571   5.0   7.0   7.00
1        A Badoni        4    16     27           2    17     8     0       0
2      0  59.259259   4.0  13.5  13.50
2        A Chopra        5    29     45           2    28    13     0       0
4      0  64.444444   5.8  22.5  11.25
3      A Flintoff        1    15     16           0    11     2     0       1
1      1  93.750000  15.0  16.0   8.00
4       A Manohar        4    16     18           1     8     8     0       0
2      0  88.888889   4.0  18.0   9.00
```

[ ]:
```
plt.figure(figsize = (12,8))

plt.subplot(221)
pp_df.SR.hist()
plt.title('SR Distribution')

plt.subplot(222)
pp_df.RPI.hist()
plt.title('RPI Distribution')

plt.subplot(223)
pp_df.BPD.hist()
plt.title('BPD Distribution')

plt.subplot(224)
pp_df.BPB.hist()
plt.title('BPB Distribution')

plt.show()
```



[ ]:
```
plt.figure(figsize = (15, 6))

plt.subplot(121)
sns.boxplot(pp_df['RPI'])

plt.subplot(122)
sns.distplot(pp_df['RPI'])
plt.show()
```



[ ]:
```
np.percentile(pp_df['RPI'], 25), np.percentile(pp_df['RPI'], 50),np.
↪percentile(pp_df['RPI'], 75)
```

[ ]:
```
(5.0, 9.5, 14.14945652173913)
```

[ ]:
```
wt_sr, wt_rpi, wt_bpd, wt_bpb = 0.38,0.25,0.12,0.26
```

[ ]:
```
pp_df['calc_SR'] = pp_df['SR'].apply(lambda x: x*x)
pp_df['calc_RPI'] = pp_df['RPI'].apply(lambda x: x*x)
pp_df['calc_BPD'] = pp_df['BPD'].apply(lambda x: x*x)
pp_df['calc_BPB'] = pp_df['BPB'].apply(lambda x: x*x)

sq_sr, sq_rpi, sq_bpd, sq_bpb = np.sqrt(pp_df[['calc_SR','calc_RPI',␣
↪'calc_BPD', 'calc_BPB']].sum(axis = 0))

pp_df['calc_SR'] = pp_df['calc_SR'].apply(lambda x: x/sq_sr)
pp_df['calc_RPI'] = pp_df['calc_RPI'].apply(lambda x: x/sq_rpi)
pp_df['calc_BPD'] = pp_df['calc_BPD'].apply(lambda x: x/sq_bpd)
pp_df['calc_BPB'] = pp_df['calc_BPB'].apply(lambda x: x/sq_bpb)

pp_df['calc_SR'] = pp_df['calc_SR'].apply(lambda x: x*wt_sr)
pp_df['calc_RPI'] = pp_df['calc_RPI'].apply(lambda x: x*wt_rpi)
pp_df['calc_BPD'] = pp_df['calc_BPD'].apply(lambda x: x*wt_bpd)
pp_df['calc_BPB'] = pp_df['calc_BPB'].apply(lambda x: x*wt_bpb)

best_sr, worst_sr = max(pp_df['calc_SR']), min(pp_df['calc_SR'])
best_rpi, worst_rpi = max(pp_df['calc_RPI']), min(pp_df['calc_RPI'])
best_bpd, worst_bpd = max(pp_df['calc_BPD']), min(pp_df['calc_BPD'])
best_bpb, worst_bpb = min(pp_df['calc_BPB']), max(pp_df['calc_BPB'])
```

[ ]:
```
pp_df['dev_best_SR'] = pp_df['calc_SR'].apply(lambda x: (x-best_sr)*(x-best_sr))
pp_df['dev_best_RPI'] = pp_df['calc_RPI'].apply(lambda x:␣
↪(x-best_rpi)*(x-best_rpi))
pp_df['dev_best_BPD'] = pp_df['calc_BPD'].apply(lambda x:␣
↪(x-best_bpd)*(x-best_bpd))
pp_df['dev_best_BPB'] = pp_df['calc_BPB'].apply(lambda x:␣
↪(x-best_bpb)*(x-best_bpb))

pp_df['dev_best_sqrt'] = pp_df.apply(lambda x: x['dev_best_SR'] +␣
↪x['dev_best_RPI'] + x['dev_best_BPD'] + x['dev_best_BPB'], axis = 1)

pp_df['dev_worst_SR'] = pp_df['calc_SR'].apply(lambda x:␣
↪(x-worst_sr)*(x-worst_sr))
```

```
pp_df['dev_worst_RPI'] = pp_df['calc_RPI'].apply(lambda x:␣
 ↪(x-worst_rpi)*(x-worst_rpi))
pp_df['dev_worst_BPD'] = pp_df['calc_BPD'].apply(lambda x:␣
 ↪(x-worst_bpd)*(x-worst_bpd))
pp_df['dev_worst_BPB'] = pp_df['calc_BPB'].apply(lambda x:␣
 ↪(x-worst_bpb)*(x-worst_bpb))

pp_df['dev_worst_sqrt'] = pp_df.apply(lambda x: x['dev_worst_SR'] +␣
 ↪x['dev_worst_RPI'] + x['dev_worst_BPD'] + x['dev_worst_BPB'], axis =1)
```

[ ]:
```
pp_df['score'] = pp_df.apply(lambda x: x['dev_worst_sqrt']/(x['dev_worst_sqrt']␣
 ↪+ x['dev_best_sqrt']), axis = 1)
```

[ ]:
```
pp_df[['batter', 'score']].head()
```

[ ]:
```
           batter     score
0  A Ashish Reddy  0.018854
1        A Badoni  0.013847
2        A Chopra  0.015849
3      A Flintoff  0.027478
4       A Manohar  0.024306
```

[ ]:
```
pp_df =pp_df[pp_df.innings >= 20]
```

[ ]:
```
pp_df[[ 'batter','innings', 'runs', 'balls', 'dismissals', 'fours', 'sixes',␣
 ↪'SR', 'BPB', 'score']].sort_values(['score'], ascending = False).
 ↪reset_index(drop = True).head(5)
```

[ ]:
```
        batter  innings  runs  balls  dismissals  fours  sixes          SR
BPB     score
0    SP Narine       44   688    423          38     86     40  162.647754
3.357143  0.158987
1  YBK Jaiswal       37   808    550          19    113     31  146.909091
3.819444  0.107503
2      CA Lynn       40   875    623          19    103     45  140.449438
4.209459  0.091021
3  JM Bairstow       36   747    537          19     91     31  139.106145
4.401639  0.087271
4     V Sehwag      103  1785   1284          69    250     53  139.018692
4.237624  0.086096
```

[ ]:
```
#THE BEST PINCH HITTER INSIDE PP IN THE IPL SO FAR (MIN 20 INNINGS) TILL 2023␣
 ↪IPL FINAL IS SUNIL NARINE WITH SCORE OF 0.15.
```