BASEBALL GAME ATTENDANCE PREDICTOR

- From a marketing perspective, I took a look at regular season baseball game data from 2000 - 2012 to predict if a stadium reached 'capacity' seats sold, and thus made a healthy profit, in year 2013.

- Assumptions
- Stadium seats are ‘filled‘ if attendance is at least 90% of the past maximum occupancy per stadium - then, I say, the game had a good showing and made a healthy profit.

DATA SOURCE

- Retrosheet.org is awesome.
- The information used here was obtained free of charge from and is copyrighted by Retrosheet. Interested parties may contact Retrosheet at "www.retrosheet.org".
- Regular season game data:

	Date	Day	Visitors	VGameNumber	Home	HGameNumber	VScore	HScore	DayNight	ParkID	Attendance	VHRs	HHRs
0	20000329	Wed	CHN	1	NYN	1	5	3	N	TOK01	55000	2	1
1	20000330	Thu	NYN	2	CHN	2	5	1	N	TOK01	55000	1	0
2	20000403	Mon	COL	1	ATL	1	0	2	D	ATL02	42255	0	2
3	20000403	Mon	MIL	1	CIN	1	3	3	D	CIN08	55596	0	1
4	20000403	Mon	SFN	1	FLO	1	4	6	N	MIA01	35101	1	0
5	20000403	Mon	LAN	1	MON	1	10	4	N	MON02	51249	2	2

DERIVATION OF ISPROFIT COLUMN

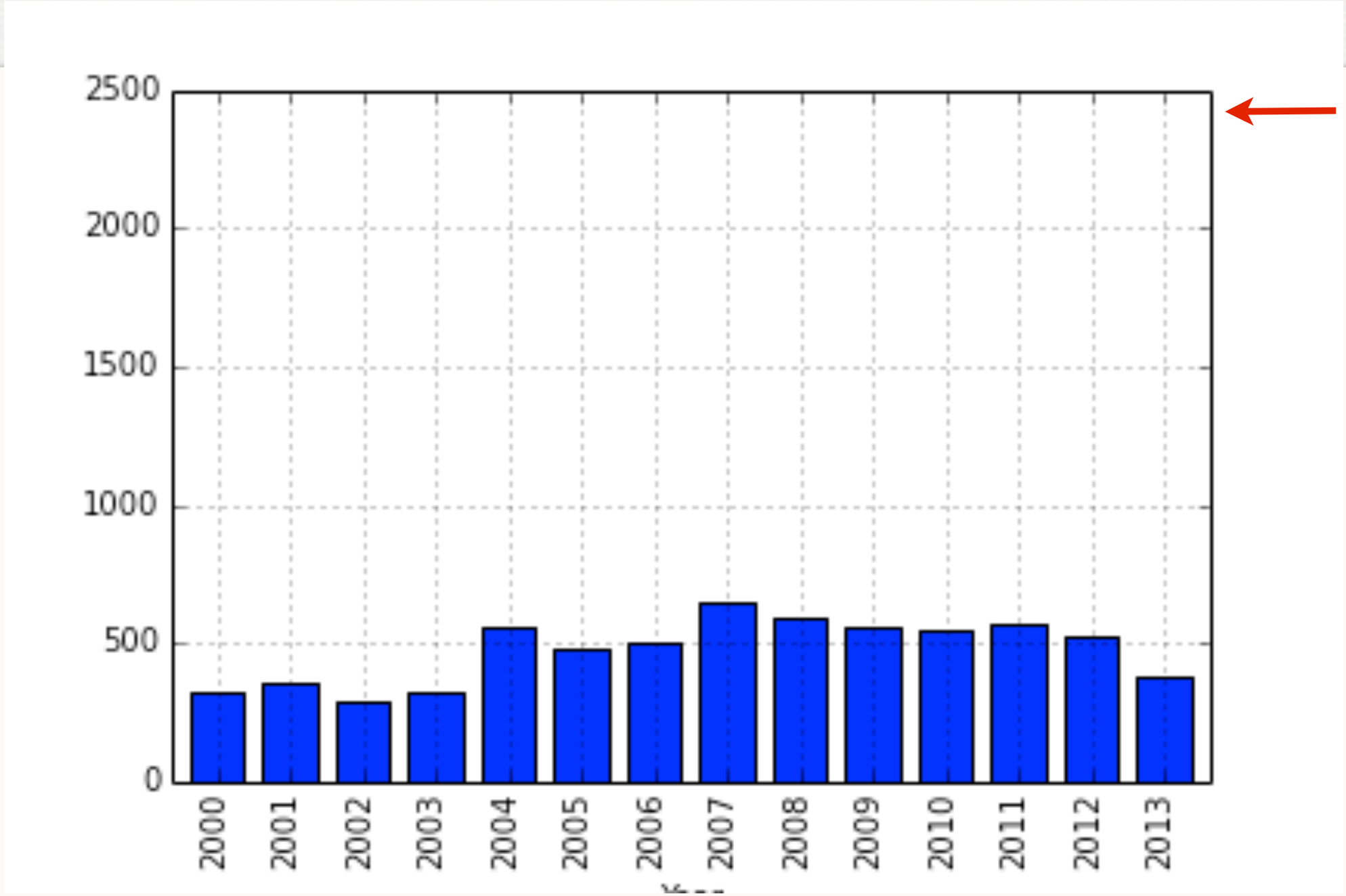
- bbdf['PercAttn'] = [bbdf.Attendance[i] / (bbdf['Attendance'].groupby(bbdf.ParkID== bbdf.ParkID[i]).max()) for i in range(0,len(bbdf))]

```
ParkID
False     61707
True      38540
dtype: float64
```

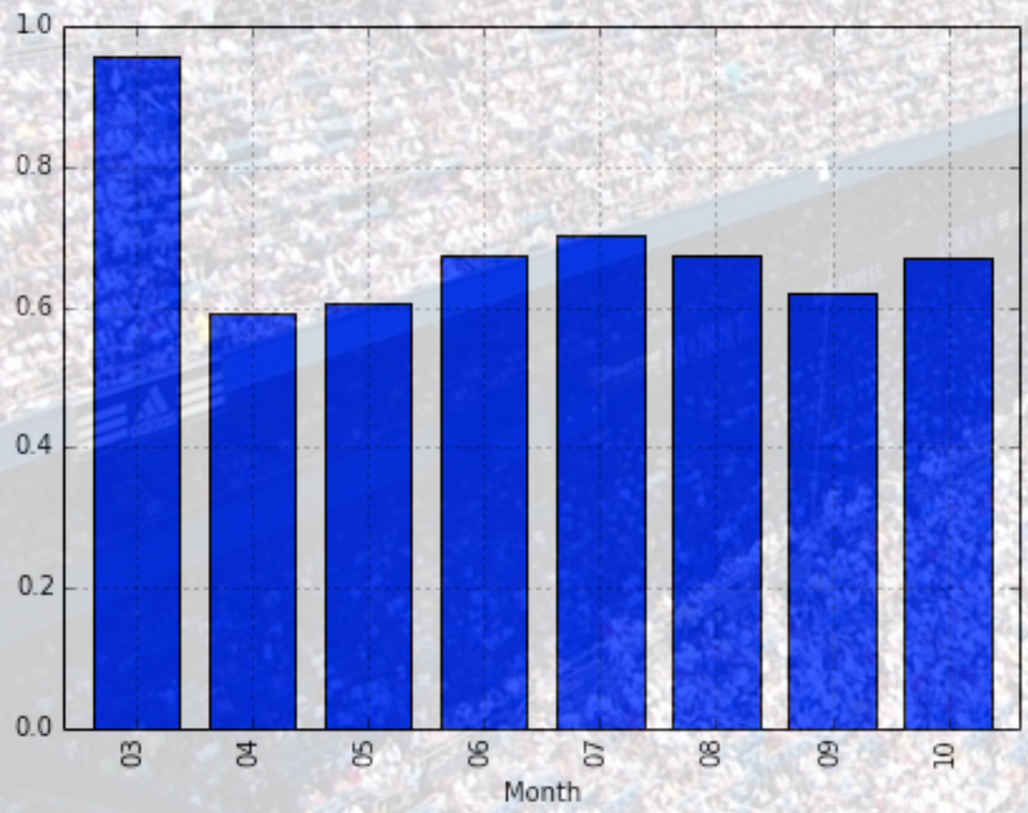
- bbdf['PercAttn'] = [float(str(bbdf['PercAttn'] [i]).split()[4]) for i in range(0,len(bbdf))]

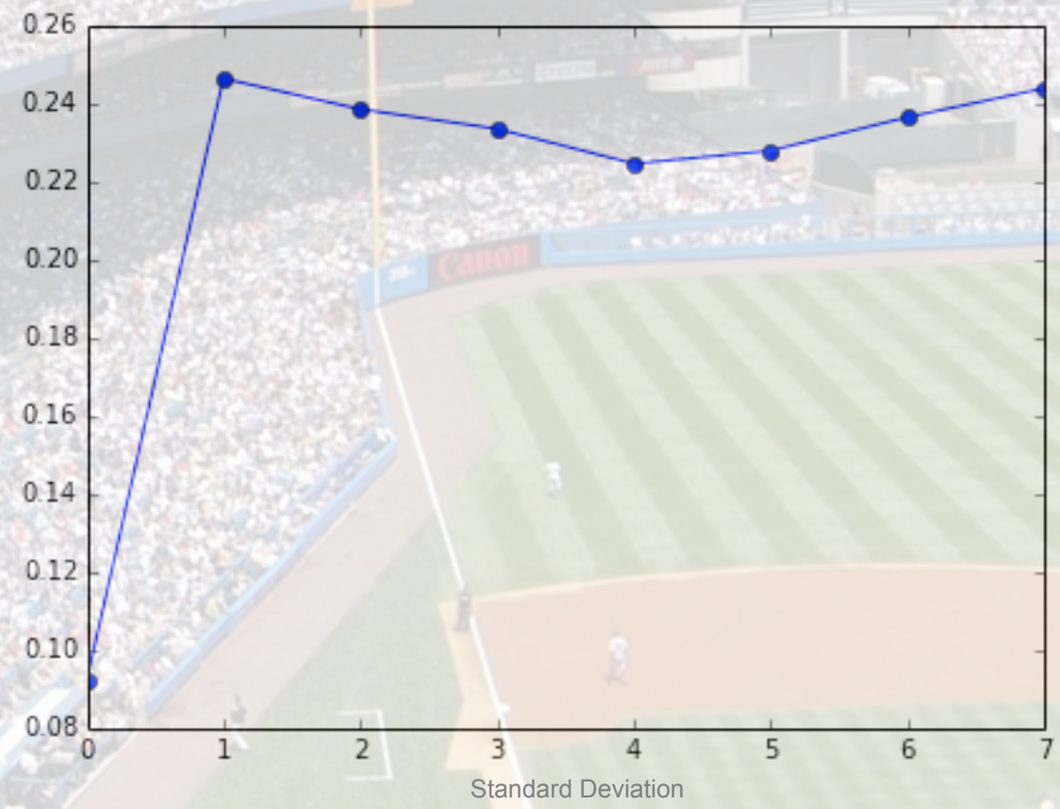
- bbdf['IsProfit'] = [1 if bbdf.PercAttn[i]>.9 else 0 for i in range(0,len(bbdf))]

COUNT OF PROFITABLE GAMES BY YEAR

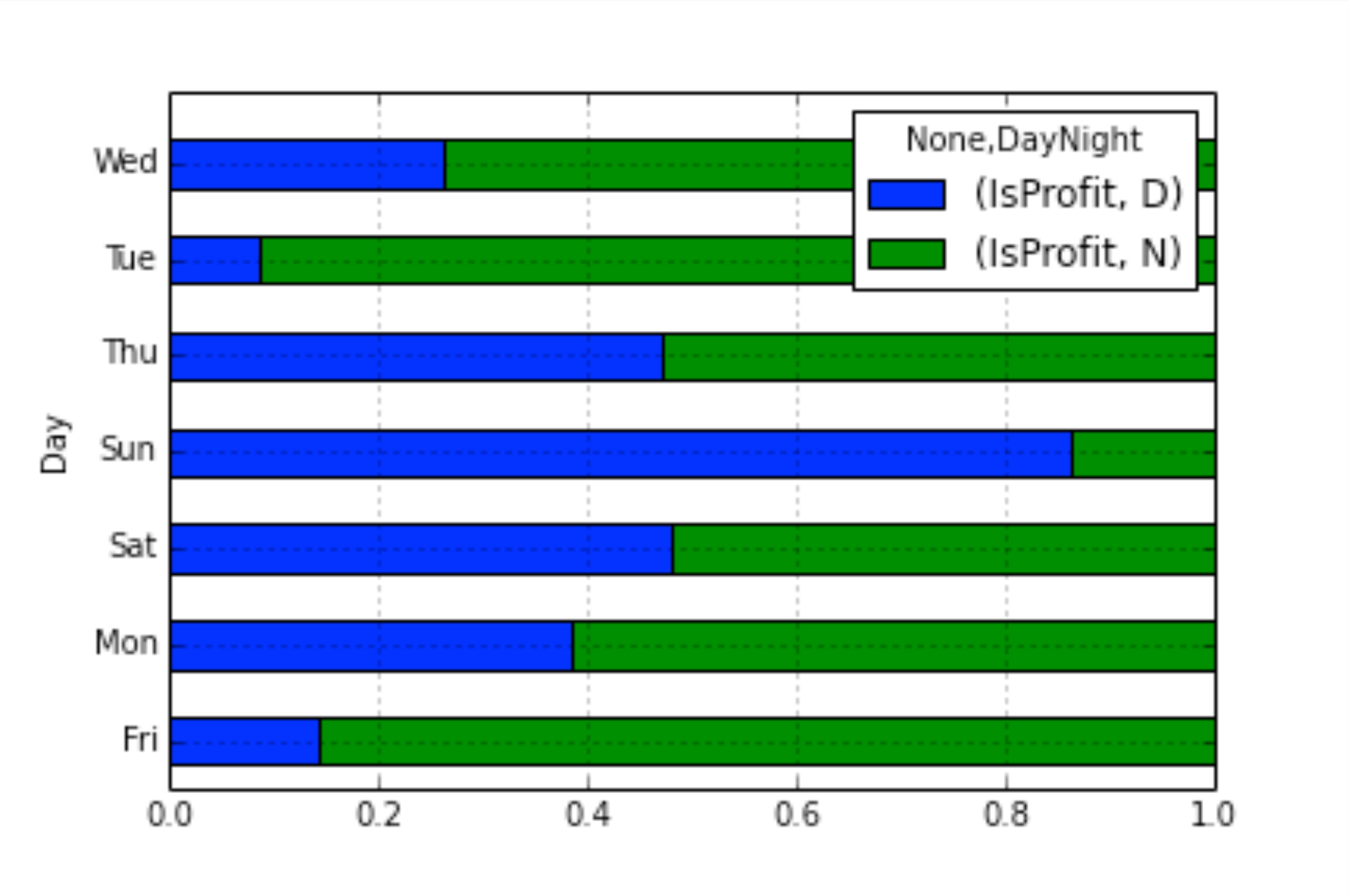


MEDIAN PERCENT ATTENDANCE BY MONTH





DAY OR NIGHT GAMES BY DAY OF WEEK



DATA SHAPE FOR LOGISTIC REGRESSION CLASSIFIER

	IsProfit	~~Year~~	NightGame	Fri	Mon	Sat	Sun	Thu	Tue	Wed	03	04	05	06	07	08	09	10
0	1	~~2000~~	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
1	1	~~2000~~	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
2	0	~~2000~~	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
3	1	~~2000~~	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
4	0	~~2000~~	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0

Predicting

- Year is not used in classifier and is there only to split out the 2013 as the test data to match the prediction.

Accuracy Score on Training Data = 80.08%

```
(array(['NightGame', 'Fri', 'Mon', 'Sat', 'Sun', 'Thu', 'Tue', 'Wed', '03',
        '04', '05', '06', '07', '08', '09', '10'], dtype=object),
 array([[-0.55662725,  0.3426472 , -0.07197398,  0.54976186, -0.1833822 ,
         -0.43499443, -0.36703733, -0.48627613,  1.76993844, -0.61750127,
         -0.53565465, -0.14351234, -0.07644627, -0.27662125, -0.55035451,
         -0.22110317]]))
```

TESTING AGAINST 2013 DATA

```
In [50]: did_it_work = [1 if predicted_Y[i] == test_set_Y[i+31580] else 0 for i in range(0,len(predicted_Y))]

In [51]: did_it_work.count(1), len(did_it_work), (did_it_work.count(1)*1.00 / len(did_it_work) * 100)

Out[51]: (2048, 2431, 84.24516659810777)
```

VS.

```
In [53]: clf.score(test_set_X,test_set_Y)

Out[53]: 0.84245166598107779
```

- Conclusion
- Using only the month, day of the week and whether the game is a day or night game predicts whether or not the stadium makes a healthy profit 80-85% of the time!