Employee Performance Analysis

DAT7 Capstone Project

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Background Knowledge About The Dataset

Business & Goal of this project

- Analyze the Employee dataset

- Identify key factors affecting performance ratings

- Accurately predict performance outcomes

- Inform HR decision-making

- Boost employee performance

- Support organizational growth.

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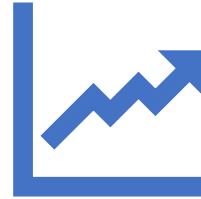*"What do you mean you don't know what I've been up to recently?! Just follow me on Twitter!"*
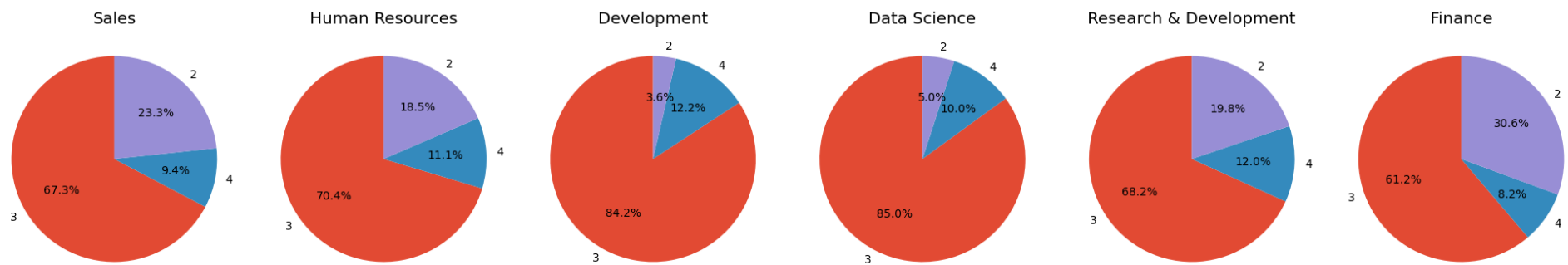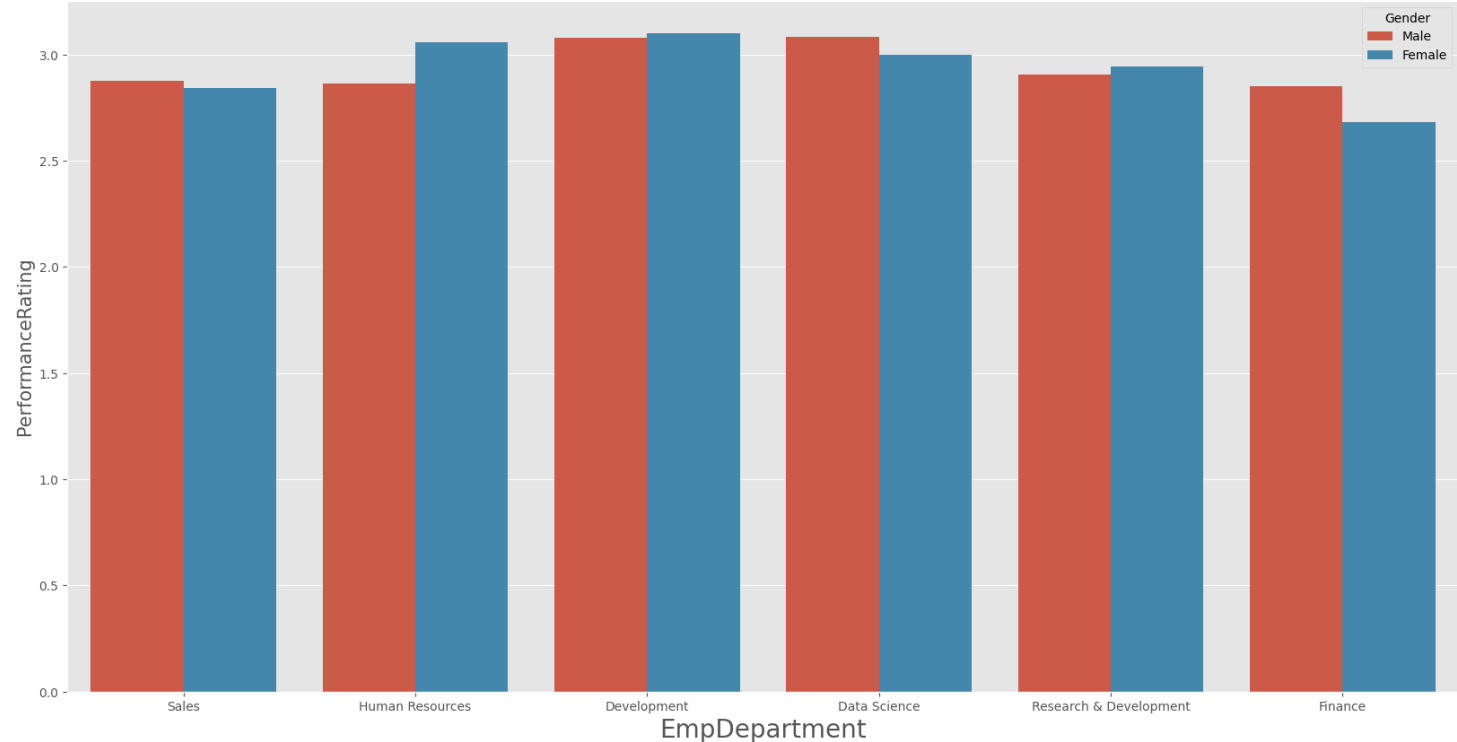
Key Findings

Department-wise Performance Rating

Top 3 Determinants Impacting Employee Performance
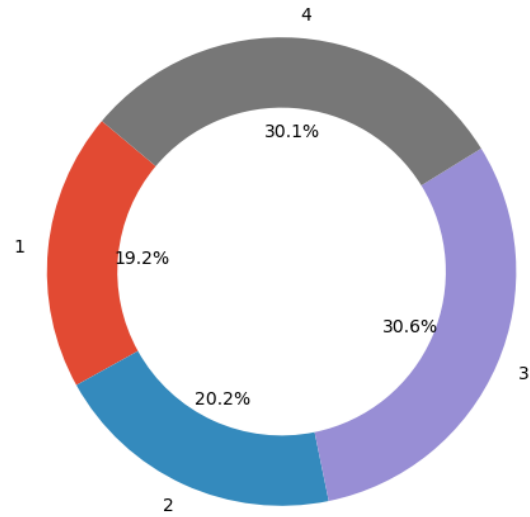
Key Takeaways for HR and Organizations

Department-wise Performance Rating

1. Low
2. Good
3. **Excellent** - All the departments have almost 60-80% excellent employee performance rate
4. Outstanding

Distribution of Employee Environment Satisfaction

(Donut chart showing: 4 = 30.1%, 3 = 30.6%, 2 = 20.2%, 1 = 19.2%)

```
In [22]: # 2.Employee last salary hike percent
         pd.crosstab(df['EmpLastSalaryHikePercent'],df['PerformanceRating'],margins=True)
```

Out[22]:

PerformanceRating	2	3	4	All
EmpLastSalaryHikePercent				
11	28	140	1	169
12	30	123	2	155
13	27	138	3	168
14	28	140	4	172
15	11	67	4	82
16	12	54	2	68
17	9	55	3	67
18	10	63	0	73
19	10	51	2	63
20	9	14	27	50
21	4	6	24	34
22	7	13	27	47
23	4	2	15	21
24	2	5	11	18
25	3	3	7	13
All	194	874	132	1200

Relationship between Work-Life Balance and Performance Rating
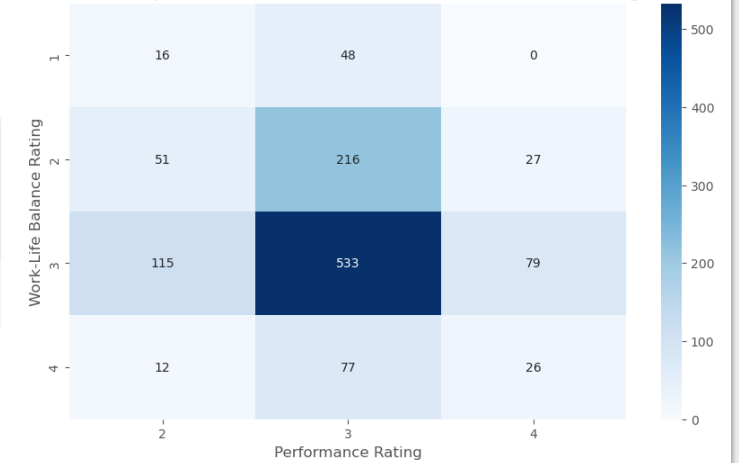
(Heatmap — Work-Life Balance Rating vs Performance Rating)

Work-Life Balance Rating \ Performance Rating	2	3	4
1	16	48	0
2	51	216	27
3	115	533	79
4	12	77	26

Top 3 Determinants Impacting Employee Performance

Key Takeaways for HR and Organizations

- **Focus on Employee Environment Satisfaction**
- **Review Compensation Regularly**
- **Promote Work-Life Balance**
- **Continuous Learning & Development**
- **Feedback Mechanism**
- **Data-Driven Decision Making**
- **Promote Collaboration**
- **Recognition and Reward System**
- **Career Path Clarity**

Regression Analysis Insights

Test RMSE: 0.3836557985067259

Out[104... OLS Regression Results

Dep. Variable:	PerformanceRating	**R-squared:**	0.532
Model:	OLS	**Adj. R-squared:**	0.493
Method:	Least Squares	**F-statistic:**	13.68
Date:	Fri, 06 Oct 2023	**Prob (F-statistic):**	3.40e-96
Time:	21:48:07	**Log-Likelihood:**	-351.30
No. Observations:	900	**AIC:**	842.6
Df Residuals:	830	**BIC:**	1179.
Df Model:	69		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	2.0227	0.160	12.629	0.000	1.708	2.337
Age	-0.0014	0.002	-0.793	0.428	-0.005	0.002
DistanceFromHome	-0.0031	0.002	-1.940	0.053	-0.006	3.59e-05
EmpEducationLevel	0.0191	0.013	1.522	0.129	-0.006	0.044
EmpHourlyRate	-0.0015	0.001	-2.472	0.014	-0.003	-0.000
EmpJobInvolvement	0.0059	0.019	0.316	0.752	-0.031	0.042
EmpJobLevel	-0.0002	0.019	-0.008	0.993	-0.037	0.037
EmpJobSatisfaction	-0.0029	0.012	-0.247	0.805	-0.026	0.020
NumCompaniesWorked	-0.0003	0.006	-0.056	0.956	-0.012	0.011
TotalWorkExperienceInYears	0.0010	0.003	0.308	0.758	-0.005	0.007
TrainingTimesLastYear	-0.0089	0.018	-0.482	0.630	-0.045	0.027
ExperienceYearsAtThisCompany	0.0026	0.005	0.546	0.585	-0.007	0.012

```python
print("Best_score: %f using %s" % (grid_result2.best_score_, grid_result2.best_params_))
```

Best_score: 0.840673 using {'solver': 'liblinear', 'penalty': 'l2', 'C': 1.0}

In [119...
```python
LR2 = LogisticRegression(C=0.1,penalty='l2',solver='newton-cg')
LR2.fit(x_sm,y_sm)
y_predict_lr2 = LR.predict(x_test)
accuracy_score(y_test,y_predict_lr)
```

Out[119... 0.8526048284625158

In [120...
```python
from sklearn.metrics import classification_report,confusion_matrix
print("Confusion Matrix----",confusion_matrix(y_test,y_predict_lr2))
print("Classification Report----",classification_report(y_test,y_predict_lr2))
```

```
Confusion Matrix---- [[246  15  17]
 [ 29 191  30]
 [  4  21 234]]
Classification Report----              precision    recall  f1-score   support

           2       0.88      0.88      0.88       278
           3       0.84      0.76      0.80       250
           4       0.83      0.90      0.87       259

    accuracy                           0.85       787
   macro avg       0.85      0.85      0.85       787
weighted avg       0.85      0.85      0.85       787
```

Thank You

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