

MECE 6397: Project 3

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Introduction

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My code for this project is included in three ways:

- Embedded in portions with relevant discussion
- Uploaded as part of this deliverable on Canvas
- Available on a public github here: <https://github.com/Sam-v6/mece-6397-doe/tree/main/project3>

Part 1: Dataset EDA

Ingesting the data and then performing some basic data analysis, we can get statistics as shown following the code excerpt that shows the mean, standard deviations, min, max, and frequency of the different values for the different categories of data. I've also provided the following plots:

- Histograms of the age, salary, awards, and ratings
- Bar charts of department, location, recruiting type, and education
- Box and whisker plots of age, salary, awards, and ratings

This overall data analysis helps us understand the trends of the data and overall composition of the data prior to applying SVM fit

In []:

```
"""
Purpose: Project 3 - Analysis on sample data with F test and SVM classification
Author: Syam Evani
"""
```

```
# Standard imports
import os
import time

# Additional imports
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score, classification_report
import matplotlib.pyplot as plt
from sklearn.preprocessing import StandardScaler
from sklearn.feature_selection import SelectKBest, f_classif
from scipy.stats import f

# Local imports
# None

#-----
# Data collection and analysis
#-----
# Assuming you have a dataset with features and target variable (customer satisfaction)
data = pd.read_csv(os.path.join(os.getenv('USERPROFILE'), 'repos', 'mece-6397-doe', 'p
sample_number = len(data)

# Generate summary statistics
summary_stats = data.describe(include='all')
print(summary_stats)

# Histograms
numerical_columns = ['age', 'salary', 'rating', 'awards']
fig, axs = plt.subplots(2, 2, figsize=(12, 8))
for i, col in enumerate(numerical_columns):
    axs[i//2, i%2].hist(data[col], bins=10, edgecolor='black')
    axs[i//2, i%2].set_title(f'Histogram of {col.capitalize()}')
    axs[i//2, i%2].set_xlabel(col.capitalize())
    axs[i//2, i%2].set_ylabel('Frequency')
plt.tight_layout()
plt.savefig(os.path.join(os.getenv('USERPROFILE'), 'repos', 'mece-6397-doe', 'proje
    
```

```
# Bar plots
categorical_columns = ['Dept', 'location', 'education', 'recruitment_type']
fig, axs = plt.subplots(2, 2, figsize=(12, 8))
for i, col in enumerate(categorical_columns):
    data[col].value_counts().plot(kind='bar', ax=axs[i//2, i%2], edgecolor='black')
    axs[i//2, i%2].set_title(f'Bar Plot of {col.capitalize()}')
    axs[i//2, i%2].set_xlabel(col.capitalize())
    axs[i//2, i%2].set_ylabel('Count')
plt.tight_layout()
plt.savefig(os.path.join(os.getenv('USERPROFILE'), 'repos', 'mece-6397-doe', 'proje
    
```

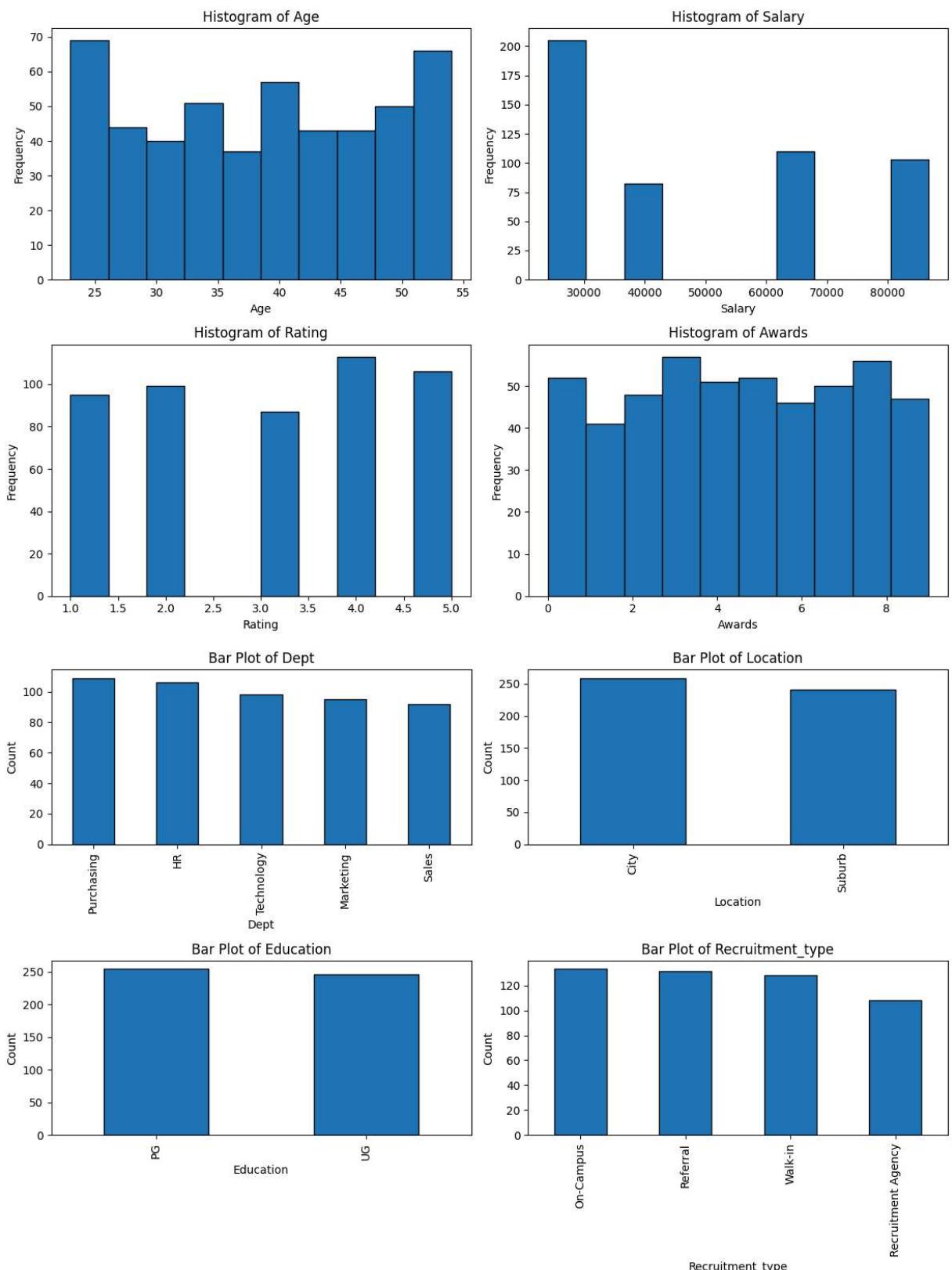
```
# Box & whisker plots
fig, axs = plt.subplots(2, 2, figsize=(12, 8))
for i, col in enumerate(numerical_columns):
    axs[i//2, i%2].boxplot(data[col])
    axs[i//2, i%2].set_title(f'Box Plot of {col.capitalize()}')
    
```

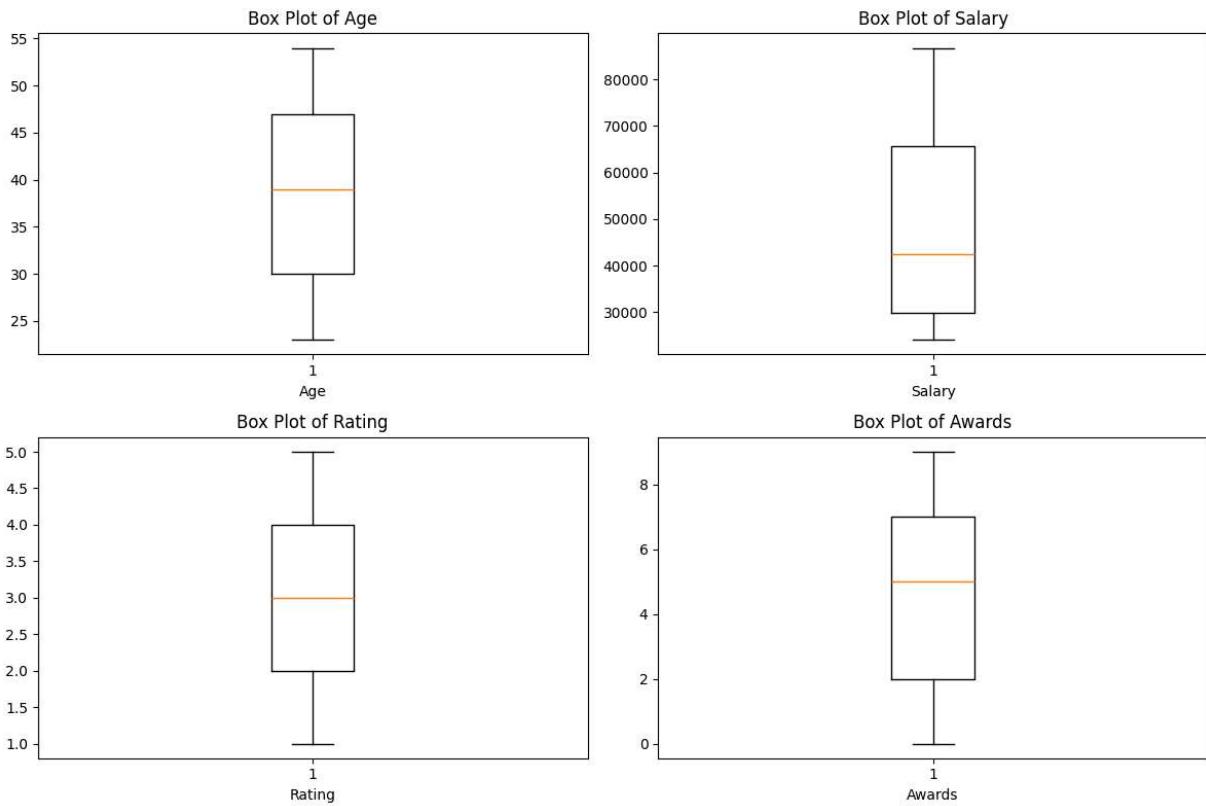
```

    axs[i//2, i%2].set_xlabel(col.capitalize())
plt.tight_layout()
plt.savefig(os.path.join(os.getenv('USERPROFILE'), 'repos', 'mece-6397-doe', 'proje

```

	emp_id	age	Dept	location	education	recruitment_type	\
count	500	500.000000	500	500	500	500	500
unique	499	NaN	5	2	2	4	
top	MKT7287	NaN	Purchasing	City	PG	On-Campus	
freq	2	NaN	109	259	254	133	
mean	NaN	38.610000	NaN	NaN	NaN	NaN	
std	NaN	9.438648	NaN	NaN	NaN	NaN	
min	NaN	23.000000	NaN	NaN	NaN	NaN	
25%	NaN	30.000000	NaN	NaN	NaN	NaN	
50%	NaN	39.000000	NaN	NaN	NaN	NaN	
75%	NaN	47.000000	NaN	NaN	NaN	NaN	
max	NaN	54.000000	NaN	NaN	NaN	NaN	
	job_level	rating	onsite	awards	certifications		\
count	500.000000	500.000000	500.000000	500.000000	500.000000		
unique	NaN	NaN	NaN	NaN	NaN		
top	NaN	NaN	NaN	NaN	NaN		
freq	NaN	NaN	NaN	NaN	NaN		
mean	3.032000	3.072000	0.466000	4.538000	0.496000		
std	1.423738	1.425089	0.499342	2.853215	0.500485		
min	1.000000	1.000000	0.000000	0.000000	0.000000		
25%	2.000000	2.000000	0.000000	2.000000	0.000000		
50%	3.000000	3.000000	0.000000	5.000000	0.000000		
75%	4.000000	4.000000	1.000000	7.000000	1.000000		
max	5.000000	5.000000	1.000000	9.000000	1.000000		
	salary	satisfied					\
count	500.000000	500.000000					
unique	NaN	NaN					
top	NaN	NaN					
freq	NaN	NaN					
mean	50416.056000	0.526000					
std	23671.392661	0.499824					
min	24076.000000	0.000000					
25%	29805.000000	0.000000					
50%	42419.000000	1.000000					
75%	65715.000000	1.000000					
max	86750.000000	1.000000					





Part 2: Dataset preparation

I've prepared the dataset with sample code which replaces the string values (i.e. department names, location, education, recruitment type) with numerical values. I've then standardized the dataset with the sample code to ensure that the different model categories are evaluated fairly (by standardizing the data with similar ranges and standard deviations)

```
In [ ]: #-----
# Prepare the dataset
#-----

# Converting categorical to numerical values for those columns
cleanup_nums = {"Dept": {"Purchasing": 1, "HR": 2, "Technology": 3, "Marketing": 4,
                        "location": {"City": 1, "Suburb": 2},
                        "education": {"PG": 1, "UG": 2},
                        "recruitment_type": {"On-Campus": 1, "Referral": 2, "Walk-in": 3, "Recruited": 4}},
                "Experience": {"Less than 1 year": 1, "1-4 years": 2, "More than 5 years": 3, "5-9 years": 4, "10+ years": 5} }

# Replace the values in the data frame
data = data.replace(cleanup_nums)

# Assuming the last column is the target variable
X = data.iloc[:, :-1] # features
y = data.iloc[:, -1] # target

# Create a StandardScaler object
scaler = StandardScaler()
```

```
# Fit and transform the data
X_normalized = scaler.fit_transform(X)
print(X_normalized)

[[ -1.12522746 -0.64316174  1.03667198 ... -1.24124642 -0.99203175
  1.5364678 ]
 [ 1.20794918  0.0636094   1.03667198 ... -0.89041363  1.00803226
 -0.33817466]
 [ 0.46557479  0.0636094   1.03667198 ... -0.89041363 -0.99203175
  0.64695247]
 ...
 [-0.48890656  0.77038055 -0.96462528 ... -0.89041363 -0.99203175
 -1.11385232]
 [-1.33733443  0.0636094   -0.96462528 ... -1.24124642  1.00803226
 -0.87158784]
 [-1.33733443  0.0636094   -0.96462528 ... -0.53958084 -0.99203175
 -0.33817466]]
```

Part 3: F-testing and initial results discussion

Note, I have combined my code for parts 3-6 in a large loop that iterates on the number of features and kernel type for the SVM model. This full code is provided below but I will provide some excerpts that speak to the relevant portions.

To perform the F-testing, I used the sample code that was automatically set to include 10 feature groups as well as the critical F calculation. Looking at the results we get the following:

Feature	F-score	P-value
age	0.00	0.9760
Dept	1.57	0.2107
location	0.34	0.5625
education	0.47	0.4940
recruitment_type	0.12	0.7303
job_level	0.18	0.6704
rating	5.19	0.0233
onsite	0.89	0.3448
awards	0.12	0.7283
certifications	0.50	0.4815
salary	0.00	0.9588

The critical F-value for these 10 groups (with 500 samples) and 95% confidence was 1.90. Given the rankings of F-scores, the actual 10 selected features were:

- department
- location
- education
- recruitment type
- job level
- rating
- awards
- salary
- onsite

With an overall accuracy of 44%.

Note that all factors (except performance rating) have high P-values and F-scores being much lower than the critical F-value, indicating that if just evaluated alone, these parameters are poor predictors of job satisfaction. Performance rating has a P-value below 0.05 (indicating statistical significance) and a F-score above the critical F-value, overall indicating that rating is a strong predictor of job satisfaction.

Part 4: SVM fitting by adding features

As noted, code implementation for how I incrementally added features into the SVM model by F-scores is shown below (I simply iterate from 1 to 11 and allow the best F score features to be added into the SVM fit model). If we keep the linear kernel and allow the iteration of the SVM model from 1 to 11 features we would get an output like something below:

```
In [ ]: ## 1 Group
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 1 groups and 500 samples at 95.0% confidence level is: nan
Accuracy: 0.5
```

	precision	recall	f1-score	support
0	0.48	0.66	0.55	47
1	0.54	0.36	0.43	53
accuracy			0.50	100
macro avg	0.51	0.51	0.49	100
weighted avg	0.51	0.50	0.49	100

Selected features: Index(['rating'], dtype='object')

2 Groups

```
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 2 groups and 500 samples at 95.0% confidence level is: 3.86019
Accuracy: 0.5
```

	precision	recall	f1-score	support
0	0.48	0.66	0.55	47
1	0.54	0.36	0.43	53
accuracy			0.50	100
macro avg	0.51	0.51	0.49	100
weighted avg	0.51	0.50	0.49	100

Selected features: Index(['Dept', 'rating'], dtype='object')

3 Groups

```
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 3 groups and 500 samples at 95.0% confidence level is: 3.01386
Accuracy: 0.5
```

	precision	recall	f1-score	support
0	0.47	0.47	0.47	47
1	0.53	0.53	0.53	53
accuracy			0.50	100

macro avg	0.50	0.50	0.50	100
weighted avg	0.50	0.50	0.50	100

Selected features: Index(['Dept', 'rating', 'onsite'], dtype='object')

4 Groups

Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 4 groups and 500 samples at 95.0% confidence level is: 2.62287
 Accuracy: 0.51

	precision	recall	f1-score	support
0	0.48	0.47	0.47	47
1	0.54	0.55	0.54	53
accuracy			0.51	100
macro avg	0.51	0.51	0.51	100
weighted avg	0.51	0.51	0.51	100

Selected features: Index(['Dept', 'rating', 'onsite', 'certifications'], dtype='object')

5 Groups

Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 5 groups and 500 samples at 95.0% confidence level is: 2.38994
 Accuracy: 0.5

	precision	recall	f1-score	support
0	0.46	0.40	0.43	47
1	0.53	0.58	0.55	53
accuracy			0.50	100
macro avg	0.49	0.49	0.49	100
weighted avg	0.50	0.50	0.50	100

Selected features: Index(['Dept', 'education', 'rating', 'onsite', 'certifications'])

6 Groups

```

Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 6 groups and 500 samples at 95.0% confidence level is: 2.23226
Accuracy: 0.47
      precision    recall   f1-score   support
      0       0.43     0.43     0.43      47
      1       0.50     0.51     0.50      53
accuracy                      0.47      100
macro avg        0.47     0.47     0.47      100
weighted avg     0.47     0.47     0.47      100

Selected features: Index(['Dept', 'location', 'education', 'rating', 'onsite', 'certifications'], dtype='object')

## 7 Groups
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 7 groups and 500 samples at 95.0% confidence level is: 2.11695
Accuracy: 0.49
      precision    recall   f1-score   support
      0       0.45     0.43     0.44      47
      1       0.52     0.55     0.53      53
accuracy                      0.49      100
macro avg        0.49     0.49     0.49      100
weighted avg     0.49     0.49     0.49      100

Selected features: Index(['Dept', 'location', 'education', 'job_level', 'rating', 'certifications'], dtype='object')

## 8 Groups
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940

```

```

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 8 groups and 500 samples at 95.0% confidence level is: 2.02818
Accuracy: 0.49

precision    recall   f1-score   support
0           0.46      0.45      0.45       47
1           0.52      0.53      0.52       53

accuracy          0.49      100
macro avg       0.49      0.49      0.49       100
weighted avg    0.49      0.49      0.49       100

Selected features: Index(['Dept', 'location', 'education', 'job_level', 'rating',
                           'awards', 'certifications'],
                           dtype='object')

## 9 Groups
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 9 groups and 500 samples at 95.0% confidence level is: 1.95725
Accuracy: 0.48

precision    recall   f1-score   support
0           0.44      0.43      0.43       47
1           0.51      0.53      0.52       53

accuracy          0.48      100
macro avg       0.48      0.48      0.48       100
weighted avg    0.48      0.48      0.48       100

Selected features: Index(['Dept', 'location', 'education', 'recruitment_type', 'job',
                           'rating', 'onsite', 'awards', 'certifications'],
                           dtype='object')

## 10 Groups
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704

```

```

Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 10 groups and 500 samples at 95.0% confidence level is: 1.8989
Accuracy: 0.44
      precision    recall   f1-score   support
0        0.39     0.34     0.36      47
1        0.47     0.53     0.50      53

accuracy                      0.44      100
macro avg                     0.43     0.43     0.43      100
weighted avg                  0.43     0.44     0.44      100

Selected features: Index(['Dept', 'location', 'education', 'recruitment_type', 'job
                           'rating', 'onsite', 'awards', 'certifications', 'salary'],
                           dtype='object')

## 11 Groups
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 11 groups and 500 samples at 95.0% confidence level is: 1.8500
Accuracy: 0.46
      precision    recall   f1-score   support
0        0.41     0.36     0.39      47
1        0.49     0.55     0.52      53

accuracy                      0.46      100
macro avg                     0.45     0.45     0.45      100
weighted avg                  0.46     0.46     0.46      100

Selected features: Index(['age', 'Dept', 'location', 'education', 'recruitment_type',
                           'rating', 'onsite', 'awards', 'certifications', 'salary'],
                           dtype='object')

## Groups and Accuracy
{'linear': {1: 0.5, 2: 0.5, 3: 0.5, 4: 0.51, 5: 0.5, 6: 0.47, 7: 0.49, 8: 0.49, 9:

```

Part 5: SVM Accuracy Discussion

For our linear kernel, varying the number of groups we get the following results for accuracy:

Groups	1	2	3	4	5	6	7	8	9	10	11
Accuracy	0.5	0.5	0.5	0.51	0.5	0.47	0.49	0.49	0.48	0.44	0.46

As evidenced above, we can see that early on with just a few groups we actually have the strongest accuracy prediction. This makes sense as we noted from initial F-score inspection that really only one factor (rating) was having any significant predictive impact on overall job satisfaction. The maximum accuracy value (just barely) is at 4 groups. However, past this, accuracy will decrease, dropping to a minimum of 46% (indicating we are more wrong than right) when including all 11 groups.

Part 6: Kernel Exploration & Analysis

In addition to linear, I also evaluated:

- Poly: projects data into a higher dimensional space with a polynomial function
- Radial Basis Function (RBF): Uses a gaussian function to project data into higher dimensions
- Sigmoid: Uses sigmoid function for projection

This is implemented in python code by iterating across these strings that with some conditional logic I make a unique SVM call for these different methods. As noted earlier, full code that shows is provided at the end of this notebook.

Accuracy results for different kernels across different groups are shown below:

Group	Linear	Poly	RBF	Sigmoid
1	0.5	0.49	0.47	0.5
2	0.5	0.49	0.49	0.47
3	0.5	0.49	0.48	0.42
4	0.51	0.53	0.49	0.5
5	0.5	0.56	0.55	0.45
6	0.47	0.59	0.55	0.39
7	0.49	0.56	0.51	0.4
8	0.49	0.58	0.51	0.39
9	0.48	0.55	0.47	0.48
10	0.44	0.6	0.48	0.53
11	0.46	0.55	0.47	0.46

As we can see above, polynomial approximations yield the best overall accuracy predictions when considering 10 groups and across the board do quite well. RBF performs slightly worse than a linear SVM fitting where as the sigmoid approximation really struggles with this data set, yielding the lowest overall accuracy predictions.

Code Implementation for Parts 3-6

```
In [ ]: #-----
# Iterate across k groups
#-----
# Init
accuracy_dict = {"linear": {}, "poly": {}, "rbf": {}, "sigmoid": {}}
kernel_list = ["linear", "poly", "rbf", "sigmoid"]

# Splitting data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X_normalized, y, test_size=0.2, random_state=42)

for kernel_type in kernel_list:
    for k_value in range(1,12):
        # Feature Selection using F-test
        # Select the top 'k' features
        selector = SelectKBest(score_func=f_classif, k=k_value)
        X_train_selected = selector.fit_transform(X_train, y_train)
        X_test_selected = selector.transform(X_test)

        #-----
        # F-testing
        #-----
        # Get the scores (F-values) computed by f_classif
        f_scores = selector.scores_

        # Optional: get p-values to understand significance
        p_values = selector.pvalues_

        # Print the feature names with their corresponding F-scores
        for feature, score, p_value in zip(X.columns, f_scores, p_values):
            print(f"Feature: {feature}, F-score: {score:.2f}, P-value: {p_value:.4f}")

        #-----
        # Calculate critical F value
        #-----
        def calculate_critical_f_value(num_groups, total_samples, confidence_level=0.95):
            # Calculate degrees of freedom
            df_between = num_groups - 1 # Degrees of freedom for the numerator (between groups)
            df_within = total_samples - num_groups # Degrees of freedom for the denominator (within groups)

            # Calculate the critical F-value at the specified confidence level
            critical_f_value = f.ppf(confidence_level, df_between, df_within)
            return critical_f_value

        # Example usage:
        num_groups = k_value
```

```
total_samples = sample_number
confidence_level = 0.95 # 95% confidence

critical_f_value = calculate_critical_f_value(num_groups, total_samples, co
print(f"Critical F-value for {num_groups} groups and {total_samples} sample

#-----
# SVM Classification
#-----
# Training the SVM classifier

if kernel_type == "linear":
    svm = SVC(kernel='linear')
elif kernel_type == "poly":
    svm = SVC(kernel='poly', degree=3, coef0=1, gamma='scale')
elif kernel_type == "rbf":
    svm = SVC(kernel='rbf', gamma='scale')
elif kernel_type == "sigmoid":
    svm = SVC(kernel='sigmoid', coef0=0.0, gamma='scale')
else:
    print("ERROR: wrong kernel type")

# Fit data
svm.fit(X_train_selected, y_train)

# Predicting the test results
y_pred = svm.predict(X_test_selected)

# Evaluating the model
accuracy = accuracy_score(y_test, y_pred)
print(f'Accuracy: {accuracy}')
print(classification_report(y_test, y_pred))

# Optionally, to see which features were selected:
selected_features_indices = selector.get_support(indices=True)
selected_features_names = X.columns[selected_features_indices]
print(f'Selected features: {selected_features_names}')

# Save results
accuracy_dict[kernel_type][k_value] = accuracy

# Print
print(accuracy_dict)
```

Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 1 groups and 500 samples at 95.0% confidence level is: nan
 Accuracy: 0.5

	precision	recall	f1-score	support
0	0.48	0.66	0.55	47
1	0.54	0.36	0.43	53
accuracy			0.50	100
macro avg	0.51	0.51	0.49	100
weighted avg	0.51	0.50	0.49	100

Selected features: Index(['rating'], dtype='object')
 Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 2 groups and 500 samples at 95.0% confidence level is: 3.860199
 2711913966

	precision	recall	f1-score	support
0	0.48	0.66	0.55	47
1	0.54	0.36	0.43	53
accuracy			0.50	100
macro avg	0.51	0.51	0.49	100
weighted avg	0.51	0.50	0.49	100

Selected features: Index(['Dept', 'rating'], dtype='object')
 Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 3 groups and 500 samples at 95.0% confidence level is: 3.013862
2207622765

Accuracy: 0.5

	precision	recall	f1-score	support
0	0.47	0.47	0.47	47
1	0.53	0.53	0.53	53
accuracy			0.50	100
macro avg	0.50	0.50	0.50	100
weighted avg	0.50	0.50	0.50	100

Selected features: Index(['Dept', 'rating', 'onsite'], dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 4 groups and 500 samples at 95.0% confidence level is: 2.622879
1395073507

Accuracy: 0.51

	precision	recall	f1-score	support
0	0.48	0.47	0.47	47
1	0.54	0.55	0.54	53
accuracy			0.51	100
macro avg	0.51	0.51	0.51	100
weighted avg	0.51	0.51	0.51	100

Selected features: Index(['Dept', 'rating', 'onsite', 'certifications'], dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 5 groups and 500 samples at 95.0% confidence level is: 2.389947
84445829

Accuracy: 0.5

	precision	recall	f1-score	support
--	-----------	--------	----------	---------

0	0.46	0.40	0.43	47
1	0.53	0.58	0.55	53
accuracy			0.50	100
macro avg	0.49	0.49	0.49	100
weighted avg	0.50	0.50	0.50	100

Selected features: Index(['Dept', 'education', 'rating', 'onsite', 'certifications'], dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 6 groups and 500 samples at 95.0% confidence level is: 2.232261

2706136007

Accuracy: 0.47

	precision	recall	f1-score	support
0	0.43	0.43	0.43	47
1	0.50	0.51	0.50	53
accuracy			0.47	100
macro avg	0.47	0.47	0.47	100
weighted avg	0.47	0.47	0.47	100

Selected features: Index(['Dept', 'location', 'education', 'rating', 'onsite', 'certifications'], dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 7 groups and 500 samples at 95.0% confidence level is: 2.116959

3191758156

Accuracy: 0.49

	precision	recall	f1-score	support
0	0.45	0.43	0.44	47
1	0.52	0.55	0.53	53
accuracy			0.49	100
macro avg	0.49	0.49	0.49	100
weighted avg	0.49	0.49	0.49	100

```

Selected features: Index(['Dept', 'location', 'education', 'job_level', 'rating', 'onsite',
   'certifications'],
   dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 8 groups and 500 samples at 95.0% confidence level is: 2.028182
9252880588
Accuracy: 0.49

```

	precision	recall	f1-score	support
0	0.46	0.45	0.45	47
1	0.52	0.53	0.52	53
accuracy			0.49	100
macro avg	0.49	0.49	0.49	100
weighted avg	0.49	0.49	0.49	100

```

Selected features: Index(['Dept', 'location', 'education', 'job_level', 'rating', 'onsite',
   'awards', 'certifications'],
   dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 9 groups and 500 samples at 95.0% confidence level is: 1.957253
1865713738
Accuracy: 0.48

```

	precision	recall	f1-score	support
0	0.44	0.43	0.43	47
1	0.51	0.53	0.52	53
accuracy			0.48	100
macro avg	0.48	0.48	0.48	100
weighted avg	0.48	0.48	0.48	100

```
Selected features: Index(['Dept', 'location', 'education', 'recruitment_type', 'job_level'])
```

```

level',
      'rating', 'onsite', 'awards', 'certifications'],
      dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 10 groups and 500 samples at 95.0% confidence level is: 1.89898
33990552476
Accuracy: 0.44

```

	precision	recall	f1-score	support
0	0.39	0.34	0.36	47
1	0.47	0.53	0.50	53
accuracy			0.44	100
macro avg	0.43	0.43	0.43	100
weighted avg	0.43	0.44	0.44	100

```

Selected features: Index(['Dept', 'location', 'education', 'recruitment_type', 'job_level',
      'rating', 'onsite', 'awards', 'certifications', 'salary'],
      dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 11 groups and 500 samples at 95.0% confidence level is: 1.85006
46331252697
Accuracy: 0.46

```

	precision	recall	f1-score	support
0	0.41	0.36	0.39	47
1	0.49	0.55	0.52	53
accuracy			0.46	100
macro avg	0.45	0.45	0.45	100
weighted avg	0.46	0.46	0.46	100

```

Selected features: Index(['age', 'Dept', 'location', 'education', 'recruitment_type',
      'job_level',
      'rating', 'onsite', 'awards', 'certifications', 'salary'],

```

```

        dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 1 groups and 500 samples at 95.0% confidence level is: nan
Accuracy: 0.49

```

	precision	recall	f1-score	support
0	0.41	0.19	0.26	47
1	0.51	0.75	0.61	53
accuracy			0.49	100
macro avg	0.46	0.47	0.44	100
weighted avg	0.46	0.49	0.45	100

```

Selected features: Index(['rating'], dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 2 groups and 500 samples at 95.0% confidence level is: 3.860199
2711913966
Accuracy: 0.49

```

	precision	recall	f1-score	support
0	0.39	0.15	0.22	47
1	0.51	0.79	0.62	53
accuracy			0.49	100
macro avg	0.45	0.47	0.42	100
weighted avg	0.45	0.49	0.43	100

```

Selected features: Index(['Dept', 'rating'], dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448

```

Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 3 groups and 500 samples at 95.0% confidence level is: 3.013862
 2207622765
 Accuracy: 0.49

	precision	recall	f1-score	support
0	0.46	0.47	0.46	47
1	0.52	0.51	0.51	53
accuracy			0.49	100
macro avg	0.49	0.49	0.49	100
weighted avg	0.49	0.49	0.49	100

Selected features: Index(['Dept', 'rating', 'onsite'], dtype='object')
 Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 4 groups and 500 samples at 95.0% confidence level is: 2.622879
 1395073507

	precision	recall	f1-score	support
0	0.50	0.36	0.42	47
1	0.55	0.68	0.61	53
accuracy			0.53	100
macro avg	0.52	0.52	0.51	100
weighted avg	0.52	0.53	0.52	100

Selected features: Index(['Dept', 'rating', 'onsite', 'certifications'], dtype='object')
 Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 5 groups and 500 samples at 95.0% confidence level is: 2.389947
 84445829

	precision	recall	f1-score	support
0	0.50	0.36	0.42	47
1	0.55	0.68	0.61	53
accuracy			0.53	100
macro avg	0.52	0.52	0.51	100
weighted avg	0.52	0.53	0.52	100

0	0.53	0.51	0.52	47
1	0.58	0.60	0.59	53
accuracy			0.56	100
macro avg	0.56	0.56	0.56	100
weighted avg	0.56	0.56	0.56	100

Selected features: Index(['Dept', 'education', 'rating', 'onsite', 'certifications'], dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 6 groups and 500 samples at 95.0% confidence level is: 2.232261

2706136007

Accuracy: 0.59

	precision	recall	f1-score	support
0	0.57	0.49	0.53	47
1	0.60	0.68	0.64	53
accuracy			0.59	100
macro avg	0.59	0.58	0.58	100
weighted avg	0.59	0.59	0.59	100

Selected features: Index(['Dept', 'location', 'education', 'rating', 'onsite', 'certifications'], dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 7 groups and 500 samples at 95.0% confidence level is: 2.116959

3191758156

Accuracy: 0.56

	precision	recall	f1-score	support
0	0.54	0.47	0.50	47
1	0.58	0.64	0.61	53
accuracy			0.56	100
macro avg	0.56	0.55	0.55	100

weighted avg	0.56	0.56	0.56	100
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Selected features: Index(['Dept', 'location', 'education', 'job_level', 'rating', 'onsite',
 'certifications'],
 dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 8 groups and 500 samples at 95.0% confidence level is: 2.028182
 9252880588

Accuracy: 0.58

	precision	recall	f1-score	support
0	0.56	0.51	0.53	47
1	0.60	0.64	0.62	53
accuracy			0.58	100
macro avg	0.58	0.58	0.58	100
weighted avg	0.58	0.58	0.58	100

Selected features: Index(['Dept', 'location', 'education', 'job_level', 'rating', 'onsite',
 'awards', 'certifications'],
 dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 9 groups and 500 samples at 95.0% confidence level is: 1.957253
 1865713738

Accuracy: 0.55

	precision	recall	f1-score	support
0	0.52	0.51	0.52	47
1	0.57	0.58	0.58	53
accuracy			0.55	100
macro avg	0.55	0.55	0.55	100
weighted avg	0.55	0.55	0.55	100

```

Selected features: Index(['Dept', 'location', 'education', 'recruitment_type', 'job_level',
                           'rating', 'onsite', 'awards', 'certifications'],
                           dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 10 groups and 500 samples at 95.0% confidence level is: 1.89898
33990552476
Accuracy: 0.6

```

	precision	recall	f1-score	support
0	0.58	0.53	0.56	47
1	0.61	0.66	0.64	53
accuracy			0.60	100
macro avg	0.60	0.60	0.60	100
weighted avg	0.60	0.60	0.60	100

```

Selected features: Index(['Dept', 'location', 'education', 'recruitment_type', 'job_level',
                           'rating', 'onsite', 'awards', 'certifications', 'salary'],
                           dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 11 groups and 500 samples at 95.0% confidence level is: 1.85006
46331252697

```

	precision	recall	f1-score	support
0	0.53	0.45	0.48	47
1	0.57	0.64	0.60	53
accuracy			0.55	100
macro avg	0.55	0.54	0.54	100
weighted avg	0.55	0.55	0.55	100

```

Selected features: Index(['age', 'Dept', 'location', 'education', 'recruitment_type',
                           'job_level'],
                           dtype='object')

```

```
'rating', 'onsite', 'awards', 'certifications', 'salary'],
      dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 1 groups and 500 samples at 95.0% confidence level is: nan
Accuracy: 0.47
```

	precision	recall	f1-score	support
0	0.43	0.38	0.40	47
1	0.50	0.55	0.52	53
accuracy			0.47	100
macro avg	0.46	0.47	0.46	100
weighted avg	0.47	0.47	0.47	100

```
Selected features: Index(['rating'], dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 2 groups and 500 samples at 95.0% confidence level is: 3.860199
2711913966
Accuracy: 0.49
```

	precision	recall	f1-score	support
0	0.46	0.49	0.47	47
1	0.52	0.49	0.50	53
accuracy			0.49	100
macro avg	0.49	0.49	0.49	100
weighted avg	0.49	0.49	0.49	100

```
Selected features: Index(['Dept', 'rating'], dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
```

Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 3 groups and 500 samples at 95.0% confidence level is: 3.013862
 2207622765
 Accuracy: 0.48

	precision	recall	f1-score	support
0	0.45	0.53	0.49	47
1	0.51	0.43	0.47	53
accuracy			0.48	100
macro avg	0.48	0.48	0.48	100
weighted avg	0.48	0.48	0.48	100

Selected features: Index(['Dept', 'rating', 'onsite'], dtype='object')
 Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 4 groups and 500 samples at 95.0% confidence level is: 2.622879
 1395073507
 Accuracy: 0.49

	precision	recall	f1-score	support
0	0.45	0.36	0.40	47
1	0.52	0.60	0.56	53
accuracy			0.49	100
macro avg	0.48	0.48	0.48	100
weighted avg	0.48	0.49	0.48	100

Selected features: Index(['Dept', 'rating', 'onsite', 'certifications'], dtype='object')
 Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 5 groups and 500 samples at 95.0% confidence level is: 2.389947
 84445829
 Accuracy: 0.55

	precision	recall	f1-score	support
0	0.53	0.45	0.48	47
1	0.57	0.64	0.60	53
accuracy			0.55	100
macro avg	0.55	0.54	0.54	100
weighted avg	0.55	0.55	0.55	100

Selected features: Index(['Dept', 'education', 'rating', 'onsite', 'certifications'], dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 6 groups and 500 samples at 95.0% confidence level is: 2.232261
2706136007

Accuracy: 0.55

	precision	recall	f1-score	support
0	0.54	0.32	0.40	47
1	0.56	0.75	0.64	53
accuracy			0.55	100
macro avg	0.55	0.54	0.52	100
weighted avg	0.55	0.55	0.53	100

Selected features: Index(['Dept', 'location', 'education', 'rating', 'onsite', 'certifications'], dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 7 groups and 500 samples at 95.0% confidence level is: 2.116959
3191758156

Accuracy: 0.51

	precision	recall	f1-score	support
0	0.47	0.30	0.36	47
1	0.53	0.70	0.60	53
accuracy			0.51	100

macro avg	0.50	0.50	0.48	100
weighted avg	0.50	0.51	0.49	100

Selected features: Index(['Dept', 'location', 'education', 'job_level', 'rating', 'onsite', 'certifications'],
 dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 8 groups and 500 samples at 95.0% confidence level is: 2.028182
 9252880588

Accuracy: 0.51

	precision	recall	f1-score	support
0	0.47	0.30	0.36	47
1	0.53	0.70	0.60	53
accuracy			0.51	100
macro avg	0.50	0.50	0.48	100
weighted avg	0.50	0.51	0.49	100

Selected features: Index(['Dept', 'location', 'education', 'job_level', 'rating', 'onsite', 'awards', 'certifications'],
 dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 9 groups and 500 samples at 95.0% confidence level is: 1.957253
 1865713738

Accuracy: 0.47

	precision	recall	f1-score	support
0	0.41	0.28	0.33	47
1	0.50	0.64	0.56	53
accuracy			0.47	100
macro avg	0.45	0.46	0.45	100
weighted avg	0.46	0.47	0.45	100

```
Selected features: Index(['Dept', 'location', 'education', 'recruitment_type', 'job_level',
       'rating', 'onsite', 'awards', 'certifications'],
       dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 10 groups and 500 samples at 95.0% confidence level is: 1.89898
33990552476
Accuracy: 0.48
```

	precision	recall	f1-score	support
0	0.42	0.30	0.35	47
1	0.51	0.64	0.57	53
accuracy			0.48	100
macro avg	0.47	0.47	0.46	100
weighted avg	0.47	0.48	0.46	100

```
Selected features: Index(['Dept', 'location', 'education', 'recruitment_type', 'job_level',
       'rating', 'onsite', 'awards', 'certifications', 'salary'],
       dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 11 groups and 500 samples at 95.0% confidence level is: 1.85006
46331252697
Accuracy: 0.47
```

	precision	recall	f1-score	support
0	0.41	0.28	0.33	47
1	0.50	0.64	0.56	53
accuracy			0.47	100
macro avg	0.45	0.46	0.45	100
weighted avg	0.46	0.47	0.45	100

```
Selected features: Index(['age', 'Dept', 'location', 'education', 'recruitment_type'])
```

```
e', 'job_level',
      'rating', 'onsite', 'awards', 'certifications', 'salary'],
      dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 1 groups and 500 samples at 95.0% confidence level is: nan
Accuracy: 0.5
```

	precision	recall	f1-score	support
0	0.48	0.68	0.56	47
1	0.55	0.34	0.42	53
accuracy			0.50	100
macro avg	0.51	0.51	0.49	100
weighted avg	0.51	0.50	0.49	100

```
Selected features: Index(['rating'], dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
Feature: rating, F-score: 5.19, P-value: 0.0233
Feature: onsite, F-score: 0.89, P-value: 0.3448
Feature: awards, F-score: 0.12, P-value: 0.7283
Feature: certifications, F-score: 0.50, P-value: 0.4815
Feature: salary, F-score: 0.00, P-value: 0.9588
Critical F-value for 2 groups and 500 samples at 95.0% confidence level is: 3.860199
2711913966
```

	precision	recall	f1-score	support
0	0.45	0.60	0.51	47
1	0.50	0.36	0.42	53
accuracy			0.47	100
macro avg	0.48	0.48	0.47	100
weighted avg	0.48	0.47	0.46	100

```
Selected features: Index(['Dept', 'rating'], dtype='object')
Feature: age, F-score: 0.00, P-value: 0.9760
Feature: Dept, F-score: 1.57, P-value: 0.2107
Feature: location, F-score: 0.34, P-value: 0.5625
Feature: education, F-score: 0.47, P-value: 0.4940
Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
Feature: job_level, F-score: 0.18, P-value: 0.6704
```

Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 3 groups and 500 samples at 95.0% confidence level is: 3.013862
 2207622765
 Accuracy: 0.42

	precision	recall	f1-score	support
0	0.40	0.47	0.43	47
1	0.44	0.38	0.41	53
accuracy			0.42	100
macro avg	0.42	0.42	0.42	100
weighted avg	0.42	0.42	0.42	100

Selected features: Index(['Dept', 'rating', 'onsite'], dtype='object')
 Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 4 groups and 500 samples at 95.0% confidence level is: 2.622879
 1395073507
 Accuracy: 0.5

	precision	recall	f1-score	support
0	0.46	0.36	0.40	47
1	0.52	0.62	0.57	53
accuracy			0.50	100
macro avg	0.49	0.49	0.49	100
weighted avg	0.49	0.50	0.49	100

Selected features: Index(['Dept', 'rating', 'onsite', 'certifications'], dtype='object')
 Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 5 groups and 500 samples at 95.0% confidence level is: 2.389947
 84445829

Accuracy: 0.45

	precision	recall	f1-score	support
0	0.40	0.36	0.38	47
1	0.48	0.53	0.50	53
accuracy			0.45	100
macro avg	0.44	0.45	0.44	100
weighted avg	0.45	0.45	0.45	100

Selected features: Index(['Dept', 'education', 'rating', 'onsite', 'certifications'], dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 6 groups and 500 samples at 95.0% confidence level is: 2.232261

2706136007

Accuracy: 0.39

	precision	recall	f1-score	support
0	0.27	0.17	0.21	47
1	0.44	0.58	0.50	53
accuracy			0.39	100
macro avg	0.35	0.38	0.36	100
weighted avg	0.36	0.39	0.36	100

Selected features: Index(['Dept', 'location', 'education', 'rating', 'onsite', 'certifications'], dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 7 groups and 500 samples at 95.0% confidence level is: 2.116959

3191758156

Accuracy: 0.4

	precision	recall	f1-score	support
0	0.32	0.26	0.29	47
1	0.44	0.53	0.48	53

accuracy		0.40	100
macro avg	0.38	0.39	100
weighted avg	0.39	0.40	100

Selected features: Index(['Dept', 'location', 'education', 'job_level', 'rating', 'onsite',

'certifications'],
dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 8 groups and 500 samples at 95.0% confidence level is: 2.028182

9252880588

Accuracy: 0.39

	precision	recall	f1-score	support
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0	0.34	0.32	0.33	47
1	0.43	0.45	0.44	53

accuracy

macro avg

weighted avg

Selected features: Index(['Dept', 'location', 'education', 'job_level', 'rating', 'onsite',

'awards', 'certifications'],
dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760

Feature: Dept, F-score: 1.57, P-value: 0.2107

Feature: location, F-score: 0.34, P-value: 0.5625

Feature: education, F-score: 0.47, P-value: 0.4940

Feature: recruitment_type, F-score: 0.12, P-value: 0.7303

Feature: job_level, F-score: 0.18, P-value: 0.6704

Feature: rating, F-score: 5.19, P-value: 0.0233

Feature: onsite, F-score: 0.89, P-value: 0.3448

Feature: awards, F-score: 0.12, P-value: 0.7283

Feature: certifications, F-score: 0.50, P-value: 0.4815

Feature: salary, F-score: 0.00, P-value: 0.9588

Critical F-value for 9 groups and 500 samples at 95.0% confidence level is: 1.957253

1865713738

Accuracy: 0.48

	precision	recall	f1-score	support
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0	0.44	0.36	0.40	47
1	0.51	0.58	0.54	53

accuracy

macro avg

weighted avg	0.47	0.48	0.47	100
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Selected features: Index(['Dept', 'location', 'education', 'recruitment_type', 'job_level',
 'rating', 'onsite', 'awards', 'certifications'],
 dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 10 groups and 500 samples at 95.0% confidence level is: 1.89898

33990552476

Accuracy: 0.53

	precision	recall	f1-score	support
0	0.50	0.34	0.41	47
1	0.54	0.70	0.61	53
accuracy			0.53	100
macro avg	0.52	0.52	0.51	100
weighted avg	0.52	0.53	0.51	100

Selected features: Index(['Dept', 'location', 'education', 'recruitment_type', 'job_level',
 'rating', 'onsite', 'awards', 'certifications', 'salary'],
 dtype='object')

Feature: age, F-score: 0.00, P-value: 0.9760
 Feature: Dept, F-score: 1.57, P-value: 0.2107
 Feature: location, F-score: 0.34, P-value: 0.5625
 Feature: education, F-score: 0.47, P-value: 0.4940
 Feature: recruitment_type, F-score: 0.12, P-value: 0.7303
 Feature: job_level, F-score: 0.18, P-value: 0.6704
 Feature: rating, F-score: 5.19, P-value: 0.0233
 Feature: onsite, F-score: 0.89, P-value: 0.3448
 Feature: awards, F-score: 0.12, P-value: 0.7283
 Feature: certifications, F-score: 0.50, P-value: 0.4815
 Feature: salary, F-score: 0.00, P-value: 0.9588
 Critical F-value for 11 groups and 500 samples at 95.0% confidence level is: 1.85006

46331252697

Accuracy: 0.46

	precision	recall	f1-score	support
0	0.41	0.34	0.37	47
1	0.49	0.57	0.53	53
accuracy			0.46	100
macro avg	0.45	0.45	0.45	100
weighted avg	0.45	0.46	0.45	100

```
Selected features: Index(['age', 'Dept', 'location', 'education', 'recruitment_type', 'job_level',
                           'rating', 'onsite', 'awards', 'certifications', 'salary'],
                           dtype='object')
{'linear': {1: 0.5, 2: 0.5, 3: 0.5, 4: 0.51, 5: 0.5, 6: 0.47, 7: 0.49, 8: 0.49, 9: 0.48, 10: 0.44, 11: 0.46}, 'poly': {1: 0.49, 2: 0.49, 3: 0.49, 4: 0.53, 5: 0.56, 6: 0.59, 7: 0.56, 8: 0.58, 9: 0.55, 10: 0.6, 11: 0.55}, 'rbf': {1: 0.47, 2: 0.49, 3: 0.48, 4: 0.49, 5: 0.55, 6: 0.55, 7: 0.51, 8: 0.51, 9: 0.47, 10: 0.48, 11: 0.47}, 'sigmoid': {1: 0.5, 2: 0.47, 3: 0.42, 4: 0.5, 5: 0.45, 6: 0.39, 7: 0.4, 8: 0.39, 9: 0.48, 10: 0.53, 11: 0.46}}
```