Global AI Job Landscape
Salary Trends Skill Demands 2025

August 4, 2025

[321]:
```
import pandas as pd
import matplotlib.pyplot as plt
from collections import Counter
import seaborn as sns
```

[322]:
```
df = pd.read_csv('../data/global_ai_job_dataset.csv')
print(df.head())
print(df.info())
```

```
    job_id              job_title  salary_usd salary_currency  \
0  AI00001  AI Research Scientist       90376             USD
1  AI00002   AI Software Engineer       61895             USD
2  AI00003          AI Specialist      152626             USD
3  AI00004           NLP Engineer       80215             USD
4  AI00005          AI Consultant       54624             EUR

  experience_level employment_type company_location company_size  \
0               SE              CT            China            M
1               EN              CT           Canada            M
2               MI              FL      Switzerland            L
3               SE              FL            India            M
4               EN              PT           France            S

  employee_residence  remote_ratio  \
0              China            50
1            Ireland           100
2        South Korea             0
3              India            50
4          Singapore           100

                                 required_skills education_required  \
0        Tableau, PyTorch, Kubernetes, Linux, NLP           Bachelor
1  Deep Learning, AWS, Mathematics, Python, Docker             Master
2     Kubernetes, Deep Learning, Java, Hadoop, NLP          Associate
3                     Scala, SQL, Linux, Python                PhD
4                      MLOps, Java, Tableau, Python             Master
```

```
   years_experience    industry posting_date application_deadline  \
0                 9  Automotive   2024-10-18           2024-11-07   
1                 1       Media   2024-11-20           2025-01-11   
2                 2   Education   2025-03-18           2025-04-07   
3                 7  Consulting   2024-12-23           2025-02-24   
4                 0       Media   2025-04-15           2025-06-23   

   job_description_length  benefits_score       company_name  
0                    1076             5.9    Smart Analytics  
1                    1268             5.2       TechCorp Inc  
2                    1974             9.4    Autonomous Tech  
3                    1345             8.6     Future Systems  
4                    1989             6.6  Advanced Robotics  
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 15000 entries, 0 to 14999
Data columns (total 19 columns):
 #   Column                  Non-Null Count  Dtype  
---  ------                  --------------  -----  
 0   job_id                  15000 non-null  object 
 1   job_title               15000 non-null  object 
 2   salary_usd              15000 non-null  int64  
 3   salary_currency         15000 non-null  object 
 4   experience_level        15000 non-null  object 
 5   employment_type         15000 non-null  object 
 6   company_location        15000 non-null  object 
 7   company_size            15000 non-null  object 
 8   employee_residence      15000 non-null  object 
 9   remote_ratio            15000 non-null  int64  
 10  required_skills         15000 non-null  object 
 11  education_required      15000 non-null  object 
 12  years_experience        15000 non-null  int64  
 13  industry                15000 non-null  object 
 14  posting_date            15000 non-null  object 
 15  application_deadline    15000 non-null  object 
 16  job_description_length  15000 non-null  int64  
 17  benefits_score          15000 non-null  float64
 18  company_name            15000 non-null  object 
dtypes: float64(1), int64(4), object(14)
memory usage: 2.2+ MB
None
```

[323]:
```
#Remaining rows Israel
df = df[
    (df["company_location"] != "Israel") &
    (df["employee_residence"] != "Israel")
]
```

[324]:
```
# Missing values are checked for each column
print("Missing values:\n", df.isna().sum())
```

```
Missing values:
 job_id                    0
job_title                 0
salary_usd                0
salary_currency           0
experience_level          0
employment_type           0
company_location          0
company_size              0
employee_residence        0
remote_ratio              0
required_skills           0
education_required        0
years_experience          0
industry                  0
posting_date              0
application_deadline      0
job_description_length    0
benefits_score            0
company_name              0
dtype: int64
```

[325]:
```
def categorize_job(title):
    title = title.lower()
    if "engineer" in title:
        return "Engineering"
    elif "scientist" in title:
        return "Science"
    elif "consultant" in title:
        return "Consulting"
    elif "specialist" in title:
        return "Specialist"
    elif "nlp" in title:
        return "NLP"
    elif "analyst" in title:
        return "Analytics"
    elif "manager" in title:
        return "Management"
    else:
        return "Other"

# this function will create a new column
df["job_category"] = df["job_title"].apply(categorize_job)
```

[326]:
```
#average salary for each experience level
avg_salary_by_exp = df.groupby("experience_level")["salary_usd"].mean()
print(avg_salary_by_exp)
```

```
experience_level
EN     63940.981029
EX    190360.687624
MI     88991.449732
SE    123886.967410
Name: salary_usd, dtype: float64
```

[327]:
```
#number of jobs in each job category
job_count_by_title = df["job_title"].value_counts()
print(job_count_by_title.head(10))  # Top 10 job titles
```

```
job_title
Machine Learning Researcher    758
AI Software Engineer           734
Autonomous Systems Engineer    732
Head of AI                     728
AI Architect                   722
Machine Learning Engineer      721
NLP Engineer                   713
Robotics Engineer              708
AI Research Scientist          707
Data Engineer                  702
Name: count, dtype: int64
```

[328]:
```
#top 5 countries with the highest average salary
top_salary_countries = df.groupby("company_location")["salary_usd"].mean().
 ↪nlargest(5)
print(top_salary_countries)
```

```
company_location
Switzerland       170393.910448
Denmark           166035.312500
Norway            158995.406470
United States     146894.834270
United Kingdom    128756.876045
Name: salary_usd, dtype: float64
```

[329]:
```
#average salary for each employment type
avg_salary_by_employment = df.groupby("employment_type")["salary_usd"].mean()
print(avg_salary_by_employment)
```

```
employment_type
CT    117404.623822
FL    116667.894151
FT    117670.862525
PT    115639.058908
Name: salary_usd, dtype: float64
```

[330]:
```
#jobs that are fully remote
remote_jobs_count = len(df[df["remote_ratio"] == 100])
print(f"Fully Remote Jobs: {remote_jobs_count}")
```

```
Fully Remote Jobs: 4617
```

[331]:
```
#the highest salary in each job category
max_salary_by_title = df.groupby("job_title")["salary_usd"].max().
 ↪sort_values(ascending=False)
print(max_salary_by_title.head(10))
```

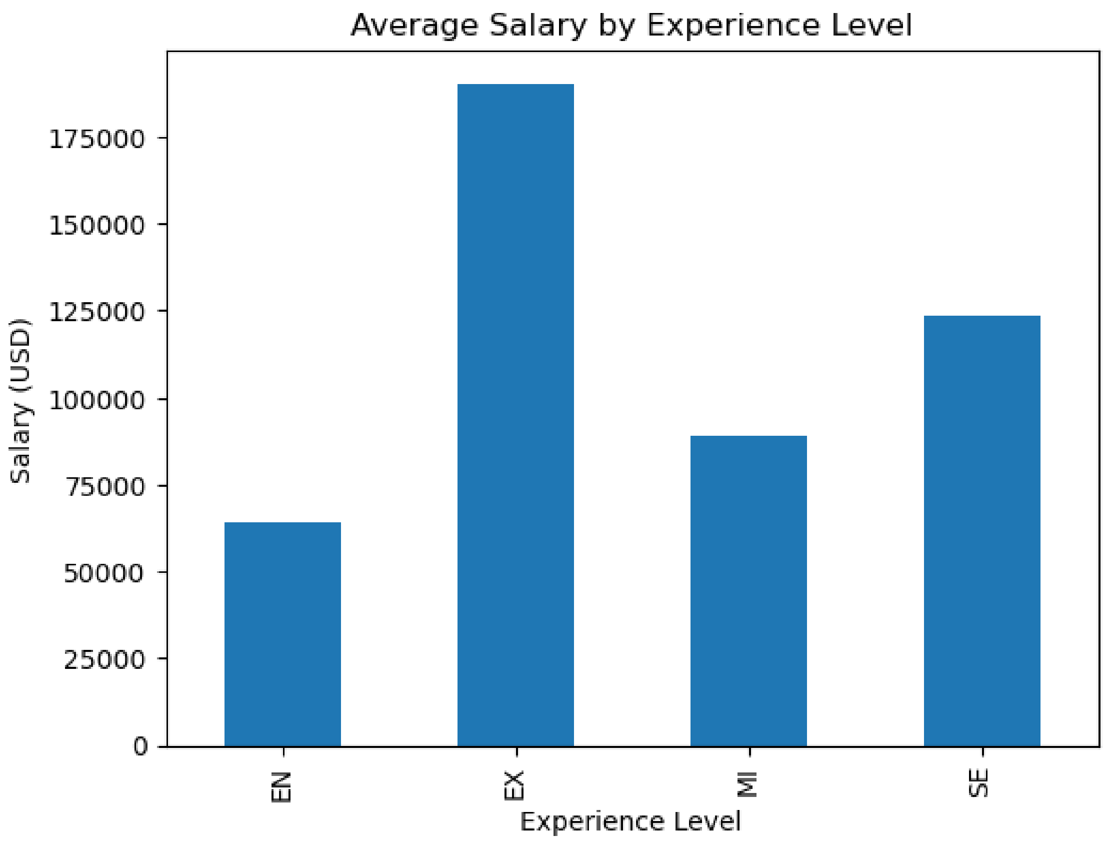
```
job_title
Machine Learning Researcher    399095
AI Architect                   398084
AI Research Scientist          394917
AI Specialist                  390292
Data Scientist                 388754
AI Product Manager             381575
AI Software Engineer           379418
Computer Vision Engineer       366957
Principal Data Scientist       364635
Autonomous Systems Engineer    364585
Name: salary_usd, dtype: int64
```

[332]:
```
#average benefits score grouped by company location
avg_benefits_by_location = df.groupby("company_location")["benefits_score"].
 ↪mean()
print(avg_benefits_by_location)
```

```
company_location
Australia         7.518106
Austria           7.518675
Canada            7.563408
China             7.520884
Denmark           7.594271
Finland           7.540966
France            7.510554
Germany           7.485019
```

```
India             7.575034
Ireland           7.390515
Japan             7.466989
Netherlands       7.515110
Norway            7.474684
Singapore         7.490426
South Korea       7.422772
Sweden            7.501877
Switzerland       7.451560
United Kingdom    7.440808
United States     7.566573
Name: benefits_score, dtype: float64
```

[333]:
```
df.groupby("experience_level")["salary_usd"].mean().plot(kind="bar")
plt.title("Average Salary by Experience Level")
plt.xlabel("Experience Level")
plt.ylabel("Salary (USD)")
plt.show()
```



[334]:
```
#total jobs in each industry
industry_count = df["industry"].value_counts()
print(industry_count)
```

```
industry
Retail                  989
Media                   978
Automotive              960
Technology              954
Consulting              947
Real Estate             943
Government              938
Transportation          937
Telecommunications      928
Healthcare              926
Energy                  923
Finance                 923
Education               902
Gaming                  900
Manufacturing           895
Name: count, dtype: int64
```

[335]:
```
#average job description length per job category
avg_desc_length_by_category = df.
 ↪groupby("job_category")["job_description_length"].mean()
print(avg_desc_length_by_category)
```

```
job_category
Analytics      1462.441261
Consulting     1538.048338
Engineering    1497.678132
Management     1503.218705
Other          1521.726902
Science        1505.388325
Specialist     1496.320175
Name: job_description_length, dtype: float64
```

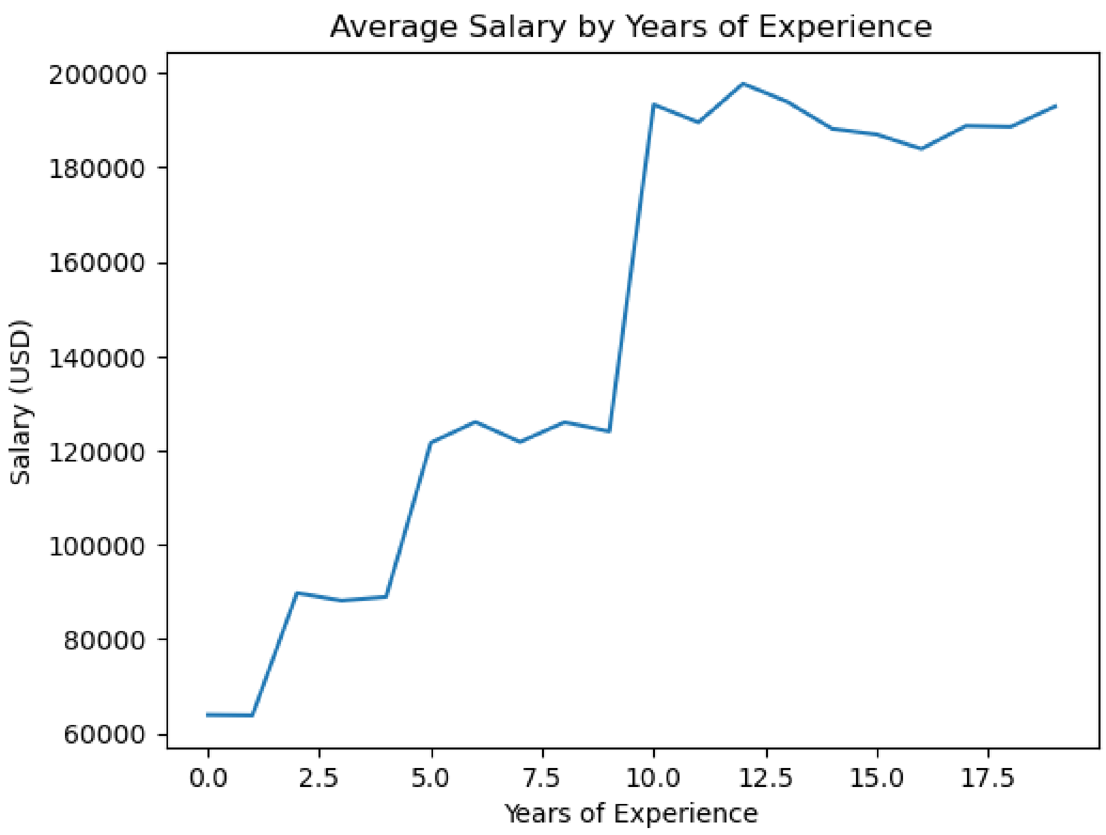
[336]:
```
#how many jobs require a PhD
phd_jobs_count = len(df[df["education_required"] == "PhD"])
print(f"Jobs Requiring PhD: {phd_jobs_count}")
```

```
Jobs Requiring PhD: 3420
```

[337]:
```
#average salary by remote ratio
avg_salary_by_remote = df.groupby("remote_ratio")["salary_usd"].mean()
print(avg_salary_by_remote)
```

```
remote_ratio
0      115678.025609
50     117440.283355
100    117465.242582
Name: salary_usd, dtype: float64
```

[338]:
```
df.groupby("years_experience")["salary_usd"].mean().plot(kind="line")
plt.title("Average Salary by Years of Experience")
plt.xlabel("Years of Experience")
plt.ylabel("Salary (USD)")
plt.show()
```



[339]:
```
#Top 10 companies offering the most jobs
top_companies = df["company_name"].value_counts().nlargest(10)
print(top_companies)
```

```
company_name
TechCorp Inc                  933
Digital Transformation LLC    903
AI Innovations                900
Quantum Computing Inc         896
Cognitive Computing           896
Future Systems                894
Cloud AI Solutions            889
Predictive Systems            881
Smart Analytics               872
Neural Networks Co            872
Name: count, dtype: int64
```

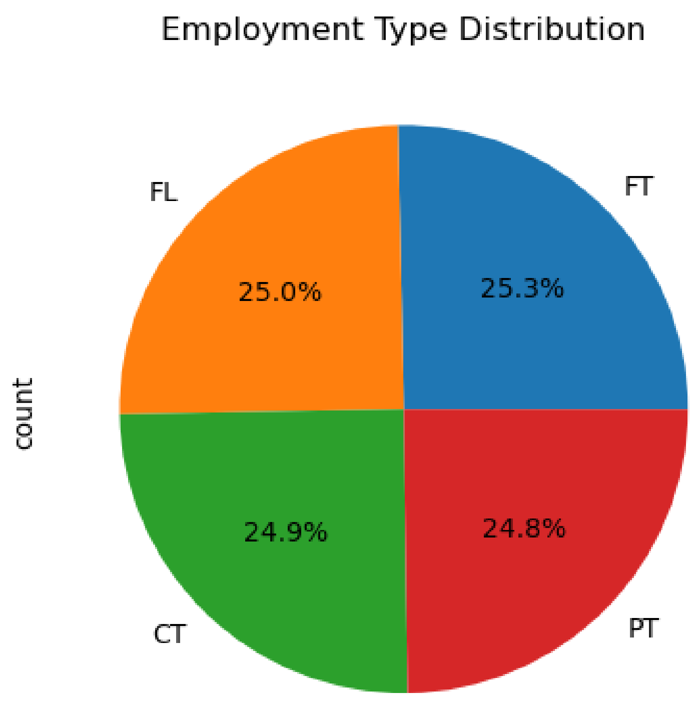
[340]:
```
#Average salary by industry
avg_salary_by_industry = df.groupby("industry")["salary_usd"].mean()
print(avg_salary_by_industry)
```

```
industry
Automotive            115564.963542
Consulting            118849.026399
Education             117341.180710
Energy                116456.836403
Finance               116727.957746
Gaming                115472.036667
Government            116644.184435
Healthcare            115322.268898
Manufacturing         117592.871508
Media                 117655.751534
Real Estate           117806.036055
Retail                116608.309403
Technology            117053.314465
Telecommunications    117072.004310
Transportation        116545.572038
Name: salary_usd, dtype: float64
```

[341]:
```
#total jobs by employee residence
residence_count = df["employee_residence"].value_counts()
print(residence_count)
```

```
employee_residence
Sweden            776
Germany           765
Denmark           764
France            764
Austria           761
India             758
South Korea       753
Canada            750
China             746
Netherlands       744
United Kingdom    741
Switzerland       739
Singapore         732
Ireland           728
Australia         715
Norway            714
United States     702
Finland           700
Japan             691
Name: count, dtype: int64
```

[342]:
```
df["employment_type"].value_counts().plot(kind="pie", autopct='%1.1f%%')
plt.title("Employment Type Distribution")
plt.show()
```



[343]:
```
#Minimum salary in each experience level
min_salary_by_exp = df.groupby("experience_level")["salary_usd"].min()
print(min_salary_by_exp)
```

```
experience_level
EN    32519
EX    86560
MI    45900
SE    64824
Name: salary_usd, dtype: int64
```

[344]:
```
#Average years of experience by company location
avg_exp_by_location = df.groupby("company_location")["years_experience"].mean()
print(avg_exp_by_location)
```

```
company_location
Australia         6.036212
Austria           6.335099
Canada            6.321004
China             6.064257
Denmark           6.815104
Finland           6.580690
France            6.163588
Germany           6.302122
India             6.112011
Ireland           6.055556
Japan             6.236188
Netherlands       6.217033
Norway            6.403657
Singapore         6.283245
South Korea       6.090523
Sweden            6.276139
Switzerland       5.934871
United Kingdom    6.122563
United States     6.366573
Name: years_experience, dtype: float64
```

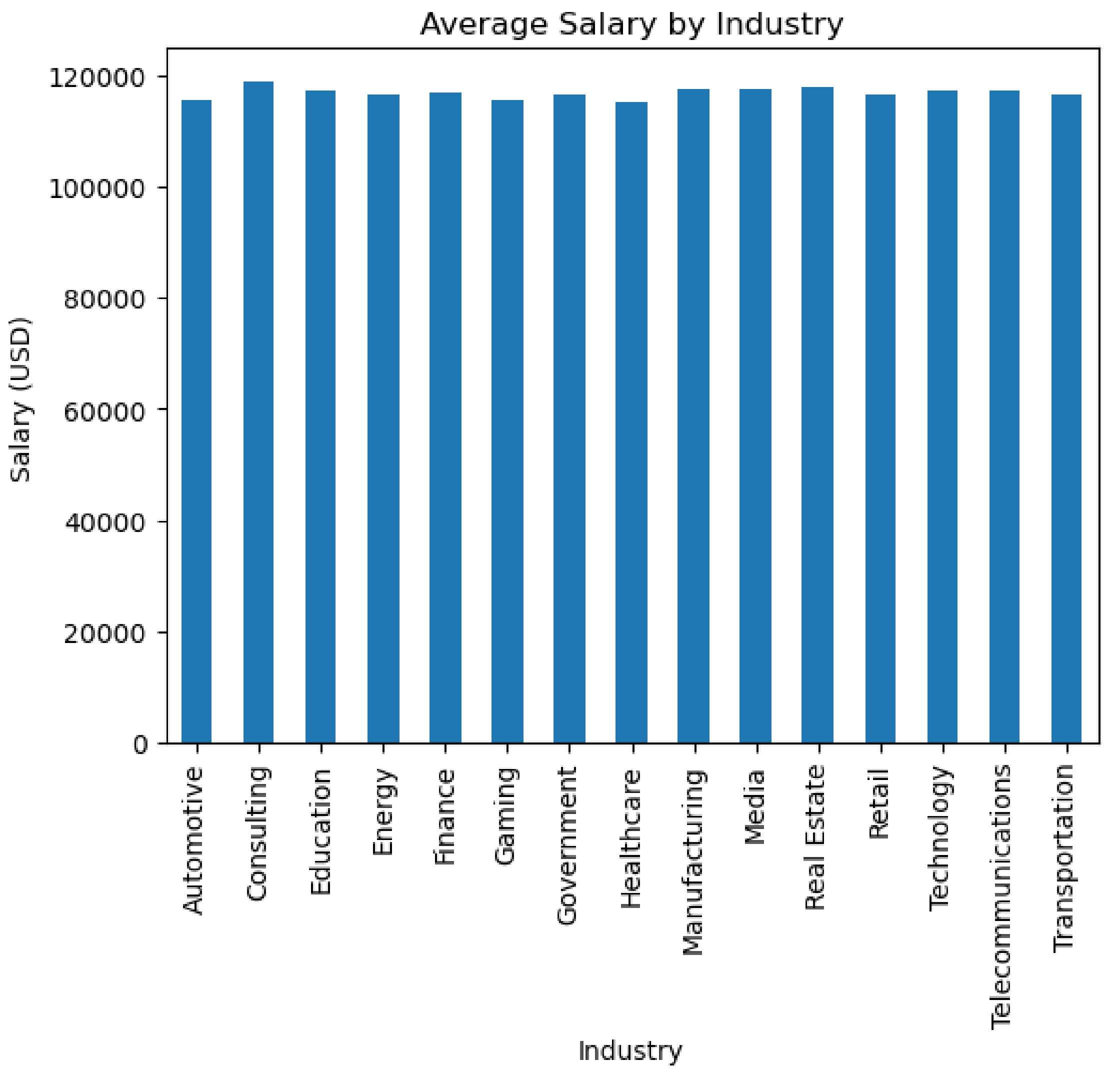
[345]:
```
#jobs requiring Python as a skill
python_jobs = len(df[df["required_skills"].str.contains("Python", na=False)])
print(f"Jobs Requiring Python: {python_jobs}")
```

```
Jobs Requiring Python: 4151
```

[346]:
```
#Average job description length by company size
avg_desc_by_size = df.groupby("company_size")["job_description_length"].mean()
print(avg_desc_by_size)
```

```
company_size
L    1506.393517
M    1506.251117
S    1497.365557
Name: job_description_length, dtype: float64
```

[347]:
```python
df.groupby("industry")["salary_usd"].mean().plot(kind="bar")
plt.title("Average Salary by Industry")
plt.xlabel("Industry")
plt.ylabel("Salary (USD)")
plt.show()
```



[348]:
```python
#Maximum benefits score for each job category
max_benefits_by_category = df.groupby("job_category")["benefits_score"].max()
print(max_benefits_by_category)
```

```
job_category
Analytics      10.0
Consulting     10.0
Engineering    10.0
```

```
Management      10.0
Other           10.0
Science         10.0
Specialist      10.0
Name: benefits_score, dtype: float64
```

[349]:
```
#average salary for fully remote jobs
avg_remote_salary = df[df["remote_ratio"] == 100]["salary_usd"].mean()
print(f"Avg Salary for Fully Remote: {avg_remote_salary:.2f}")
```

```
Avg Salary for Fully Remote: 117465.24
```

[350]:
```
#posting_date to datetime and count jobs posted in 2025
df["posting_date"] = pd.to_datetime(df["posting_date"])
jobs_2025 = len(df[df["posting_date"].dt.year == 2025])
print(f"Jobs Posted in 2025: {jobs_2025}")
```

```
Jobs Posted in 2025: 3412
```

[351]:
```
#Average years of experience for jobs paying more than 100K
avg_exp_high_salary = df[df["salary_usd"] > 100000]["years_experience"].mean()
print(f"Avg Experience for Salary > 100K: {avg_exp_high_salary:.2f}")
```

```
Avg Experience for Salary > 100K: 9.82
```

[352]:
```
#Top 10 countries (employee residence) by average salary
top_residence_salary = df.groupby("employee_residence")["salary_usd"].mean().
 ↪nlargest(10)
print(top_residence_salary)
```

```
employee_residence
Switzerland       153582.131258
Denmark           151289.712042
Norway            145006.631653
United States     138516.018519
Singapore         124986.124317
Netherlands       124122.331989
United Kingdom    122288.591093
Sweden            121396.645619
Germany           119481.945098
Australia         119109.619580
Name: salary_usd, dtype: float64
```

[353]:
```
#the top 10 highest paying jobs
top_highest_paying = df.sort_values(by="salary_usd", ascending=False).head(10)
print(top_highest_paying[["job_title", "salary_usd", "company_name"]])
```

```
                        job_title  salary_usd                 company_name
9891    Machine Learning Researcher      399095                 TechCorp Inc
2309                 AI Architect      398084               Future Systems
12499         AI Research Scientist      394917  Machine Intelligence Group
12803                 AI Specialist      390292               DataVision Ltd
317                 Data Scientist      388754            DeepTech Ventures
5483                 AI Architect      383142               Future Systems
10468           AI Product Manager      381575           Neural Networks Co
9637           AI Software Engineer      379418       Algorithmic Solutions
8377          AI Research Scientist      372206       Quantum Computing Inc
14431         AI Research Scientist      371087               Future Systems
```

[354]:
```
#average benefits score by education level
avg_benefits_by_education = df.groupby("education_required")["benefits_score"].
 ↪mean()
print(avg_benefits_by_education)
```

```
education_required
Associate    7.518840
Bachelor     7.542760
Master       7.477699
PhD          7.471287
Name: benefits_score, dtype: float64
```

[355]:
```
#how many jobs require both Python and SQL
python_sql_jobs = df[df["required_skills"].str.contains("Python", na=False) &
                     df["required_skills"].str.contains("SQL", na=False)]
print(f"Jobs requiring both Python and SQL: {len(python_sql_jobs)}")
```

```
Jobs requiring both Python and SQL: 543
```

[356]:
```
#average salary by education level
avg_salary_by_education = df.groupby("education_required")["salary_usd"].mean()
print(avg_salary_by_education)
```

```
education_required
Associate    116135.988172
Bachelor     117264.852667
Master       118479.750921
PhD          115482.582456
Name: salary_usd, dtype: float64
```

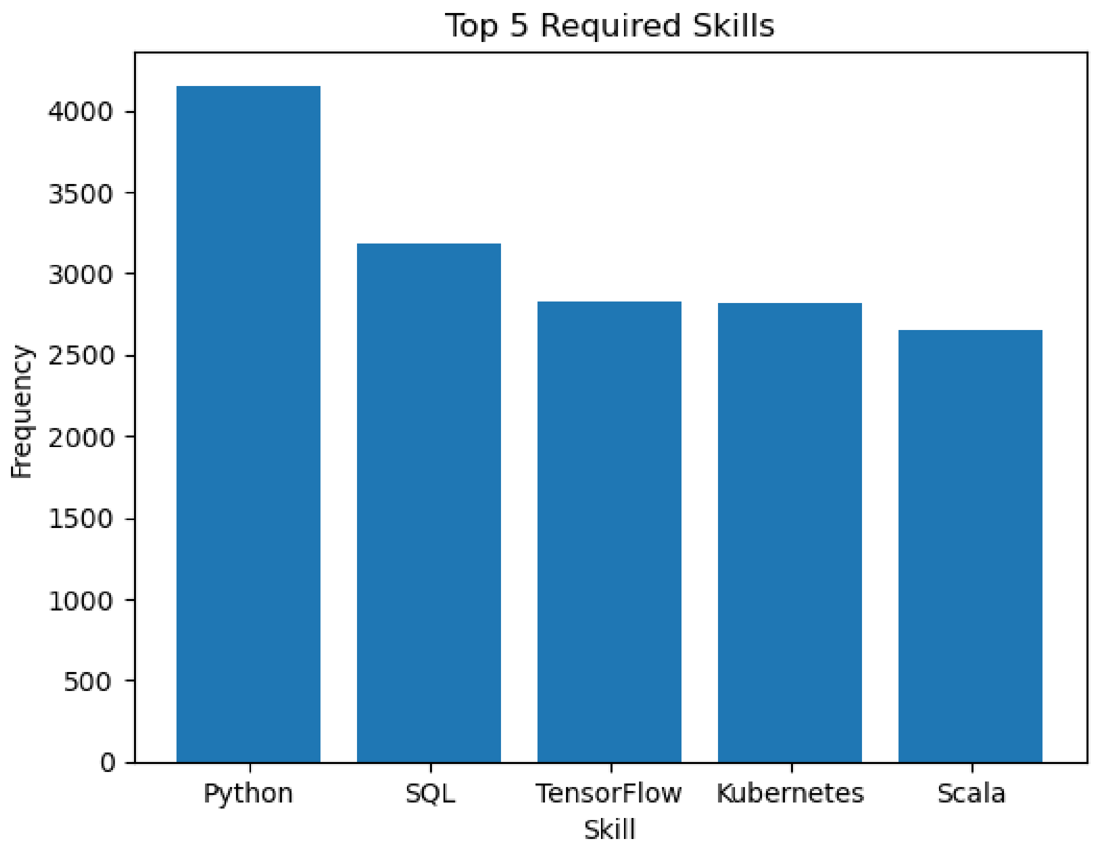
```
[357]: #job titles with the longest descriptions
       longest_descriptions = df.sort_values(by="job_description_length",␣
        ↪ascending=False).head(10)
       print(longest_descriptions[["job_title", "job_description_length"]])
```

```
                          job_title  job_description_length
2782    Autonomous Systems Engineer                    2499
12736      Principal Data Scientist                    2499
3331             AI Product Manager                    2499
2054   Machine Learning Researcher                     2499
3386                  AI Consultant                    2499
1123                     Head of AI                    2499
7089                     Head of AI                    2499
1138                     Head of AI                    2498
9939          AI Research Scientist                    2498
9550                  Data Engineer                    2498
```

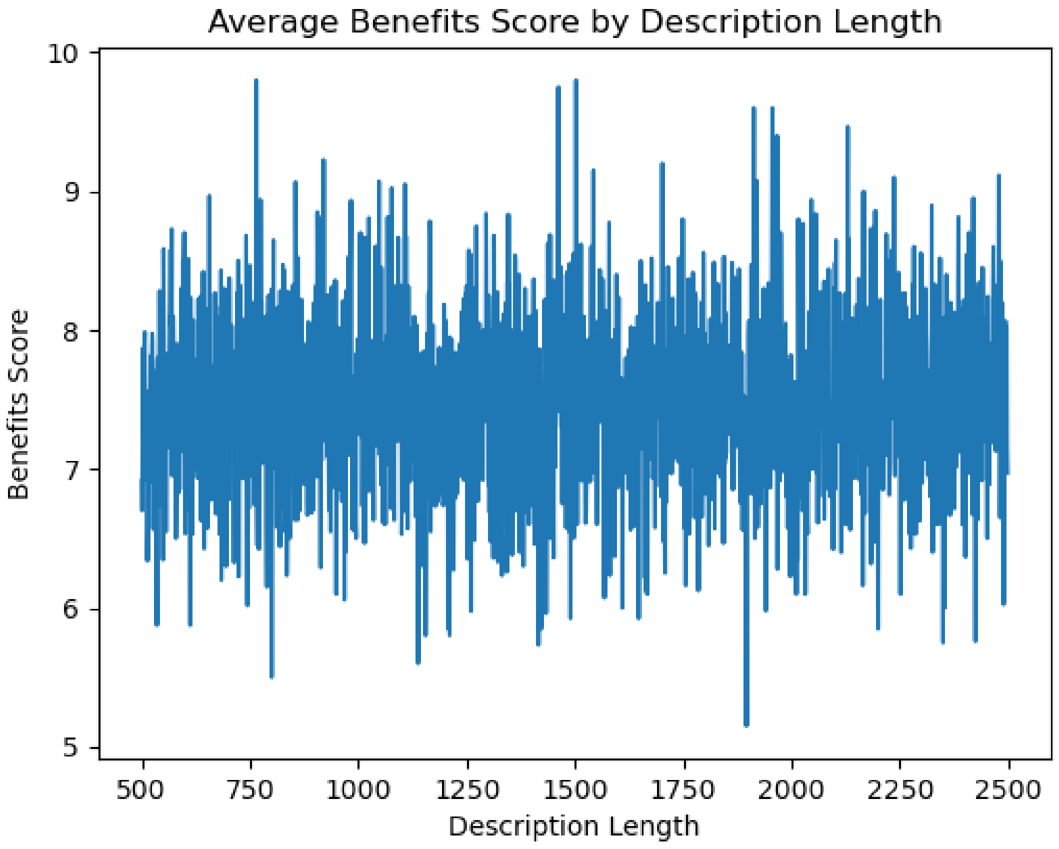
```
[358]: #the number of jobs posted per month
       df["posting_date"] = pd.to_datetime(df["posting_date"])
       jobs_per_month = df["posting_date"].dt.to_period("M").value_counts().sort_index()
       print(jobs_per_month)
```

```
posting_date
2024-01    889
2024-02    867
2024-03    873
2024-04    924
2024-05    895
2024-06    880
2024-07    906
2024-08    885
2024-09    827
2024-10    894
2024-11    881
2024-12    910
2025-01    897
2025-02    778
2025-03    865
2025-04    872
Freq: M, Name: count, dtype: int64
```

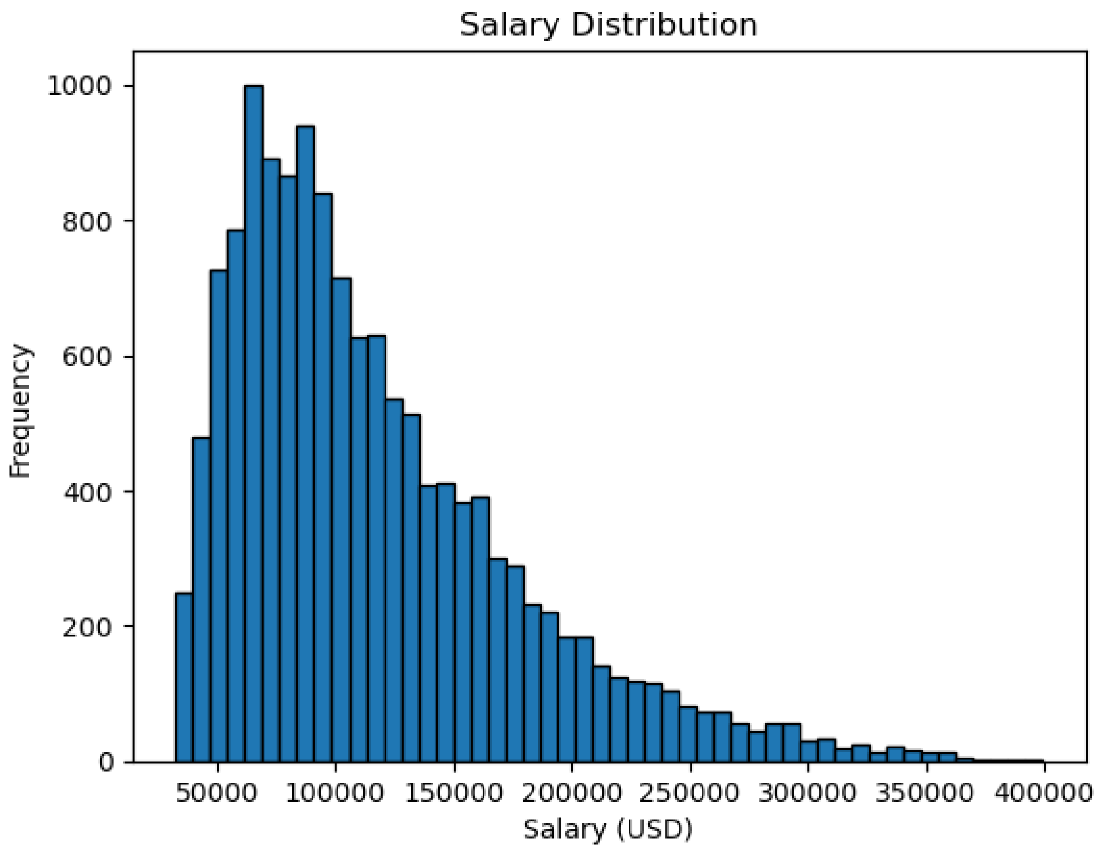
[359]:
```
all_skills = df["required_skills"].str.split(", ").sum()
top_skills = Counter(all_skills).most_common(5)
skills, counts = zip(*top_skills)

plt.bar(skills, counts)
plt.title("Top 5 Required Skills")
plt.xlabel("Skill")
plt.ylabel("Frequency")
plt.show()
```



[360]:
```
df.groupby("job_description_length")["benefits_score"].mean().plot(kind="line")
plt.title("Average Benefits Score by Description Length")
plt.xlabel("Description Length")
plt.ylabel("Benefits Score")
plt.show()
```



[361]:
```
df["salary_usd"].plot(kind="hist", bins=50, edgecolor="black")
plt.title("Salary Distribution")
plt.xlabel("Salary (USD)")
plt.ylabel("Frequency")
plt.show()
```


Salary Distribution
Frequency
Salary (USD)