# In [1]: 

**from**

sklearn

.

ensemble

**import**

RandomForestClassifier

# In [2]: 

**from**

sklearn

.

svm

**import**

SVC

# In [3]: 

**import**

pandas

**as**

pd

# In [8]: 

df

**=**

pd

.

read\_csv

(

r'C:\Users\Sanika\Downloads\fake\_job\_postings.csv'

)

[10]:

df Out[10]:

**job\_id title location department salary\_range company\_profile**

We're Food52, Fo Marketing US, NY,

1. 1 Marketing NaN and we've created growing,

Intern New York

a groundbreaki... A

Customer 90 Seconds, the

Organise

Service - Cloud NZ, , worlds Cloud

1. 2 Success NaN Vibrant -

Video Auckland Video Production

Production ...

Commissioning Valor Services

Our clie

Machinery US, IA, provides

1. 3 NaN NaN Housto

Assistant Wever Workforce (CMA) Solutions th...

Account

Our passion for THE COM Executive - US, DC,

1. 4 Sales NaN improving quality – E

Washington Washington of life thro... Sys

DC

SpotSource

Bill Review US, FL, Fort Solutions LLC is a

1. 5 NaN NaN Itemiz

Manager Worth Global Human

ManagerL

Cap...

**...** ... ... ... ... ... ...

Vend is looking

Account

CA, ON, for some Just in ca **17875** 17876 Director - Sales NaN

Toronto awesome new first time

Distribution talent to...

WebLinc is the e-

Payroll US, PA, commerce

1. 17877 Accounting NaN Account

Accountant Philadelphia platform and

service...

Project Cost

We Provide Full Experie Control Staff US, TX,

1. 17878 NaN NaN Time Permanent Cost

Engineer - Houston

Positions for m... Cost Con...

Nem Graphic NG, LA,

1. 17879 NaN NaN NaN

Designer Lagos

ex

Vend is looking

Web Who ar

NZ, N, for some

1. 17880 Application Engineering NaN an award

Wellington awesome new

Developers

talent to...

1. rows × 18 columns

[11]: df.info()

<class 'pandas.core.frame.DataFrame'>

RangeIndex: 17880 entries, 0 to 17879

Data columns (total 18 columns):

# Column Non-Null Count Dtype

--- ------ -------------- -----

1. job\_id 17880 non-null int64
2. title 17880 non-null object
3. location 17534 non-null object
4. department 6333 non-null object
5. salary\_range 2868 non-null object
6. company\_profile 14572 non-null object
7. description 17879 non-null object
8. requirements 15185 non-null object
9. benefits 10670 non-null object
10. telecommuting 17880 non-null int64
11. has\_company\_logo 17880 non-null int64
12. has\_questions 17880 non-null int64
13. employment\_type 14409 non-null object
14. required\_experience 10830 non-null object
15. required\_education 9775 non-null object
16. industry 12977 non-null object
17. function 11425 non-null object
18. fraudulent 17880 non-null int64 dtypes: int64(5), object(13) memory usage: 2.5+ MB

# In [12]: 

df

.

columns

Out[12]:

Index(['job\_id', 'title', 'location', 'department', 'salary\_range', 'company\_profile', 'description', 'requirements', 'benefits',

'telecommuting', 'has\_company\_logo', 'has\_questions', 'employment\_typ e',

'required\_experience', 'required\_education', 'industry', 'function',

'fraudulent'], dtype='object')

# In [13]: 

df **=** df[['title', 'location', 'department', 'salary\_range',

'telecommuting', 'has\_company\_logo', 'has\_questions', 'employment\_type',

'required\_experience', 'required\_education', 'industry', 'function', 'fraudulent']]

[14]:

df['fraudulent'].value\_counts()

Out[14]:

1. 17014
2. 866

Name: fraudulent, dtype: int64

# In [15]: 

salary\_range\_dictionary

**=**

dict

(

df

[

'salary\_range'

].

value\_counts

())

# In [16]: 



In

[17]:

144000-192000

:

1,

'33000-37000': 1,

'60-80': 1,

'962-962': 1,

'45000-58000': 1,

'40-60': 1,

'85000-125000': 1,

'16000-28000': 1,

'65000-110000': 1,

'0-95000': 1,

'63000-63000': 1,

'850-1000': 1,

'55000-79000': 1,

'12000-19000': 1,

'1000-20000': 1,

'90000-115000': 1,

'2-Apr': 1,

'1100-1200': 1,

'175000-275000': 1,

'37400-37400': 1,

'

92000

288000

'

salary\_range\_dictionary

error\_values

**=**

[]

**for**

key

,

value

**in**

salary\_range\_dictionary

.

items

():

current\_key

**=**

key

.

split

(

'-'

)

**try**

:

current\_key

[

0

]

**=**

int

(

current\_key

[

0

])

current\_key

[

1

]

**=**

int

(

current\_key

[

1

])

**except**

:

error\_values

.

append

(

key

)

[18]:

error\_values

Out[18]:

['10-Oct',

'10-Nov',

'Oct-20',

'11-Nov', '40000',

'Jun-18',

'4-Apr',

'9-Dec',

'3-Apr',

'8-Sep',

'4-Jun',

'2-Apr',

'11-Dec',

'Dec-25',

'2-Jun',

'Oct-15']

# In [19]: 

**for**

val

**in**

error\_values

:

df

**=**

df

[

df

[

'salary\_range'

]

**!=**

val

]

# In [20]: 

Out[20]:

'0-0': 142,

{

'40000-50000': 66,

'30000-40000': 55,

'25000-30000': 37,

'45000-67000': 37,

'30000-50000': 32,

'35000-45000': 30,

'70000-90000': 30,

'80000-100000': 30,

'50000-80000': 29,

'60000-80000': 28,

'55000-75000': 28,

'50000-70000': 28,

'30000-35000': 27,

'40000-45000': 27,

'40000-60000': 27,

'25000-35000': 26,

dict

(

df

[

'salary\_range'

].

value\_counts

())

# In [21]: 

df\_salary\_range\_empty **=** df[df['salary\_range'].isna()] df\_salary\_range\_not\_empty **=** df[**~**df['salary\_range'].isna()]

[22]:

df\_salary\_range\_not\_empty

[

'salary'

]

**=**

''

df\_salary\_range\_empty

[

'salary'

]

**=**

''

<ipython-input-22-1bcdc3fd7caa>:1: SettingWithCopyWarning:

A value is trying to be set on a copy of a slice from a DataFrame.

Try using .loc[row\_indexer,col\_indexer] = value instead

[See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/ stable/user\_guide/indexing.html#returning-a-view-versus-a-copy (https://pand as.pydata.org/pandas-docs/stable/user\_guide/indexing.html#returning-a-view-v ersus-a-copy)](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)  df\_salary\_range\_not\_empty['salary'] = ''

<ipython-input-22-1bcdc3fd7caa>:2: SettingWithCopyWarning:

A value is trying to be set on a copy of a slice from a DataFrame.

Try using .loc[row\_indexer,col\_indexer] = value instead

[See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/ stable/user\_guide/indexing.html#returning-a-view-versus-a-copy (https://pand as.pydata.org/pandas-docs/stable/user\_guide/indexing.html#returning-a-view-v ersus-a-copy)](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

df\_salary\_range\_empty['salary'] = ''

# In [23]: 

df\_salary\_range\_not\_empty

**=**

df\_salary\_range\_not\_empty

.

reset\_index

()

# In [24]: 

df\_salary\_range\_not\_empty

.

columns

Out[24]:

Index(['index', 'title', 'location', 'department', 'salary\_range',

'telecommuting', 'has\_company\_logo', 'has\_questions', 'employment\_typ e',

'required\_experience', 'required\_education', 'industry', 'function',

'fraudulent', 'salary'], dtype='object')

# In [25]: 

df\_salary\_range\_not\_empty **=** df\_salary\_range\_not\_empty[['title', 'location', 'department', '

'telecommuting', 'has\_company\_logo', 'has\_questions', 'employment\_type',

'required\_experience', 'required\_education', 'industry', 'function', 'fraudulent', 'salary']]

# In [26]: 

**for** i **in** range(df\_salary\_range\_not\_empty.shape[0]): current\_salary\_range **=** df\_salary\_range\_not\_empty['salary\_range'].values[i] current\_salary\_list **=** current\_salary\_range.split('-')

salary\_value **=** (int(current\_salary\_list[1]) **+** int(current\_salary\_list[0]))**/**2 df\_salary\_range\_not\_empty['salary'].values[i] **=** salary\_value

[27]:

df\_salary\_range\_not\_empty['salary'].mean()

Out[27]:

664074.4301302359

# In [28]: 

df\_salary\_range\_empty['salary'] **=** df\_salary\_range\_not\_empty['salary'].mean()

<ipython-input-28-1c0606e6c435>:1: SettingWithCopyWarning:

A value is trying to be set on a copy of a slice from a DataFrame.

Try using .loc[row\_indexer,col\_indexer] = value instead

[See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/ stable/user\_guide/indexing.html#returning-a-view-versus-a-copy (https://pand as.pydata.org/pandas-docs/stable/user\_guide/indexing.html#returning-a-view-v ersus-a-copy)](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

df\_salary\_range\_empty['salary'] = df\_salary\_range\_not\_empty['salary'].mean

()

# In [29]: 

df

**=**

df\_salary\_range\_not\_empty

.

append

(

df\_salary\_range\_empty

)

# In [30]: 

df

.

columns

Out[30]:

Index(['title', 'location', 'department', 'salary\_range', 'telecommuting',

'has\_company\_logo', 'has\_questions', 'employment\_type', 'required\_experience', 'required\_education', 'industry', 'function',

'fraudulent', 'salary'], dtype='object')

# In [31]: 

df **=** df[['title', 'location', 'department', 'salary','telecommuting',

'has\_company\_logo', 'has\_questions', 'employment\_type',

'required\_experience', 'required\_education', 'industry', 'function', 'fraudulent']]

[32]: df.info()

<class 'pandas.core.frame.DataFrame'>

Int64Index: 17853 entries, 0 to 17879

Data columns (total 13 columns):

# Column Non-Null Count Dtype

--- ------ -------------- -----

1. title 17853 non-null object
2. location 17509 non-null object
3. department 6330 non-null object
4. salary 17853 non-null object
5. telecommuting 17853 non-null int64
6. has\_company\_logo 17853 non-null int64
7. has\_questions 17853 non-null int64
8. employment\_type 14383 non-null object
9. required\_experience 10806 non-null object
10. required\_education 9752 non-null object
11. industry 12952 non-null object
12. function 11404 non-null object
13. fraudulent 17853 non-null int64 dtypes: int64(4), object(9) memory usage: 1.9+ MB

[33]:

dict(df['title'].value\_counts())

Out[33]:

{'English Teacher Abroad ': 311,

'Customer Service Associate ': 146, 'Graduates: English Teacher Abroad (Conversational)': 144,

'English Teacher Abroad': 95,

'Software Engineer': 86,

'English Teacher Abroad (Conversational)': 83,

'Customer Service Associate - Part Time ': 76,

'Account Manager': 75, 'Web Developer': 66,

'Project Manager': 62,

'Beauty & Fragrance consultants needed': 60,

'Graduates: English Teacher Abroad ': 57,

'Customer Service Representative': 51,

'Administrative Assistant': 48,

'Product Manager': 47,

'Office Manager': 46,

'Sales Representative': 45,

'Customer Service Associate': 45,

'Marketing Manager': 45,

'Web Designer': 44,

'Senior Software Engineer': 44,

'iOS Developer': 44,

'Account Executive': 41,

'Customer Service Team Lead ': 40,

'Front End Developer': 38,

'Sales Manager': 37,

'Software Developer': 36,

'Android Developer': 33,

'Contact Center Representatives': 31,

'Data Scientist': 31,

'Business Analyst': 30,

'Java Developer': 29,

'PHP Developer': 28,

'Entry Level Sales': 26,

'Customer Service Technical Specialist ': 26,

'Graphic Designer': 25,

'Business Development Manager': 25,

'.NET Developer': 24,

'Executive Assistant': 24,

'DevOps Engineer': 23,

'Community Manager': 22,

'Process Engineer': 21,

'English Teacher Overseas': 21,

'Data Analyst': 21,

'Data Entry Admin/Clerical Positions - Work From Home': 21,

'Home Based Payroll Typist/Data Entry Clerks Positions Available': 21,

'Cruise Staff Wanted \*URGENT\*': 21,

'QA Engineer': 21,

'Sales Director': 21,

'Application Developer': 21,

'Physical Therapist': 20,

'Marketing Representative': 20,

'UI/UX Designer': 20,

'Accountant': 19,

'Collections Supervisor': 19,

'Production Supervisor': 19,

'Sales Executive': 19,

'Systems Engineer': 18,

'Inside Sales Representative': 18,

'Human Resources Manager': 18,

'Regional Sales Manager': 18,

'Operations Manager': 18,

'Controls Engineer': 18,

'Front-End Developer': 17,

'Marketing Associate': 17,

'Marketing Intern': 17,

'Associate Business Development': 17,

'UX Designer': 17,

'Product Designer': 17,

'Senior Web Developer': 16,

'Mechanical Engineer': 16,

'Customer Service Associate - On Call ': 16,

'Quality Assurance Engineer': 16,

'Senior Developer': 16,

'Electrical Maintenance Technician': 16,

'Head of Marketing': 15,

'Data Entry': 15,

'Office Administrator': 15, 'Customer Service Associate - Part Time': 15,

'UI Designer': 15,

'Front-end Developer': 15,

'Developer': 14,

'Digital Marketing Manager': 14,

'Senior Java Developer': 14,

'Technical Support Engineer': 14,

'Maintenance Technician': 14,

'Manufacturing Engineer': 14,

'Quality Assurance Manager': 14,

'Customer Success Manager': 14,

'Visual Designer': 13,

'Assistant Manager': 13,

'Cad Designer': 13,

'Manufacturing Operations Supervisor': 13,

'Manager of Finance': 13,

'Manufacturing Engineering Manager': 13,

'UX/UI Designer': 13,

'Service Delivery Manager 1 ': 12,

'Linux System Administrator': 12,

'Branch Manager': 12,

'Agent-Inbound Sales Position': 12,

'Receptionist': 12,

'New Product Development Project Leader': 12,

'Escrow Officer / Title Closer': 12,

'Buyer': 12,

'Social Media Manager': 12,

'Field Operations Specialist': 12,

'Product Marketing Manager': 12,

'Call Center Representative': 12, 'Home Based Payroll Data Entry Clerk Position - Earn $100-$200 Daily ': 12,

'Regional Inside Sales Representative': 12,

'Marketing Coordinator': 12,

'System Administrator': 12,

'CNC Programmer': 11,

'Android Engineer': 11,

'Sr. Design Engineer Mechanical - 3D CAD': 11,

'Auditor': 11,

'Local Representative': 11,

'Branch Associate': 11,

'Sales Development Representative': 11,

'Controller': 11,

'Manufacturing Engineering - Lean Manufacture': 11,

'Senior iOS Developer': 11, 'IT Security Analyst': 11,

'Full Stack Developer': 11,

'iOS Engineer': 11,

'Mobile Developer': 11,

'Luxury fragrance consultants needed for Xmas!': 10,

'Sales Associate': 10,

'Payroll Clerk': 10,

'Demonstrator': 10,

'Lean Manufacturing': 10,

'Automotive Controls Engineer': 10,

'Senior Designer': 10,

'JavaScript Developer': 10,

'Sales Engineer': 10,

'Network Marketing': 10,

'Payroll Data Coordinator Positions - Earn $100-$200 Daily ': 10,

'Process Improvement Project Engineering Manager': 10,

'Frontend Developer': 10,

'Backend Engineer': 10,

'Food Quality': 10,

'CNC Machinist': 10,

'Director, Supply Chain - Strategy': 10,

'Marketing Director': 10,

'Electrical Controls Engineer': 10,

'Sales Representative with Management Training - AT&T': 10,

'Inside Sales': 10,

'Account Sales Managers $80-$130,000/yr': 10,

'Talent Management Process Manager': 10,

'Electrical Maintenance Technician - Major States': 10,

'Quality Manager': 10,

'Regional Field Sales Representative': 10,

'Health Safety Environmental Manager': 10,

'Sales Consultant': 9,

'Technical Project Manager': 9,

'Senior Product Manager': 9, 'Senior Accountant': 9,

'Call Center Supervisor': 9,

'Senior Software Developer': 9,

'Lead Developer': 9,

'Project Coordinator': 9,

'Digital Account Manager': 9,

'Title Closer': 9,

'Agency Sales Managers $150-$175,000/yr': 9,

'Customer Service Representative ': 9,

'Senior PHP Developer': 9,

'Senior Account Manager': 9,

'Art Director': 9,

'Sales Rep for AT&T Solutions Provider - Management Training': 9,

'Social Media Intern': 9,

'Injection Molding Supervisor': 8,

'Account Executive ': 8,

'Sales Professional': 8,

'Outside Sales Professional': 8,

'Technical Writer': 8,

'Project Manager ': 8,

'Service Delivery Manager 2 ': 8,

'Key Account Manager': 8,

'HR Generalist': 8,

'Systems Administrator': 8,

'Marketing Assistant': 8,

'Financial Analyst': 8,

'Customer Service Team Lead': 8,

'Office Assistant': 8,

'Title/Escrow Closer': 8,

'Systems Engineers/Network Administrators/Tiers I-III': 8,

'Sales Executive ': 8,

'Data Engineer': 8,

'Production Manager': 8,

'Chief Financial Officer': 8,

'Production Engineer': 8,

'Business Development Executive': 8,

'Sale Representatives': 8,

'Senior QA Engineer': 7,

'Copywriter': 7,

'Hiring 8-10 Reps by Monday- Customer Service/Sales': 7,

'Sales Coordinator': 7,

'Technical Support Associate': 7,

'Business Development Associate': 7,

'Director of Sales': 7,

'Military Veterans Wanted for Solar Energy Construction': 7,

'Customer Service Associate ': 7,

'Sales, Assistant Manager & Market Manager Positions Available': 7,

'Home Automation and Alarm Sales Office Launch - AT&T Digital Life': 7,

'Frontend Engineer': 7,

'Front-End Engineer': 7,

'Customer Service Rep': 7,

'Home Improvement Marketing': 7,

'HR Manager': 7,

'Campaign Manager': 7,

'Event Specialists': 7,

'Client Service Professional': 7,

'Network Engineer': 7,

'Executive Chef': 7,

'Truck Driver - CDL Truck Driver - Truck Driving Jobs': 7,

'Financial Controller': 7,

'Recovery Specialists': 7,

'Mirfield Warehousing Apprenticeship Under NAS 16-18 Year Olds Only ': 7,

'Interaction Designer': 7,

'Customer Service Reps': 7,

'Business Development Director': 7,

'Python Developer': 7,

'Financial Advisor': 7,

'Title Insurance Ops: Sr Title Officer/Counsel': 6,

'Field Sales Representative': 6,

'Promotions / Marketing Assistant': 6,

'Administrative Assistant ': 6,

'Attorney': 6,

'Head of Product': 6,

'Senior .NET Developer': 6,

'Title Account Executive': 6,

'Account Manager ': 6,

'Business Developer': 6,

'Customer Service Specialist': 6,

'Insurance Sales Representative': 6,

'Senior Network Engineer': 6,

'Sales Lead Generator': 6,

'Recruitment Consultant': 6,

'Intern': 6,

'Product Analyst': 6,

'Front-End Web Developer': 6,

'Senior Project Manager': 6,

'Sales Representative ': 6,

'Customer Service Positions': 6,

'Vehicle Purchaser': 6,

'Appointment Coordinator': 6,

'Director of Marketing': 6,

'Store Manager': 6,

'Admin Assistant': 6,

'Project Controls Specialist': 6,

'QA Manager': 6,

'Internship': 6,

'Sr Software Engineer (Python/Django) - Remote': 6,

'Technical Support Specialist': 6,

'Appointment Setter': 6,

'Lawn and Maintenance Contractors ': 6,

'Back-End Developer': 6,

'Personal Assistant': 6, 'Account Director': 6,

'Front End Engineer': 6,

'Creative Director': 6,

'Senior iOS Engineer': 6,

'Senior Visual Designer': 6,

'Marketing and Sales Representative- Full Time Position': 6,

'Ruby on Rails Developer': 6,

'Escrow Officer / Closer': 6,

' Payroll Data Entry Clerk Position - Earn $100-$200 Daily ': 6,

'Senior Ruby Developer': 6,

'Field Technician': 6,

'Project Engineer': 6,

'Marketing Specialist ': 6,

'Application Support Analyst': 6,

'Teaching English': 6,

'Senior Territory Manager': 6,

'PHP Web Developer': 6,

'Retail Associate': 6,

'Junior Software Engineer': 6,

'Maintenance Mechanic': 6,

'Business Development': 6,

'Birmingham Business Admin Apprenticeship Under NAS 16-18 Year Olds Only': 5,

'Marketing Executive': 5,

'Director of Operations': 5,

'Business Development Intern': 5,

'Senior Front End Engineer': 5,

'Customer Service Specialist in our Promotions Department': 5,

'Client Services Manager': 5,

'Marketing Rep Positions (Base Plus Commissions)': 5,

'Senior Marketing Manager': 5,

'Specialist Curriculum Associate': 5,

'Associate': 5,

'Customer Service Manager': 5,

'Applications Engineer': 5,

'Support Worker (Personal Assistant)': 5,

'Junior Digital Designer': 5,

'Entry Level CSR Wanted $22.50/HR PLUS Commissions': 5,

'Receptionist ': 5,

'Customer Service Agent': 5,

'Front End Web Developer': 5,

'Facilities Engineer': 5,

'Growth Hacker': 5,

'Junior Web Developer': 5,

'Business Development Manager ': 5,

'Sales Account Executive': 5,

'Junior Web Designer': 5,

'Driver II ': 5,

'Graduate Summer Work Program -- Limited Openings -- Apply Now': 5,

'Backend Developer': 5,

'25 CLIENT SUPPORT OFFICERS HIRING : IMMEDIATELY PLACING': 5,

'Administrative Coordinator': 5,

'Development Manager': 5,

'Customer Care Representative': 5,

'Business Intelligence Analyst': 5,

'Digital Designer': 5,

'\*\*\*NEEDED 15-20 CUSTOMER SERVICE REPS': 5,

'Solutions Architect': 5,

'Passport and Visa Specialist': 5,

'Content Writer': 5,

'Product Owner': 5,

'Content Marketer': 5,

'Marketing / Sales Representative ': 5,

'Executive Director': 5,

'Senior Account Executive': 5,

'Data Entry Clerk': 5,

'Oracle DBA': 5,

'.Net Developer': 5,

'Security Engineer': 5,

'Customer Service Positions ($18-$22 an hour)': 5,

'Sales Intern': 5,

'Head of Online Marketing': 5,

'Drupal Developer': 5,

'Senior Ruby on Rails Developer': 5,

'EXPERIENCED CAREGIVERS NEEDED TODAY!THE BEST PAY & AWESOME BENEFITS!!': 5,

'Graphic Designer ': 5,

'Customer Relations - Full Time - No Call Center': 5,

'General Application': 5,

'Program Manager': 5,

'Full-Cycle Recruiter (Oil & Gas)': 5,

'Promotional Sales Representative': 5,

'Accounting Assistant': 5,

'Bookkeeper': 5,

'Customer Service Technical Specialist': 5,

'Director of Rehab': 5,

'Van Foreman / Driver - Class A': 5,

'Online Marketing Specialist': 5,

'Senior Interaction Designer': 5,

'Operations Specialists': 5,

'Senior Sales Executive': 5,

'Super Marketing Specialist': 5,

'Title Sales Representative': 5,

'Care Assistant': 5,

'200K + MANAGEMENT POSITION FOR EXPERIENCED MERCHANT CASH ADVANCE REPS': 5, 'Completion Engineer': 5,

'Lead Designer': 5,

'Full-Cycle Oil & Gas Recruiter ': 5,

'Property Preservation Field Crews': 5,

'HR Assistant': 5,

'Support Engineer': 5,

'Structural Engineer': 5,

'Online Marketing Manager': 5,

'Customer Service Reps Needed For Expansion': 5,

'Title Insurance & Settlement Sales: Midwestern Account Executive': 4,

'Public Relations Manager': 4,

'Paid Training for Direct Sales Representative with Management Opportunit y': 4,

'Senior C# Developer': 4,

'Junior Project Manager': 4,

'Administration Assistant': 4,

'iOS developer': 4,

'Commercial Real Estate Paralegal- Atlanta-Buckhead': 4,

'VP Engineering': 4,

'Executive Assistant ': 4,

'Brand Manager': 4,

'Design Intern': 4,

'Sr. Accountant': 4,

'Web Application Developer': 4, 'Principal Engineer': 4,

'Senior Frontend Developer': 4,

'Sales Agents $400/wk Plus Commission': 4,

'QA Tester': 4,

'Senior Developer Ruby on Rails': 4,

'Translation Project Manager': 4,

'Marketing Manager ': 4,

'Accounts Payable Clerk': 4,

'Junior Developer': 4,

'Interactive Designer': 4,

'Electrician': 4,

'.NET Web Developer': 4,

'Software Development Intern': 4,

'Marketing Representative Positions': 4,

'Software Engineer ': 4,

'Title Insurance: Reader-Residential & Commercial-NYC & Long Island': 4,

'Test Analyst': 4,

'Solution Architect': 4,

'Business Development Specialist': 4, 'Customer Support Associate': 4,

'UI Developer ': 4,

'Optical Sales': 4,

'Junior Designer': 4,

'Sr. Reservoir Engineer': 4,

'Desktop Support Technician': 4,

'Senior Android Developer': 4,

'Addiction and Mental Health Counsellor': 4,

'Production Artist': 4,

'Senior Software Engineer ': 4,

'Analyst': 4,

'Management Accountant': 4,

'C# Developer': 4,

'PHP Web Application Developer': 4,

'Digital Project Manager': 4,

'Appointment Setter avg. 1,000-1,100 weekly Plus Commission': 4,

'Director of Finance': 4,

'Marketing Internship': 4,

'Account Coordinator': 4,

'Engagement Manager': 4,

'Staff Accountant': 4,

'Finance Assistant': 4,

'General Clerk 2 ': 4,

'PT / FT Drivers': 4,

'Network Administrator': 4,

'Estimator': 4,

'Chelmsford Customer Service Apprenticeship Under NAS 16-18 Year Olds Onl y': 4,

'Lead Software Engineer': 4,

'Occupational Therapy Assistant': 4,

'Senior Quality Assurance Engineer': 4,

'Assistant Retail Manager -- Must LOVE Dogs': 4,

'Outbound Sales - Telemarketing for Healthcare IT': 4,

'Web Application Developer (Node.JS)': 4,

'Financial Services Professional': 4,

'Full Stack Engineer': 4,

'QA / BA entry level': 4,

'Customer Support Specialist': 4,

'Field Engineer': 4,

'Regional Manager': 4,

'Executive Assistant For Rapidly Growing Startup (Temp-to-Perm) - $36K': 4,

'Sr. Java Developer': 4,

'Insurance Administrator': 4,

'Senior Account Executive - Embedded Solutions': 4,

'IT Security': 4,

'Digital Marketing Specialist': 4,

'Java Web Developer': 4,

'GIS Technician': 4,

'Quality Assurance Analyst': 4,

'Software developer': 4,

'Mail Processing Associate - General Clerk 1 ': 4,

'Healthcare Support Rep': 4,

'Head of Operations': 4,

'Registered Nurse ': 4,

'Program Director (Danville Center)': 4,

'Software Engineer in Test': 4,

'Senior Data Scientist': 4,

'Scrum Master': 4,

'Lead UI/UX Designer': 4,

'Customer Assistant': 4,

'Marketing Analyst': 4,

'Clinic Assistant, North West London': 4,

'Call Center Representative I': 4,

'Applications Administrator': 4,

'English Teacher Overseas (Conversational)': 4,

'Customer Support Star': 4,

'Customer Care Specialist': 4,

'Carpenter': 4,

'Healthcare Assistant': 4,

'Ruby on Rails Engineer': 4,

'Wakefield Trainee Marketing Consultant Apprenticeship Under NAS 16-18 Year

Olds Only': 4,

'Software Engineering Intern': 4,

'Corporate Controller': 4,

'Technical Lead': 4,

'EHS Manager': 4,

'Mobile Software Engineer': 4,

'General Manager': 4,

'VP of Engineering': 4,

'Accounts Assistant': 4,

'Accounting Manager': 4,

'Receptionist/Office Clerk': 4,

'Care Assistant (Personal Assistant)': 4,

'Gatwick Customer Service Apprenticeship 16-18 Year Olds Only': 4,

'Digital Marketing Executive': 4,

'Chief Operating Officer': 4,

'Director of Client Engagement ': 4,

'Hotel Guest Service Agent': 4,

'Clinic Assistant, Kingston': 3,

'Senior Business Development Manager': 3,

'Inside Sales ': 3,

'PR Director': 3,

'Customer Service Techincal Specialist - Part Time': 3,

'Risk Supervisor': 3,

'Management Associate': 3,

'Manager Trainee': 3,

'Technical Support Representative': 3,

'Minnesota Spanish Bilingual Communication Assistant': 3,

'Implementation Manager': 3,

'Environmental Scientist': 3,

'Digital Copywriter': 3,

'Sales Account Manager': 3,

'Client Ambassador': 3,

'IOS Developer': 3,

'Service Advisor': 3,

'Sales Leader - Healthcare Veterans': 3,

'Southend-on-Sea Traineeships Under NAS 16-18 Year Olds Only': 3, 'Customer Service Associate- Part Time ': 3,

'Editor': 3,

'Java Developer ': 3,

'Chief Marketing Officer': 3,

'Clinical Supervisor': 3, 'Affiliate Manager': 3,

'Security Consultant': 3,

'DH7 Business Admin Apprenticeship Under NAS 16-24 Year Olds Only': 3,

'Recruiting Coordinator': 3, 'Financial Accountant': 3,

'Junior Product Manager': 3,

'Software Engineer - Android': 3,

'Human Resources Assistant': 3,

'SQL Developer': 3,

'Systems Support Technician': 3,

'Inside Sales Professional-Omaha': 3,

'Business Development Representative': 3,

'Customer Service Representative - Entry-Level Management': 3,

'Pizza Delivery Drivers - Harrogate': 3,

'Junior DevOps Engineer': 3,

'SEO Manager': 3,

'Technical Site Representative ': 3,

'Pharmacist': 3,

'Solar Installer': 3,

'Design Internship': 3,

'Customer Engagement Solutions Sales Executive': 3,

'Assistant Accountant/immediate start': 3,

'Computer Support Specialist': 3,

'Customer Success Engineer': 3,

'Junior Software Developer': 3,

'Ruby developer': 3,

"PASSIONATE EXPERIENCED PCP's NEEDED TODAY! WE PAY MORE FOR THE VERY BEST I

N THE INDUSTRY!": 3,

'Personal Care Worker - Community Living Assistant': 3,

'Certified Electrician': 3,

'Wireless Sales Consultants Wanted - Hiring This Week!!!': 3,

'Product Manager ': 3,

'Director of Product Management': 3,

'SAP BI/HANA Managing Consultant': 3,

'Area Manager': 3,

'Police Officer': 3,

'Senior Application Developer': 3,

'Receptionist - Part Time ': 3,

"Part-time In-Store Assistants (Papa John's Pizza)": 3,

'Collections Manager': 3,

'Account Planner': 3,

'SAP BW Sr. Developer': 3,

'Data Architect': 3,

'Senior Digital Producer': 3,

'Head of Business Intelligence': 3,

'Operations Engineer': 3,

'Database Administrator': 3,

'SAP BOBJ Sr. Developer': 3,

'Title Insurance- VP of Operations & Sales- Chicago Loop': 3,

'Senior Engineering Product Manager': 3,

'Internal Marketing Representative': 3,

'Software Engineer Intern': 3,

'Graphics Designer': 3, 'Project manager': 3,

'Field Technician ': 3,

'Web Application Engineer': 3,

'Security Officer (SO)': 3,

'Assistant Accountant': 3,

'Sales Director - Replise US Operations': 3,

'Senior UI/UX Designer': 3,

'Mobile Product Manager': 3,

'Minnesota Communication Assistant': 3,

'Management Trainee': 3,

'CTO': 3,

'Part Time Cleaner- Ann Arbor Area ': 3,

'Experienced Dog Groomer - Costa Mesa': 3, 'Telesales Opportunities': 3,

'Business Development Representative ': 3,

'Mortgage Loan Processor': 3,

'Technical Business Analyst': 3,

'Collections Representatives': 3,

'Leasing Consultant': 3,

'Sr Software Engineer': 3,

'Senior Software Engineers, C++ for AUTOMOTIVE': 3,

'Marketing Communications Manager': 3,

'Web Project Manager': 3,

'Agent inbound business': 3,

'Care Worker (Personal Assistant)': 3,

'IT Manager': 3,

'Account Supervisor': 3,

'Director, eCommerce': 3, 'Graphics Artist': 3,

'Javascript Engineer': 3,

'Channel Training Manager': 3,

'Senior Mechanical Engineer': 3,

'Lobby Ambassador ': 3,

'Social Media Specialist': 3,

' Account Executive/Digital Ad Sales': 3,

'Design Engineer': 3,

'Administrative Clerk': 3,

'Head of Sales': 3,

'Full Stack Rails Engineer': 3,

'Clinic Assistant, Suffolk': 3,

'Experienced Travel Recruiter': 3,

'Chemical Operator': 3,

'Product Lead': 3,

'Back-end Developer': 3,

'Sales and Marketing team expanding. Hiring immediately': 3,

'Brand Ambassador': 3,

'Regional Sales Executive ': 3,

'Customer Success Specialist': 3,

'Janitors (SF Bay Area)': 3,

'IT Developer': 3,

'PR8 Apprentice Administrator Under NAS 16-18 Year Olds Only': 3,

'Associate Product Manager': 3,

'Management - Entry-Level': 3,

'New York Communication Assistant': 3,

'Product Specialist': 3,

'Minnesota Part time Maintenance Technician': 3,

'HVAC Technician': 3,

'Director of Demand Generation': 3,

'Senior Systems Engineer': 3,

'WF7 5BE Pontefract Recruitment Apprenticeship 16-18 Year Olds Only': 3,

'Contact Resolution Supervisor': 3,

'Outside Sales | Design Consultant': 3,

'UI/UX Lead Designer': 3,

'Writers': 3,

'Seamstress': 3,

'Clinic Assistant': 3,

'Shyp Hero Courier - Los Angeles ': 3,

'Substance Abuse Counselor (Greensboro Center)': 3,

'Retail Store Manager': 3,

'Java developer': 3,

'JavaScript Frontend Developer': 3,

'Software Engineer - Frontend': 3,

'Internal Recruiter': 3,

'Lead UX Designer': 3,

'Partnership Manager': 3,

'Customer Support': 3,

'Accounting Clerk': 3,

'Consultant': 3,

'Home Care Schedulers': 3,

'Benefits Consultant': 3,

'Research Associate': 3,

'Registered Nurse': 3,

'Digital Producer': 3,

'Lead Web Developer': 3,

'Recruiting Manager': 3,

'Head of Human Resources': 3,

'Compliance Analyst': 3,

'Maintenance Supervisor': 3,

'UI / UX Designer': 3,

'Search Marketing Specialist': 3,

'Ruby Engineer': 3,

'QA Automation Engineer': 3,

'FRONT OFFICE MANAGER': 3,

'Database Engineer': 3,

'Warehouse Manager': 3,

'Implementation Specialist': 3,

'IT Project Manager': 3,

'Graduates: English Teacher Overseas': 3, 'Community Management Intern': 3,

'Sales Rep': 3,

'Customer Service Advisor': 3,

'Association Manager': 3,

'Lead Data Scientist': 3,

'Wastewater Technician ': 3,

'Hotel Housekeeper': 3,

'Electrical Engineer': 3,

'Real Estate Agents': 3,

'Front Desk Receptionist': 3,

'Flooring Technicians': 3,

'BB11 5TD Business Admin Apprenticeship Under NAS 16-18 Year Olds Only': 3, 'Digital Account Director': 3,

'Licensed Practical Nurse (LPN)- Private Duty': 3,

'Senior Java developers (Java SE)': 3,

'Content Marketing Manager': 3,

'Delivery Driver - Part Time ': 3,

'Title Insurance: Recording Officer / Recorder -NYC': 3,

'Delivery Driver': 3,

'Front-End Developer ': 3,

'Business Manager': 3,

'Sales Manager ': 3,

'PROGRESS Systems Supervisor': 3,

'Customer Success Guru': 3,

'Inside Sales Specialist': 3,

'Editorial Intern': 3,

'Secondary Science Teacher': 3,

'Senior Technical Writer': 3,

'Registered Nurse (Home Health)': 3,

'Cook': 3,

'Sr. Network Engineer': 3,

'Recruiter': 3,

'Brand Ambassador - Entry-Level Advertising, Marketing and PR': 3,

'New York Spanish Bilingual Communication Assistant ': 3,

'Marketing Lead': 3,

'Line Cook & Dishwashers': 3,

'Swindon Logistics Apprentice/Warehousing Apprenticeship Under NAS 16-18 Ye ar Olds Only': 3,

'Talent Manager': 3,

'Human Resources Coordinator': 3,

'Traffic Manager Web/Mobile': 3,

'Quality Assurance (QA) Engineer': 3,

'Drinking Water/Wastewater Operator': 3,

'Part-time Local Coordinator for highschool Exchange Students': 3,

'Quality Engineer': 3,

'Sales Managers (2x)': 3,

'Senior Android Engineer': 3,

'TapHunter Intern Leadership Program': 3,

'Full Stack Web Developer': 3,

'Data Solutions Developer (Node.JS)': 3,

'Frontend Web Developer': 3,

'Junior Account Manager': 3,

'Sales manager': 3,

'Happiness Recruiter': 3,

'Channel Manager': 3,

'Customer Service Representatives': 3,

'Crane Operator': 3,

'Chief Operating Officer (COO)': 3,

'Account Executive - Charlotte': 3,

'Executive Administrative Assistant': 3,

'General Construction/General Labor': 3,

'Technical Recruiter': 3,

'Digital Marketing Intern': 3, 'Settlements Coordinator': 3,

'Human Resources Director': 3,

'Birmingham Apprenticeships Under NAS 16-18 Year Olds Only': 3, 'Enterprise Manager ': 3,

'Customer Experience Specialist': 3,

'Database Analyst': 3,

'Recovery Specialist': 3,

'Senior JavaScript Developer': 3,

'Sheffield Estate Agents Office Assistant Apprenticeship Under NAS 16-18 Ye ar Olds Only': 3,

'HR Specialist': 3,

'Specialist Teaching Associate': 3,

'Business Development Executive ': 3,

'Car Sales Executive ': 3,

'Inside Sales Rep': 3,

'File Clerk': 3,

'Ohio French Creole Bilingual Communication Assistant ': 3,

'Marketing': 3,

'Sales Development Rep': 3,

'Sr. Software Engineer': 3,

'Junior Systems Administrator': 3,

'Operations Lead': 3,

'Lead Mechanical Engineer': 3,

'Position Finance Assistant': 3,

'Database Developer': 3,

'Director of Technical Operations': 3,

'UX Lead': 3,

'Staff Interpreter': 3,

'Insurance Agent': 3,

'Game Developer': 3,

'Data Entry Clerk II ': 3,

'ETL Developer': 3,

'Content Strategist': 3,

'Junior Graphic Designer': 3,

'Texas Communication Assistant': 3,

'CAD Operator': 3,

'Home Carer (Personal Assistant)': 3,

'User Interface Designer': 3,

'Marketing - Admin Support ': 2,

' Marketing Specialist ': 2,

'Manager, Business Development': 2,

'Work with us': 2,

'Cognos Developer': 2,

'UST Testing Technician': 2,

'Senior Mechanical Designer': 2,

'Product Marketing Manager ': 2,

'Senior Loan Originator': 2,

'Seeking Pet Lovers: Pet Sitting/Dog Walking': 2,

'Software Developer ': 2,

'Senior Strategist': 2,

'Traffic Manager': 2,

'Senior Test Engineer': 2,

'Manchester Business Admin Apprenticeship available under NAS 16-18 year ol ds only': 2,

'Outside Sales Executive': 2,

'Sales Associate ': 2,

'Digital Sales Manager': 2,

'Driver I ': 2,

'Buyers Admin Assistant': 2,

'Project Subcontracting Manager': 2,

'Car Sales Executive': 2,

'Mainframe Developer': 2,

'Geophysicist': 2,

'Customer Happiness Technician (cell phone & tablet repair) for growing Sea ttle startup': 2,

'Junior Front End Developer': 2,

'UI Designer ': 2,

'Tech Support Specialist': 2,

'Customer Service Apprenticeship 16-18 Year Olds Only': 2,

'Sales Consultant NYC': 2,

'PHP Developer ': 2,

'Enterprise Account Executive': 2,

'Material Engineers Specialists': 2,

'Driver I - Part Time ': 2,

'Part-time Warehouse Help': 2,

'Accounts & Payroll Officer': 2,

'Associate Luxury Manager': 2,

'Corporate Controller ': 2,

'Elite Agent': 2,

'Software Project Manager': 2,

'Customer Experience Representative': 2,

'Compliance Coordinator': 2,

'Information Architect and UI/UX Designer': 2,

'Scheduling Assistant': 2,

'Commercial Lines Account Manager': 2,

'Linux Engineer': 2,

'Full-Stack Software Developer': 2,

'North East Training Provider Requires Health and Social Level 2, 3 and 5 A ssessors': 2,

'Customer Support Agent': 2,

'Legal Services Clerk / Immigration Consultant, Downtown Vancouver': 2,

'Marketing Administrator': 2,

'CUSTOMER SERVICES REP( FULL TIME POSITION)': 2,

'Psychiatric Nurse Practitioner': 2,

'ANDROID DEVELOPER': 2,

'Voyageur Medical Wheelchair Driver ': 2,

'Account Executive - Redlands, CA': 2,

'Infrastructure Manager': 2,

'Outside Sales Professional-Macomb': 2,

'Recruitment Specialist': 2,

'IT Consultant': 2,

'Retail Solution Specialist': 2,

'Customer Service ': 2,

'General Clerk 1 ': 2,

'Embedded and Application Engineer': 2,

'CDL Driver': 2,

'Director of Human Resources ': 2,

'Reprographics Specialist ': 2,

'Business Systems Analyst': 2,

'Leicester Fragrance and Beauty Promotional Staff': 2,

'VP of Product': 2,

'Advisor-Inbound Technical': 2,

'Sous Chef': 2,

'Sales & Support role': 2,

'Customer Service Agent From Home': 2,

'Core member of a startup in the hospitality industry': 2,

'Operational Database Administrator ': 2,

'Office Assistant III': 2,

'Administrative Support': 2,

'Magento Developer': 2,

'Personal Assistant to the CEO': 2,

'Optician': 2,

'Construction Engineer, Electrical, Instrumentation, Mechanical': 2,

'Digital Marketing Consultant': 2,

'Account Executive - Sacramento, CA': 2,

'Corporate Account Executive': 2,

'Human Resources Generalist': 2,

'Employment Specialist': 2,

'Nursing Professionals': 2,

'Process Safety Engineer': 2,

'Restaurant Manager': 2,

'Customer Service Representative to Enroll People in NO COST Cell Phone Pro gram': 2,

'Test Automation Engineer': 2,

'Senior UX Designer': 2,

'Senior System Engineering Manager ': 2,

'QA Engineer ': 2,

'Accounts Receivable Analyst': 2,

'SEO Consultant': 2,

'SEO Analyst': 2,

'Principal Consultant': 2,

'Full Stack Ruby Engineer': 2,

'Senior System Administrator': 2,

'HX5 9HT Business Admin Apprenticeship Under NAS 16-18 Year Olds Only': 2,

'Accounting Specialist': 2,

'Returning BI Professionals': 2,

'Senior .NET Web Developer': 2,

'Lead Network Engineer': 2, 'Python Developer at Growth Intelligence': 2,

'Client Support Specialist': 2,

'Junior Interactive Designer': 2,

'Customer Service Team Leader': 2,

'Dewsbury Business Admin Apprenticeship Under NAS 16-18 Year Olds Only': 2,

'Receptionist Office Assistant': 2,

'Field Supervisor ': 2,

'Customer Service Associate- On Call ': 2,

'Psychiatric Nurse from Europe (Relocation to England)': 2,

'Part Time Cleaner- Chelsea/Dexter': 2,

'Web App Developer': 2,

'Telemarketer': 2,

'HR Intern': 2,

'Data Entry Clerk / Administrative Assistant': 2,

'Technical Intern': 2,

'Senior Benefits Analyst': 2,

'Call Center Representatives': 2,

'IT Security Engineer, Immediate full time opening at Fortune 500 Co.': 2,

'LINUX SYSTEM ADMINISTRATOR': 2,

'Business Development Lead': 2,

'Internal IT Administrator': 2,

'Caregiver/HHA/CNA- Watervliet/Hartford': 2,

'Copywriter (Freelance)': 2,

'Nuneaton DGV Apprenticeship available under NAS 18 year olds only!': 2,

'Inside Sales Professional': 2,

'Growth Marketing Manager': 2,

'Now Hiring Inbound Sales Representatives': 2,

'Web Application Developers': 2,

'Product Support Engineer': 2,

'Manchester Apprentice Office Administrator Under NAS 16-18 Year Olds Onl y': 2,

'Accounts & Payroll Administrator': 2,

'Motion Graphics Designer': 2,

'Senior / Lead Designer': 2,

'Marketing Exec': 2,

'Inside Sales Manager': 2,

'Business Development Associate ': 2,

'Cost Engineer': 2,

'SharePoint Developer': 2,

'Events Manager': 2,

'Mechanical Assembly & Test Technician': 2,

'Grant Funding Advisor': 2,

'Purchasing Specialist': 2,

'Senior Software Engineer QA Automation': 2,

'Vice President': 2,

'Product Engineer': 2,

'Full-Time Caregiver (Position B) for a Shy, Sweet Young Woman': 2,

'Sales Representative with Management Training - DirecTV': 2,

'Engineering Graduate Trainee @ Upstream': 2,

'Interaction Designer Internship': 2,

'Retail Staff Member': 2,

'UI Developer': 2,

'Records Clerk ': 2,

'Associate Strategist': 2,

'Customer Success Associate': 2,

'Pre-Sales Executive': 2,

'Business Analyst Intern': 2,

'Head of Customer Experience': 2,

'CM3 4AJ Customer Service Apprenticeship Under NAS 16-18 Year Olds Only': 2,

'International IT Recruiter': 2,

'Digital Marketing Trainee': 2,

'SQL Server Developer': 2,

'Agent-Inbound Customer Service': 2,

'SharePoint Consultant': 2,

'Regional Change Consultant': 2,

'Business Operations Intern': 2,

'Web Developer (Part-Time)': 2,

'Medical Receptionist/Scheduler': 2,

'Junior Sales Representative': 2,

'Producer': 2,

'Manufacturing Process Supervisor': 2,

'Administrative': 2,

'Fall Internship': 2,

'Requirements Analyst': 2,

'PPC Specialist': 2,

'Full Stack Software Engineer': 2,

'Chief Technology Officer': 2,

'CUSTOMER SERVICE REPRESENTATIVE': 2,

'ASP.net Developer Job opportunity at United States,New Jersey': 2,

'Summer Internship: Java ': 2,

'Rooms Division Manager': 2,

'Accounts Payable Clerk ': 2,

'Winter / Spring Internship': 2,

'Full-Cycle Recruiter': 2,

'S20 1AH Business Admin Apprenticeship Available Under NAS 16-18 year olds only!': 2,

'Front-End Developers': 2,

'Contract Sales Representative': 2,

'Medical Surgical RN ': 2,

'Title Insurance: National Commercial Coordinator / Paralegal -NYC': 2,

'Office Manager / Executive Assistant': 2,

'International Broadcaster, English Service': 2,

'Senior Programmer': 2,

'Customer Care Representative I ': 2,

'Advanced Network Administrator': 2,

'Vaadin Developer ': 2,

'Front End Software Engineer': 2,

'Marketing Associate ': 2,

'Full-Time Caregiver (Position C) for a Shy, Sweet Young Woman': 2,

'Senior Product Designer': 2,

'Quality Assurance Specialist': 2,

'Client Services Director': 2,

'Smart-Meter Expert': 2,

'Cooks & Cashiers': 2,

'Outside Sales Professional-Greater St. Paul Area': 2,

'Senior Engineer (Dev ops)': 2,

'Full-Stack Engineer': 2,

'Front-End Developer/HTML/JavaScript/CSS': 2,

'Entry Level Sales and Marketing Rep - Northwest/West Chicagoland Area': 2,

'Store Manager position': 2,

'Trainee Recruitment Consultant': 2,

'Sr. Account Executive': 2,

'Chief Marketing Officer (CMO)': 2,

'Paralegal': 2,

'CSR': 2,

'Project / Program Manager': 2,

'Sales Account Executive- Printing/Commercial': 2,

'Graduate Developer': 2,

'Quality Assurance Lead': 2,

'The Symicor Group is Looking for Seasoned Banking Recruiters to Join Our F irm': 2,

'INTERMEDIATE PHP DEVELOPER': 2,

'Health + Safety Professional': 2,

'Entrepreneurial Executive Assistant': 2,

'Service Associate': 2,

'Electrical Supervisor': 2,

'Winter Associate': 2,

'Hotel Front Desk Clerk': 2,

'User Experience Lead': 2,

'Sr. Manager Plant Controller - Tyler, TX ': 2,

'Operations Analyst': 2,

'Director of Engineering': 2,

'Director, Information Security ': 2,

'Public Relations Coordinator': 2,

'Project Lead': 2,

'Growth Analyst ': 2,

'Application Developer - Salesforce': 2,

'Web Engineer': 2,

'In-House Legal Counsel (10 month contract)': 2,

'CUSTOMER SERVICE REP': 2,

'Lead Software Engineer - Web': 2,

'Title Insurance: Title Coordinator -Long Island, NY': 2,

'Software Architect ': 2,

'Title Insurance: Title Assistant / Title Coordinator/ Property Research Ex aminer': 2,

'H1B SPONSOR FOR L1/L2/OPT': 2,

...}

# In [34]: 

manager\_list

**=**

[

'manager'

,

'management'

]

engineer\_list

**=**

[

'developer'

,

'tester'

,

'engineer'

,

'software'

,

'scientist'

,

'designer'

,

'a

marketing\_list

**=**

[

'marketing'

,

'sales'

,

'accountant'

,

'business'

,

'executive'

,

'finance'

,

'

[35]:

df

**=**

df

.

reset\_index

()

# In [36]: 

df

.

columns

Out[36]:

Index(['index', 'title', 'location', 'department', 'salary', 'telecommutin g',

'has\_company\_logo', 'has\_questions', 'employment\_type',

'required\_experience', 'required\_education', 'industry', 'function',

'fraudulent'], dtype='object')

# In [37]: 

df **=** df[['title', 'location', 'department', 'salary', 'telecommuting',

'has\_company\_logo', 'has\_questions', 'employment\_type',

'required\_experience', 'required\_education', 'industry', 'function', 'fraudulent']]

# In [38]: 

df

[

'simplified\_titles'

]

**=**

''

# In [39]: 

**for**

i

**in**

range

(

df

.

shape

[

0

]):

current\_title

**=**

str

(

df

[

'title'

].

values

[

i

]).

lower

()

current\_title\_list

**=**

current\_title

.

split

(

' '

)

**for**

each\_word

**in**

current\_title\_list

:

**if**

each\_word

**in**

manager\_list

:

df

[

'simplified\_titles'

].

values

[

i

]

**=**

'Manager'

**break**

**elif**

each\_word

**in**

engineer\_list

:

df

[

'simplified\_titles'

].

values

[

i

]

**=**

'Engineer'

**break**

**elif**

each\_word

**in**

marketing\_list

:

df

[

'simplified\_titles'

].

values

[

i

]

**=**

'Marketing'

**break**

**else**

:

df

[

'simplified\_titles'

].

values

[

i

]

**=**

'Others'

[40]:

df

[

'simplified\_titles'

].

value\_counts

()

Out[40]:

Others 8048

Engineer 4792

Marketing 3273

Manager 1740

Name: simplified\_titles, dtype: int64

# In [41]: 

df

.

columns

Out[41]:

Index(['title', 'location', 'department', 'salary', 'telecommuting',

'has\_company\_logo', 'has\_questions', 'employment\_type',

'required\_experience', 'required\_education', 'industry', 'function',

'fraudulent', 'simplified\_titles'], dtype='object')

# In [42]: 

df **=** df[['simplified\_titles','location', 'department', 'salary', 'telecommuting',

'has\_company\_logo', 'has\_questions', 'employment\_type',

'required\_experience', 'required\_education', 'industry', 'function', 'fraudulent']]

# In [43]: 

df

.

info

()

<class 'pandas.core.frame.DataFrame'>

RangeIndex: 17853 entries, 0 to 17852

Data columns (total 13 columns):

# Column Non-Null Count Dtype

--- ------ -------------- -----

1. simplified\_titles 17853 non-null object
2. location 17509 non-null object
3. department 6330 non-null object
4. salary 17853 non-null object
5. telecommuting 17853 non-null int64
6. has\_company\_logo 17853 non-null int64
7. has\_questions 17853 non-null int64
8. employment\_type 14383 non-null object
9. required\_experience 10806 non-null object
10. required\_education 9752 non-null object
11. industry 12952 non-null object
12. function 11404 non-null object
13. fraudulent 17853 non-null int64 dtypes: int64(4), object(9) memory usage: 1.8+ MB

[44]:

department\_empty

**=**

df

[

df

[

'department'

].

isna

()]

department\_not\_empty

**=**

df

[

**~**

df

[

'department'

].

isna

()]

# In [45]: 

department\_empty

[

'department'

]

**=**

'Others'

<ipython-input-45-802de423c10c>:1: SettingWithCopyWarning:

A value is trying to be set on a copy of a slice from a DataFrame.

Try using .loc[row\_indexer,col\_indexer] = value instead

[See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/ stable/user\_guide/indexing.html#returning-a-view-versus-a-copy (https://pand as.pydata.org/pandas-docs/stable/user\_guide/indexing.html#returning-a-view-v ersus-a-copy)](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

department\_empty['department'] = 'Others'

# In [46]: 

df

**=**

department\_empty

.

append

(

department\_not\_empty

)

# In [47]: 

df

.

info

()

<class 'pandas.core.frame.DataFrame'>

Int64Index: 17853 entries, 1 to 17852

Data columns (total 13 columns):

# Column Non-Null Count Dtype

--- ------ -------------- -----

1. simplified\_titles 17853 non-null object
2. location 17509 non-null object
3. department 17853 non-null object
4. salary 17853 non-null object
5. telecommuting 17853 non-null int64
6. has\_company\_logo 17853 non-null int64
7. has\_questions 17853 non-null int64
8. employment\_type 14383 non-null object
9. required\_experience 10806 non-null object
10. required\_education 9752 non-null object
11. industry 12952 non-null object
12. function 11404 non-null object
13. fraudulent 17853 non-null int64 dtypes: int64(4), object(9) memory usage: 1.9+ MB

[48]:

Out[48]:

{

'GB, LND, London': 718,

'US, NY, New York': 658,

'US, CA, San Francisco': 472,

'GR, I, Athens': 464,

'US, , ': 339,

'US, TX, Houston': 268,

'US, IL, Chicago': 255,

'US, DC, Washington': 251,

'DE, BE, Berlin': 221,

'NZ, N, Auckland': 218,

'US, CA, Los Angeles': 185,

'GB, , London': 179,

'US, TX, Austin': 174,

'US, CA, San Diego': 164,

'GB, , ': 138,

'US, GA, Atlanta': 135,

'GB, LND, ': 131,

dict

(

df

[

'location'

].

value\_counts

())

# In [49]: 

df

[

'location'

]

**=**

df

.

location

.

str

[:

2

]

[50]:

dict

(

df

[

'location'

].

value\_counts

())

Out[50]:

{'US': 10636,

'GB': 2384,

'GR': 940,

'CA': 457,

'DE': 383,

'NZ': 333,

'IN': 271,

'AU': 214,

'PH': 132,

'NL': 127,

'BE': 117,

'IE': 114,

'SG': 80,

'HK': 77,

'PL': 76,

'EE': 72,

'IL': 72,

'FR': 70,

'ES': 66,

'AE': 54,

'EG': 52,

'SE': 49,

'RO': 46,

'DK': 42,

'ZA': 40,

'BR': 36,

'IT': 31,

'FI': 29,

'PK': 27,

'LT': 23,

'QA': 21,

'MY': 21,

'RU': 20,

'JP': 20,

'PT': 18,

'MX': 18,

'BG': 17,

'TR': 17,

'CN': 15,

'CH': 15,

'SA': 15,

'MU': 14,

'HU': 14,

'AT': 14,

'MT': 13,

'UA': 13,

'ID': 13,

'CY': 11,

'NG': 10,

'TH': 10,

'KR': 10,

'IQ': 10,

'LU': 9,

'BY': 9,

'AR': 9,

'BH': 9,

'PA': 9,

'NO': 8,

'RS': 7,

'KE': 7,

'CZ': 6,

'LV': 6,

'TT': 4,

'VN': 4,

'TW': 4,

'NI': 4,

'VI': 3,

'BD': 2,

'IS': 2,

'TN': 2,

'ZM': 2,

'KW': 2,

'SK': 2,

'AM': 2,

'CL': 2,

'LK': 2,

'KZ': 1,

'CM': 1,

'HR': 1,

'PE': 1,

'GH': 1,

'JM': 1,

'MA': 1,

'SD': 1,

'UG': 1,

'KH': 1,

'CO': 1,

'AL': 1,

'SV': 1,

'SI': 1} [51]:

df

.

info

()

<class 'pandas.core.frame.DataFrame'>

Int64Index: 17853 entries, 1 to 17852

Data columns (total 13 columns):

# Column Non-Null Count Dtype

--- ------ -------------- -----

1. simplified\_titles 17853 non-null object
2. location 17509 non-null object
3. department 17853 non-null object
4. salary 17853 non-null object
5. telecommuting 17853 non-null int64
6. has\_company\_logo 17853 non-null int64
7. has\_questions 17853 non-null int64
8. employment\_type 14383 non-null object
9. required\_experience 10806 non-null object
10. required\_education 9752 non-null object
11. industry 12952 non-null object
12. function 11404 non-null object
13. fraudulent 17853 non-null int64 dtypes: int64(4), object(9) memory usage: 1.9+ MB

# In [52]: 

df

**=**

df3

.

append

(

df4

)

df

[

'required\_experience'

].

unique

()

Out[52]:

array(['Mid-Senior level', 'Associate', 'Entry level', nan, 'Internship', 'Not Applicable', 'Director', 'Executive'], dtype=object)

# In [53]: 

df3

**=**

df

[

df

[

'required\_experience'

].

isna

()]

df4

**=**

df

[

**~**

df

[

'required\_experience'

].

isna

()]

# In [54]: 

df3

[

'required\_experience'

]

**=**

'Not Applicable'

<ipython-input-54-f3b398a155de>:1: SettingWithCopyWarning:

A value is trying to be set on a copy of a slice from a DataFrame.

Try using .loc[row\_indexer,col\_indexer] = value instead

[See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/ stable/user\_guide/indexing.html#returning-a-view-versus-a-copy (https://pand as.pydata.org/pandas-docs/stable/user\_guide/indexing.html#returning-a-view-v ersus-a-copy)](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

df3['required\_experience'] = 'Not Applicable'

In [55]:  [56]:

df

.

info

()

<class 'pandas.core.frame.DataFrame'>

Int64Index: 17853 entries, 6 to 17852

Data columns (total 13 columns):

# Column Non-Null Count Dtype

--- ------ -------------- -----

1. simplified\_titles 17853 non-null object
2. location 17509 non-null object
3. department 17853 non-null object
4. salary 17853 non-null object
5. telecommuting 17853 non-null int64
6. has\_company\_logo 17853 non-null int64
7. has\_questions 17853 non-null int64
8. employment\_type 14383 non-null object
9. required\_experience 17853 non-null object
10. required\_education 9752 non-null object
11. industry 12952 non-null object
12. function 11404 non-null object
13. fraudulent 17853 non-null int64 dtypes: int64(4), object(9) memory usage: 1.9+ MB

# In [58]: 

df

[

'required\_education'

].

value\_counts

()

Out[58]:

Bachelor's Degree 5140

High School or equivalent 2065

Unspecified 1396

Master's Degree 414

Associate Degree 274

Certification 170

Some College Coursework Completed 102

Professional 74

Vocational 49

Some High School Coursework 27

Doctorate 26

Vocational - HS Diploma 9

Vocational - Degree 6 Name: required\_education, dtype: int64

# In [59]: 

df5

**=**

df

[

df

[

'required\_education'

].

isna

()]

df6

**=**

df

[

**~**

df

[

'required\_education'

].

isna

()]

[60]:

df5

[

'required\_education'

]

**=**

'Unspecified'

df

**=**

df5

.

append

(

df6

)

<ipython-input-60-45a4c9a81c76>:1: SettingWithCopyWarning:

A value is trying to be set on a copy of a slice from a DataFrame.

Try using .loc[row\_indexer,col\_indexer] = value instead

[See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/ stable/user\_guide/indexing.html#returning-a-view-versus-a-copy (https://pand as.pydata.org/pandas-docs/stable/user\_guide/indexing.html#returning-a-view-v ersus-a-copy)](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

df5['required\_education'] = 'Unspecified'

# In [61]: 

df

.

info

()

<class 'pandas.core.frame.DataFrame'> Int64Index: 17853 entries, 10 to 17849

Data columns (total 13 columns):

# Column Non-Null Count Dtype

--- ------ -------------- -----

1. simplified\_titles 17853 non-null object
2. location 17509 non-null object
3. department 17853 non-null object
4. salary 17853 non-null object
5. telecommuting 17853 non-null int64
6. has\_company\_logo 17853 non-null int64
7. has\_questions 17853 non-null int64
8. employment\_type 14383 non-null object
9. required\_experience 17853 non-null object
10. required\_education 17853 non-null object
11. industry 12952 non-null object
12. function 11404 non-null object
13. fraudulent 17853 non-null int64 dtypes: int64(4), object(9) memory usage: 1.9+ MB

# In [62]: 

df

[

'fraudulent'

].

value\_counts

()

Out[62]:

1. 16988
2. 865

Name: fraudulent, dtype: int64

[63]:

Out[63]:

{

'Information Technology and Services': 1733,

'Computer Software': 1375,

'Internet': 1062,

'Marketing and Advertising': 827,

'Education Management': 821,

'Financial Services': 779,

'Hospital & Health Care': 497,

'Consumer Services': 353,

'Telecommunications': 331,

'Oil & Energy': 287,

'Retail': 222,

'Real Estate': 175,

'Accounting': 159,

'Construction': 158,

'E-Learning': 139,

'Management Consulting': 130,

'Design': 129,

'Staffing and Recruiting': 127,

dict

(

df

[

'industry'

].

value\_counts

())

# In [64]: 

df **=** df.reset\_index()

df **=** df[['simplified\_titles', 'location', 'department', 'salary',

'telecommuting', 'has\_company\_logo', 'has\_questions', 'employment\_type',

'required\_experience', 'required\_education', 'function', 'fraudulent']]

# In [65]: 

df

.

info

()

<class 'pandas.core.frame.DataFrame'>

RangeIndex: 17853 entries, 0 to 17852

Data columns (total 12 columns):

# Column Non-Null Count Dtype

--- ------ -------------- -----

1. simplified\_titles 17853 non-null object
2. location 17509 non-null object
3. department 17853 non-null object
4. salary 17853 non-null object
5. telecommuting 17853 non-null int64
6. has\_company\_logo 17853 non-null int64
7. has\_questions 17853 non-null int64
8. employment\_type 14383 non-null object
9. required\_experience 17853 non-null object
10. required\_education 17853 non-null object
11. function 11404 non-null object
12. fraudulent 17853 non-null int64 dtypes: int64(4), object(8) memory usage: 1.6+ MB

[66]:

df

[

'function'

].

value\_counts

()

Out[66]:

Information Technology 1748

Sales 1468

Engineering 1348

Customer Service 1216

Marketing 828

Administrative 630

Design 340

Health Care Provider 338

Education 325

Other 323

Management 317

Business Development 228

Accounting/Auditing 211

Human Resources 205

Project Management 183

Finance 172

Consulting 143

Art/Creative 132

Writing/Editing 131

Production 116

Product Management 114

Quality Assurance 111

Advertising 90

Business Analyst 84

Data Analyst 82

Public Relations 76

Manufacturing 74

General Business 68

Research 50

Legal 47

Strategy/Planning 46

Training 38

Supply Chain 36

Financial Analyst 33

Distribution 24

Purchasing 15

Science 14

Name: function, dtype: int64

[67]:

df7

**=**

df

[

df

[

'function'

].

isna

()]

df8

**=**

df

[

**~**

df

[

'function'

].

isna

()]

df7

[

'function'

]

**=**

'Other'

df

**=**

df7

.

append

(

df8

)

<ipython-input-67-9d867cd555e5>:4: SettingWithCopyWarning:

A value is trying to be set on a copy of a slice from a DataFrame.

Try using .loc[row\_indexer,col\_indexer] = value instead

[See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/ stable/user\_guide/indexing.html#returning-a-view-versus-a-copy (https://pand as.pydata.org/pandas-docs/stable/user\_guide/indexing.html#returning-a-view-v ersus-a-copy)](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

df7['function'] = 'Other'

# In [68]: 

df

**=**

df

.

dropna

()

# In [69]: 

df

Out[69]:

**simplified\_titles location department salary telecommuting has\_company\_lo**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **3** | Others | AU | Others | 97500.0 | 0 |
| **5** | Others | US | Others | 110000.0 | 0 |
| **8** | Others | AU | Others | 110000.0 | 0 |
| **11** | Engineer | GR | Others | 25000.0 | 0 |
| **14** | Others | CA | Others | 37500.0 | 0 |
| **...** | ... | ... | ... | ... | ... |
| **17848** | Others | US | Account/finance | 664074.43013 | 0 |
| **17849** | Marketing | US | Sales | 664074.43013 | 0 |
| **17850** | Marketing | US | Simple  Relevance | 664074.43013 | 0 |
| **17851** | Others | US | IT | 664074.43013 | 0 |
| **17852** | Marketing | US | Accounting | 664074.43013 | 0 |

14253 rows × 12 columns

[70]:

df\_0

**=**

df

[

df

[

'fraudulent'

]

**==**

0

]

df\_1

**=**

df

[

df

[

'fraudulent'

]

**==**

1

]

# In [71]: 

df\_0

**=**

df\_0

[:

1000

]

# In [72]: 

df\_1

.

shape

Out[72]:

(617, 12)

# In [73]: 

df

**=**

df\_0

.

append

(

df\_1

)

# In [75]: 

df

.

columns

Out[75]:

Index(['simplified\_titles', 'location', 'department', 'salary',

'telecommuting', 'has\_company\_logo', 'has\_questions', 'employment\_typ e',

'required\_experience', 'required\_education', 'function', 'fraudulen t'],

dtype='object')

# In [76]: 

df

.

head

()

Out[76]:

**salary telecommuting has\_company\_logo has\_questions employment\_type required\_experien**

97500.0 0 1 1 Full-time Not Applica

110000.0 0 0 1 Full-time Not Applica

110000.0 0 1 1 Full-time Not Applica

25000.0 0 1 1 Full-time Not Applica

1080000.0 0 1 0 Full-time Not Applica

[94]:

*#df.describe().columns*

# In [78]: 

cat\_cols **=** ['simplified\_titles', 'location', 'department', 'salary', 'employment\_type', 'required\_experience', 'required\_education', 'function']

# In [79]: 

**from**

sklearn

.

preprocessing

**import**

LabelEncoder

# In [80]: 

**for**

each\_col

**in**

cat\_cols

:

le

**=**

LabelEncoder

()

df

[

each\_col

]

**=**

le

.

fit\_transform

(

df

[

each\_col

])

# In [81]: 

df

.

describe

().

columns

Out[81]:

Index(['simplified\_titles', 'location', 'department', 'salary',

'telecommuting', 'has\_company\_logo', 'has\_questions', 'employment\_typ e',

'required\_experience', 'required\_education', 'function', 'fraudulen t'],

dtype='object')

# In [82]: 

X **=** df[['simplified\_titles', 'location', 'department', 'salary',

'telecommuting', 'has\_company\_logo', 'has\_questions', 'employment\_type',

'required\_experience', 'required\_education', 'function']].values Y **=** df[['fraudulent']].values

# In [109]: 

rfc

**=**

RandomForestClassifier

()

svc

**=**

SVC

()

# In [84]: 

**from**

sklearn

.

model\_selection

**import**

train\_test\_split

[110]:

X\_train

,

X\_test

,

Y\_train

,

Y\_test

**=**

train\_test\_split

(

X

,

Y

)

**from**

sklearn

.

preprocessing

**import**

StandardScaler

st\_x

**=**

StandardScaler

()

X\_train

**=**

st\_x

.

fit\_transform

(

X\_train

)

X\_test

**=**

st\_x

.

transform

(

X\_test

)

# In [111]: 

X\_train

.

shape

,

X\_test

.

shape

,

Y\_train

.

shape

,

Y\_test

.

shape

Out[111]:

((1212, 11), (405, 11), (1212, 1), (405, 1))

# In [112]: 

rfc

.

fit

(

X\_train

,

Y\_train

)

<ipython-input-112-96e8a0ce9cd3>:1: DataConversionWarning: A column-vector y was passed when a 1d array was expected. Please change the shape of y to (n\_ samples,), for example using ravel(). rfc.fit(X\_train, Y\_train)

Out[112]:

RandomForestClassifier()

# In [113]: 

svc

.

fit

(

X\_train

,

Y\_train

)

C:\Users\Sanika\anaconda3\New folder (2)\lib\site-packages\sklearn\utils\val idation.py:63: DataConversionWarning: A column-vector y was passed when a 1d array was expected. Please change the shape of y to (n\_samples, ), for examp le using ravel(). return f(\*args, \*\*kwargs)

Out[113]:

SVC()

# In [114]: 

Y\_pred\_scv

**=**

svc

.

predict

(

X\_test

)

[120]:

Out[120]:

**from**

sklearn

.

metrics

**import**

confusion\_matrix

cm1

**=**

confusion\_matrix

(

Y\_test

,

Y\_pred\_scv

)

cm1

array([[239, 3],

[ 30, 133]], dtype=int64)

# In [115]: 

Y\_pred\_rfc

**=**

rfc

.

predict

(

X\_test

)

# In [116]: 

Out[116]:

**from**

sklearn

.

metrics

**import**

confusion\_matrix

cm

**=**

confusion\_matrix

(

Y\_test

,

Y\_pred\_rfc

)

cm

array([[237, 5],

[ 23, 140]], dtype=int64)

# In [117]: 

**from**

sklearn

.

metrics

**import**

accuracy\_score

# In [118]: 

accuracy\_score

(

Y\_test

,

Y\_pred\_scv

)

Out[118]:

0.9185185185185185

# In [119]: 

accuracy\_score

(

Y\_test

,

Y\_pred\_rfc

)

Out[119]:

0.9308641975308642

# In [ ]: 