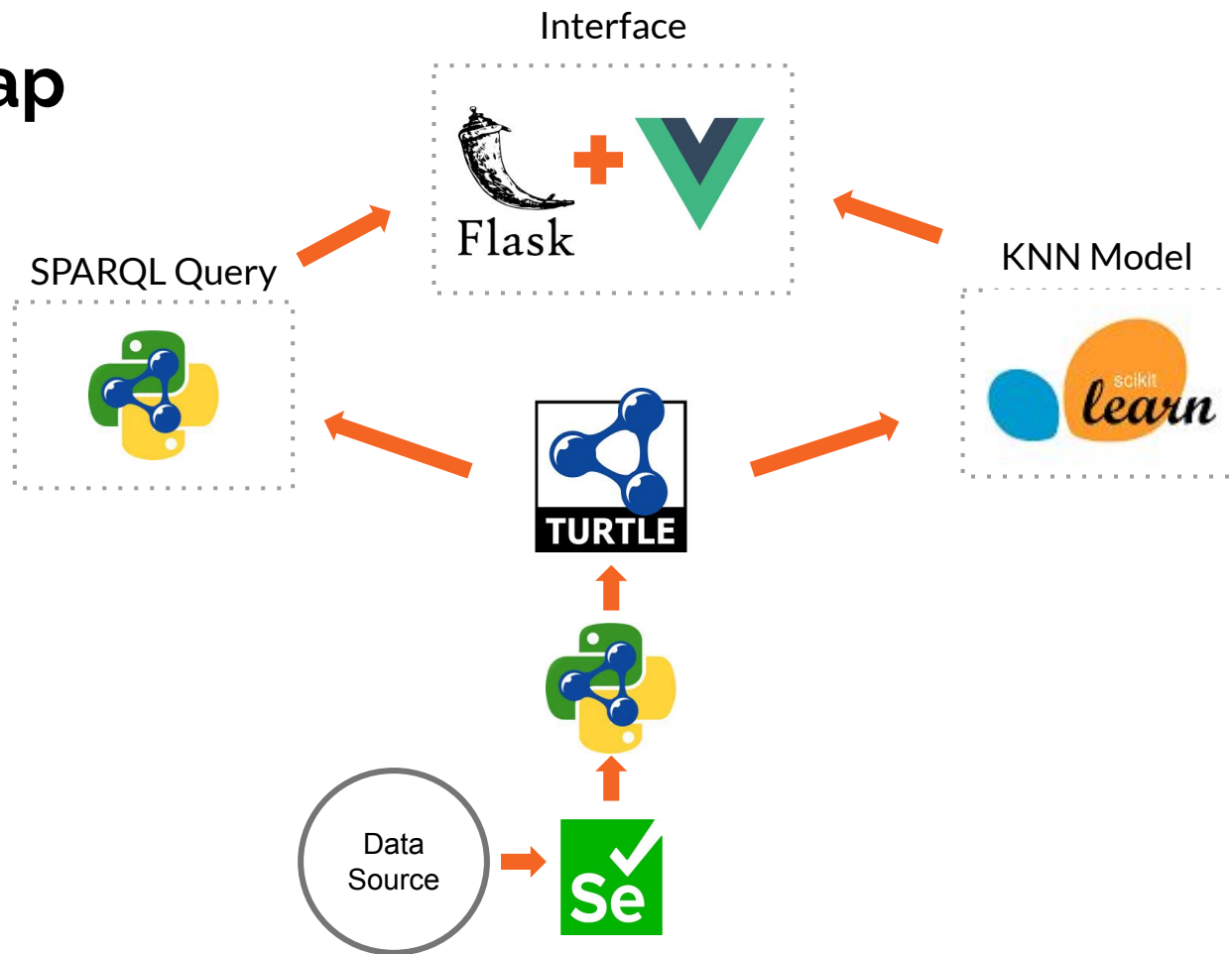

Career-Skill Knowledge Graph

2022 Fall DS558
By Ruijie Rao, Linkai Shao

Domains & Goals




RoadMap



Lightcast API

Specific titles & skills



C (Programming Language)
KS102384C2CLUJG5V1

It is a general-purpose, procedural computer programming language supporting structured programming, lexical variable scope, and recursion, with a static type system. By design, C provides constructs that map efficiently to typical machine instructions. It has found lasting use in applications previously coded in assembly...

[Read more on Wikipedia →](#)


Have feedback on this skill? Let us know

Related Skills (How does Lightcast define a skill?)

C++ (Programming Language)

Embedded Software

Embedded Systems

Job Postings Data 

	Top Companies Posting	Top Job Titles
Company	5-Month Postings	8-Month Postings
Amazon	5,614	Software Engineers
Boeing	3,017	Embedded Software Engineers
Raytheon Technologies	2,487	Software Development Engineers
Radiant5	2,364	Principal Software Engineers

Indeed

Job Relevant Info

What does a Software Engineer do?

Software engineers are the creative minds behind computer programs. They may begin by asking how the customer plans to use the software. They must identify the core functionality that users need from software programs. Software engineers must also determine user requirements that are unrelated to the functions of the software, such as the level of security and performance needs. They design the program and then give instructions to programmers, who write computer code and test it.

If the program does not work as expected or if testers find it too difficult to use, software engineers go back to the design process to fix the problems or improve the program. After the program is released to the customer, a software engineer may perform upgrades and maintenance.

Working as a Software Engineer

Depending on their roles, qualifications, specialization and years of experience, a software engineer may:

- Analyze users' needs and then design, test, and develop software to meet those needs
- Recommend software upgrades for customers' existing programs and systems
- Ensure that a program continues to function normally through software maintenance and testing
- Document every aspect of an application or system as a reference for future maintenance and upgrades
- Create a variety of models and diagrams (such as flowcharts) that show programmers the software code needed for an application
- Collaborate with other computer specialists to create optimum software.

What skills help Software Engineers find jobs?

✓ APIs	✓ AWS	✓ Agile
✓ Angular	✓ Azure	✓ C
✓ C#	✓ C++	✓ C/CO
✓ Communication skills	✓ Data structures	✓ Design patterns

Glassdoor

Job Relevant Info

What does a Data Analyst do?

Data analysts research and use data to solve problems, optimize profit, minimize turnover, or streamline logistics, and to help companies make better business decisions. They assess a company's complex information including sales numbers, market research, or behavior, with the goal of reaching simpler, smarter conclusions, and use their technical expertise to stress test the data for quality and accuracy.

Data analysts collect, process, and perform statistical analysis of data and translate the numbers into a layman's terms. By identifying trends and making predictions about the future, they help companies make sense of how they work. Data analysts...

[Read More](#)

How much does a Data Analyst make?

\$71,605 /yr

Total Pay

\$67,193 /yr + **\$4,412** /yr

Base Pay Additional Pay

[See More Insights](#)

Related Careers

Analytics Specialist

\$92,783

13% skills overlap

BI Analyst

\$87,441

50% skills overlap

Data Scientist

\$124,593

25% skills overlap

Analytics Consultant

\$103,787

25% skills overlap

Kaggle Job Dataset

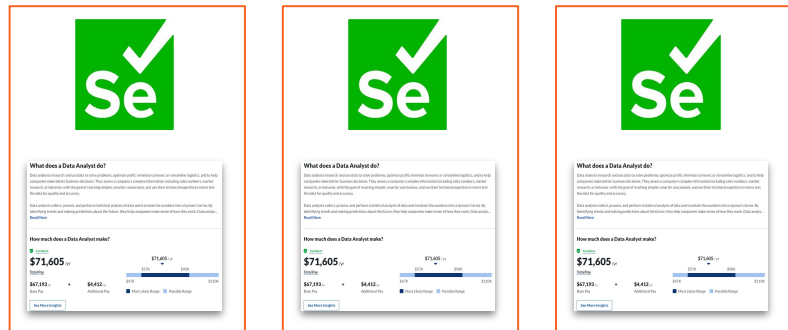
Structured Data

advertising company	employment jobcategory jobid	joblocation jobtitle	postdate	year	state name salary	url4 url5
https://www.digitalmarketing24.com/looking-for-cs-in-sa-102384c2clujg5v1/	102384c2clujg5v1	SA, AUTOMATION 1 hour ago	Telemarketing not available	KS	BELOW \$48,975\$60,000\$70,000\$1,545,000\$3,000	https://www.digitalmarketing24.com/looking-for-cs-in-sa-102384c2clujg5v1/
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https://www.leadershipofallthings.com/looking-for-cs-in-sa-102384c2clujg5v1/	102384c2clujg5v1	SA, AUTOMATION 1 week ago	Telemarketing not available	KS	BELOW \$48,975\$60,000\$70,000\$1,545,000\$3,000	https://www.leadershipofallthings.com/looking-for-cs-in-sa-1023

Crawling

- **55,797** Titles
- **100+** Hours
- **Selenium** Headless Browser
- Python Concurrent **Threading**

10 Parallel Headless Selenium Drivers



ID	titleName	salary	description	responsibility	relatedTitles	requiredSkills
K01	Data Analyst	\$99,120	This job..	You are required..	Data Engineer, Applied Data..	Python, Data Mining, Data Science..
...						

Job Title Entity Resolution

Indeed & Glassdoor Titles

Software Engineer

Medical Laboratory Tech

⋮

Data Scientist II

Kaggle Dataset

Medical Laboratory
Technician

Talent Recruiter

⋮

Data Scientist

Indeed & Glassdoor Relate Titles

Talent Specialist

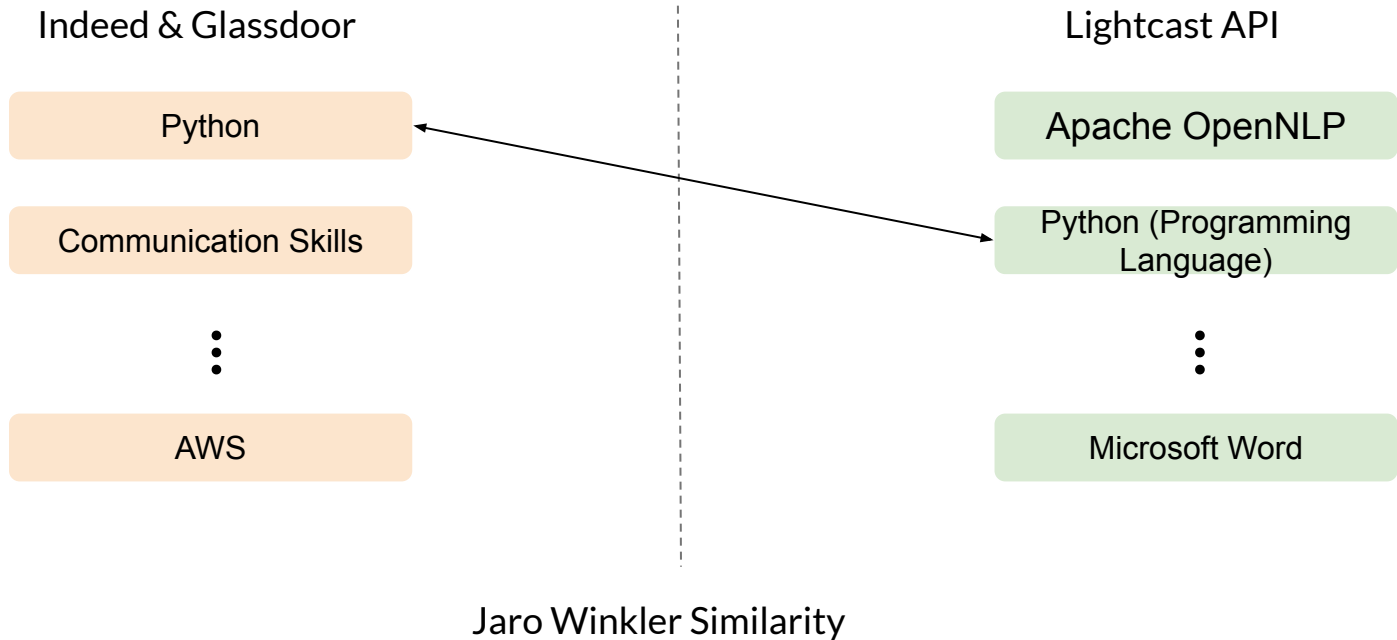
Platform Architect -
Manager

⋮

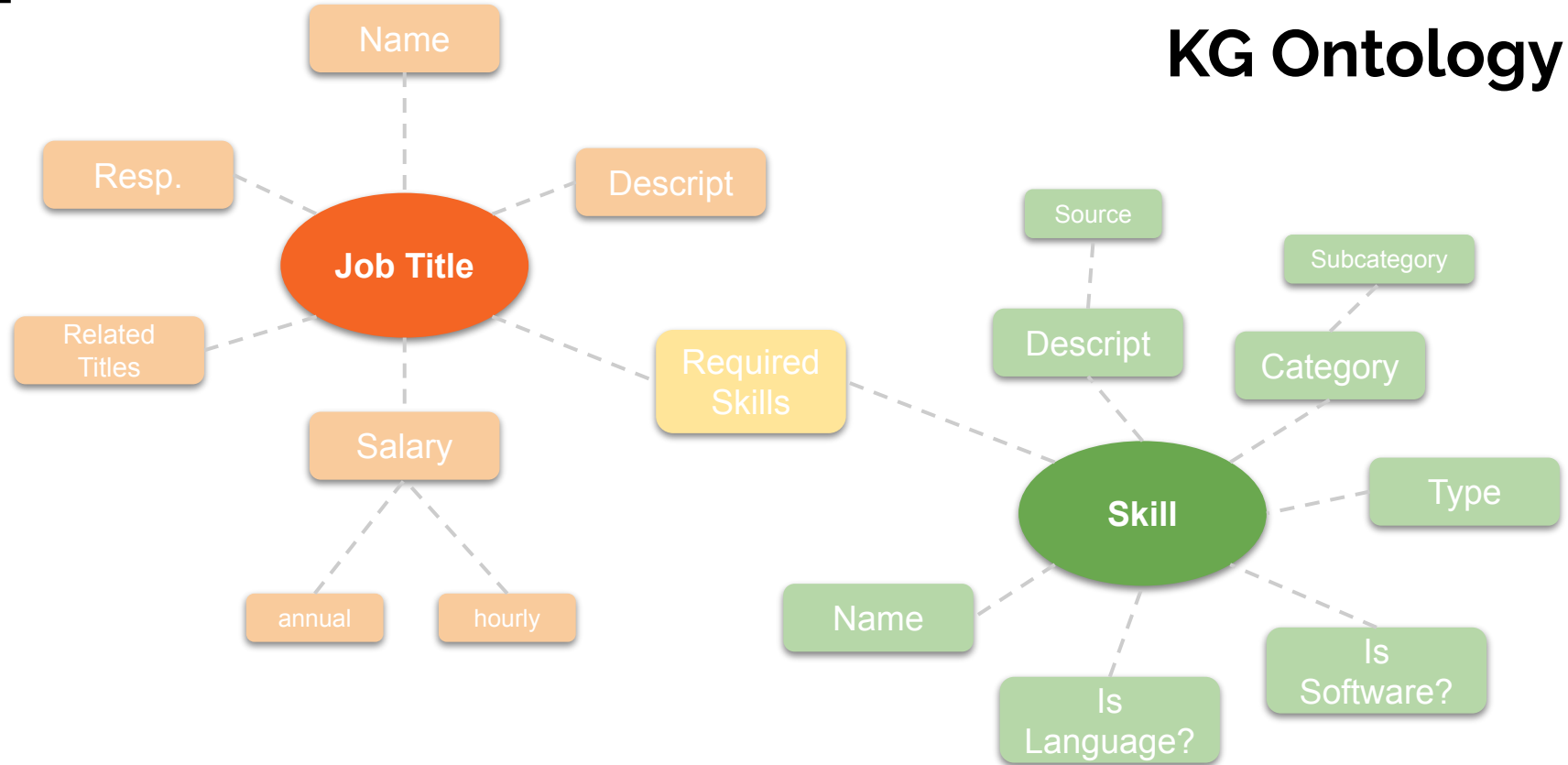
Clinical
Neuropsychologist

Jaro Winkler Similarity & Matched Skills

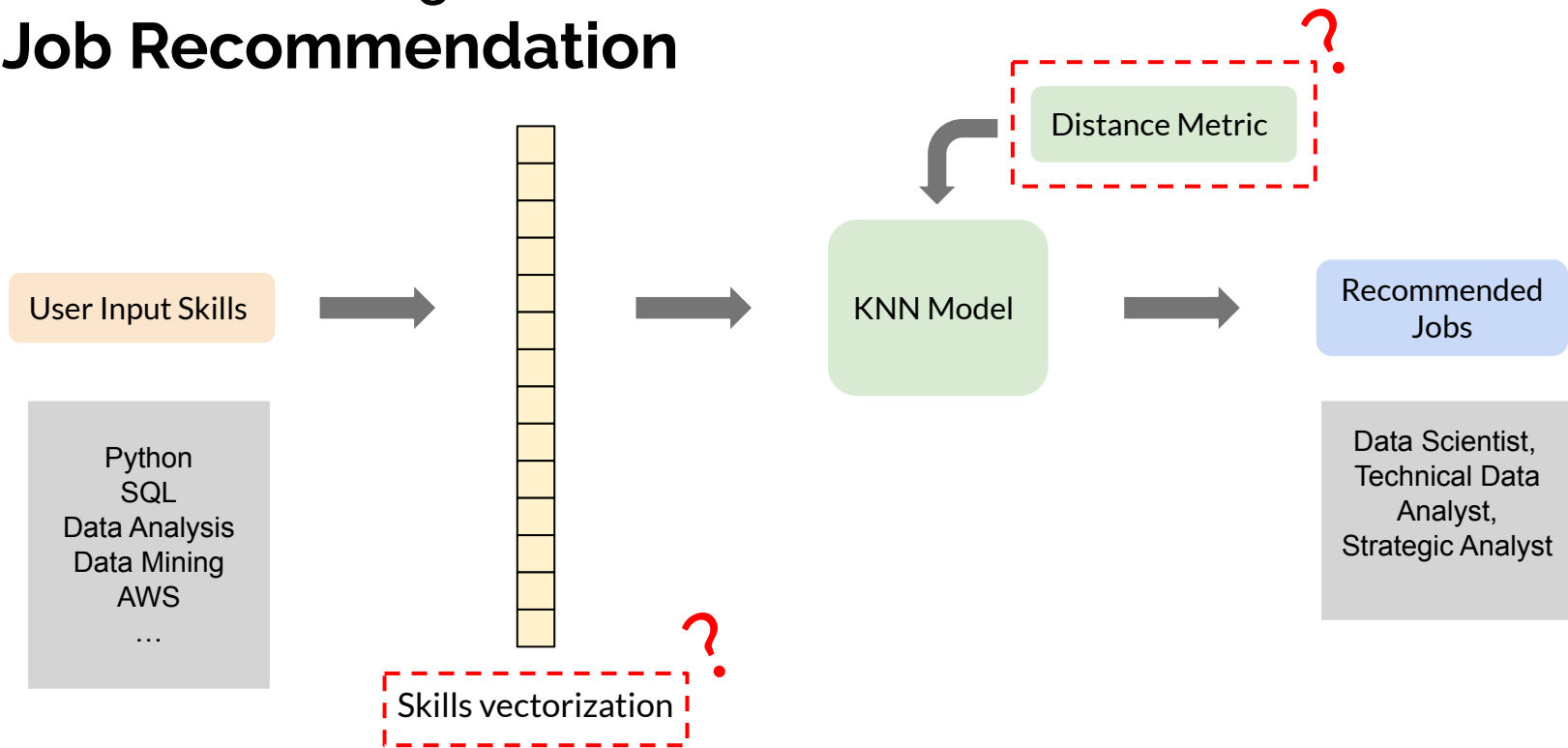
Job Skill Entity Resolution



KG Ontology

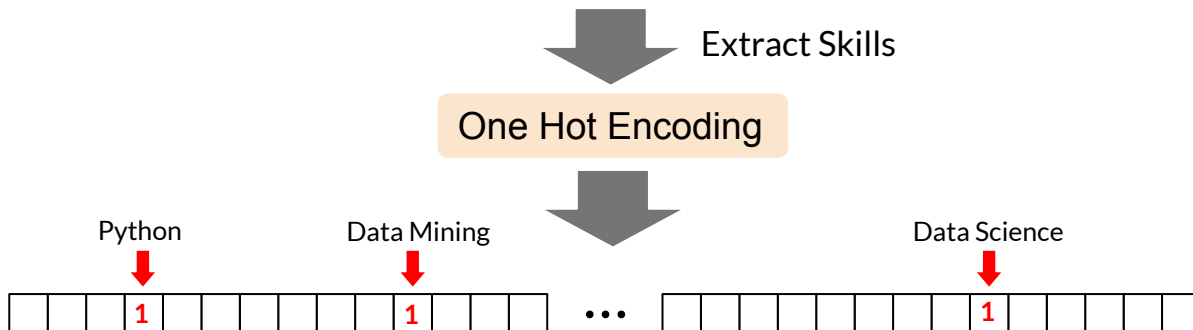


Technical Challenge: Job Recommendation



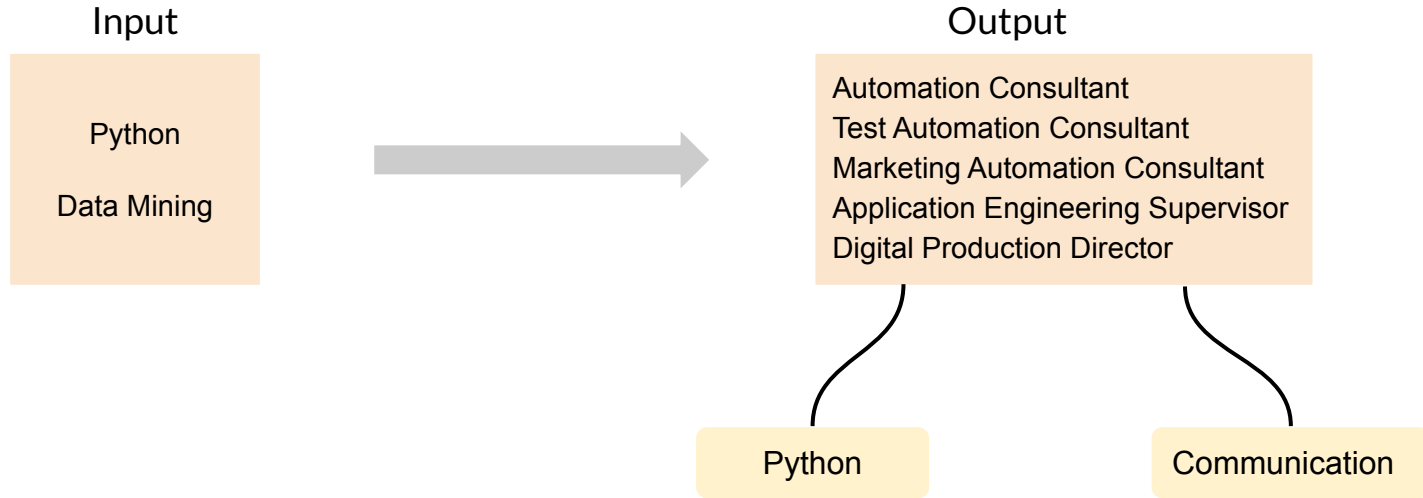
Data Preprocessing: Job Recommendation

ID	titleName	salary	description	responsibility	relatedTitles	requiredSkills
K01	Data Analyst	\$99,120	This job..	You are required..	Data Engineer, Applied Data..	Python, Data Mining, Data Science..
...						



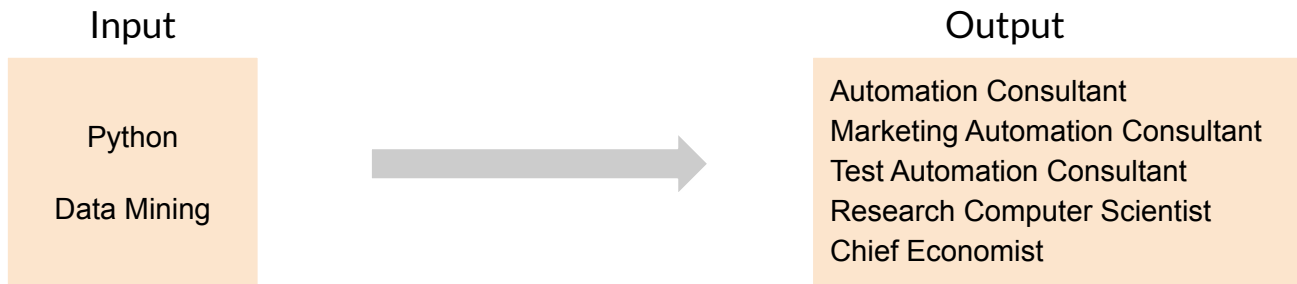
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Try #1: Euclidean Distance



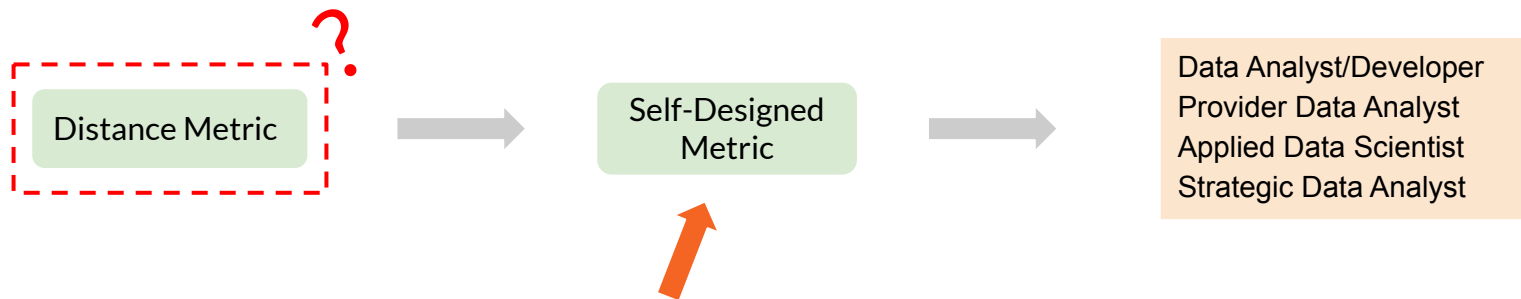
—

Try #2: Jaccard Distance



Penalize on jobs which have more skills when users input only a few skills

Final: Metric Set Up



Applied "bitwise and" between two encoding
vectors to compute similarity

Evaluation: Job Recommendation

Approach 1:

Random combination of skills → 100% accuracy

Approach 2:

User Research Investigation → 20 Interviewees → 95% accuracy

Skills						Result
Data Modeling	Data Warehousing	Apache Hive	Big Data	-	-	Data Engineer, ETL Architect
Accounting	Computer Sales	Communication	Accounting Software	Balance Sheet	Analytical Skills	Control Accountant, Tax Accountant

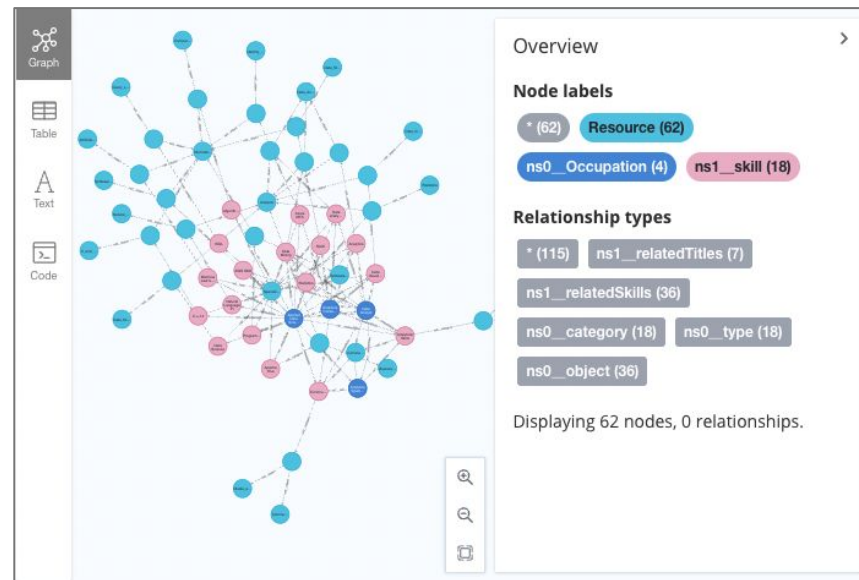
Visualization

```
career_title:ET0004AFC23172193E a schema:Occupation ;
career:annualSalary "72408.0"^^xsd:float ;
career:relatedSkills emsi_skill:BGS894FE73CB92723FD8,
emsi_skill:ES8447BA722C50F8F852,
emsi_skill:ESA9372A0C2E0E70C228,
emsi_skill:KS1218W78FGVPVP2KXPX,
emsi_skill:KS1220H6CP1B0GH9STNK,
emsi_skill:KS122556LMQ829G2CCRV,
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emsi_skill:KS1281L64DB6GGS37X4,
emsi_skill:KS440F26FJ79XS9M0QW1,
emsi_skill:KS4425C63RPH46FJ9BX7,
emsi_skill:KSYIJN0ID1F7P2HPDUCJ ;
career:relatedTitles career_title:ET5AD1CE488B4D20AA,
career_title:ET5F8A23E938AF6E85,
career_title:ETABBAE9948F7A41C0,
career_title:ETD3D7CCAFE65E0FFC ;
schema:name "Industrial Security Manager" .
```

Neo4j



Neosemantics



KG Quality Assessment

Quality dimensions

- **Accuracy**

Intrinsic

Is data **free of error** & correctly describing facts in the real-world?

- **Objectivity**

Is data are **free of bias** & impartial?

- **Reputation**

Is data **trustworthy** & enough referenced?

- **Consistency**

Does data form a **consistent** knowledge representation?

- **Timeliness**

Contextual

Is data sufficiently **up to date**?

- **Completeness**

Does data have **sufficient breadth**, depth, & scope?

- **Interpretability**

Representational

Can data can be interpreted by machines & humans **without ambiguity**?

- **Interlinking**

Accessibility

Is data **sufficiently interlinked to other resources**, either within or without Wikimedia?



Search ▾

Advance

Interactive App: Title Query

Search Job Title



ID ↕	Title Name ↕	Annual Salary ↕
ET4A446A1A5F6142AD	.NET Application Architect	\$174,308.00
ETB5E3860B8B9A9755	.NET Architect	\$170,168.00
ETEB3BB8E555C79368	.NET Developer	\$105,292.00
ETB3859094FF2DD443	.NET Front End Developer	\$85,016.00
ETE906C8A7B45816CC	.NET Full Stack Developer	\$112,176.00
ET43E23B0D9CC22B20	.NET Instructor	\$151,329.00
ETDC1D7422DAE637FC	.NET Programmer	\$126,601.00
ETCA9495C4C34E37FD	.NET SQL Developer	\$116,623.00
ET77124BA7E3D9E462	.NET UI Developer	\$116,087.00
ET77124BA7E3D9E462	.NET UI Developer	\$116,087.00
ET8F077BD6FE1CDADB	1st Grade Teacher	\$46,622.00
ET7C32E210C0AF53C	1st Grade Teacher Assistant	No Record
ET86922DE339DEE480	1st/2nd Grade Teacher	\$50,778.00
ET41FCB2FFBAFD7DAD	3D CAD Designer	\$62,240.00
ET89058E4C657C1D45	3D Graphic Designer	\$58,677.00
ET11311FAE5E006599	3D Programmer	\$82,390.00
ET0E2E50E5D1C0733E	3rd/4th Grade Teacher	\$53,649.00
ET51C27C2AE987ADB	4th Grade Mathematics Teacher	\$59,049.00
ETB1122816082A2467	4th Grade Teacher	\$50,054.00
ETA88698D81E55A65B	5th Grade English Teacher	\$44,515.00

< 1 2 3 4 5 6 ... 2790 > Total 55797

Interactive App: Skill Query

Filter

Skill Category:
Animation and Game Design

Skill Type:
☒ Software ☐ Language

ID	Skill Name	Skill Type
ES78DC0D6C56B45948AA	AAA Video Games	Specialized_Skill Software
ES76304EB16C987C0EC8	Adobe Animate	Specialized_Skill Software
BGS4CF659F813BB61D18	Amazon Lumberyard	Specialized_Skill Software
KS120SG6YZ0TSYHNV8XS	Autodesk MotionBuilder	Specialized_Skill Software
KS122266320DNBB2P82W	Cocos2D	Specialized_Skill Software
KS1229F6NHVITYG5V9QW6	Console Games	Specialized_Skill Software
BGSF9565DD0E0C3EAEF5	Evermotion NOX	Specialized_Skill Software
BGSFE93D30AFCFDE9E7	FumeFX	Specialized_Skill Software
KS1CP08ZKGPT6Y1J2A3	Gemfire	Specialized_Skill Software
KS8BNIZ850KR1OETSDX	Google Glass	Specialized_Skill Software
KS125T8678SG98RMS4W8	LibGDX	Specialized_Skill Software
KS1266C6Q3MN12890Y8C	MASSIVE (Software)	Specialized_Skill Software
BGS4979F3FE938F07A7	Marmoset Toolbag	Specialized_Skill Software
BGS9C5BF9CB3AE0E8E8B	Motva COLIMO	Specialized_Skill Software
KS120SH8M1GS4XJQJML	Mudbox	Specialized_Skill Software
BGSA41ECC64E948DEB81	Nevercenter Silo	Specialized_Skill Software
KS1277C627G9Z3RLKTC	OGRE	Specialized_Skill Software
ES2A0E81676E2AA5B7A	OmniGraffle	Specialized_Skill Software
KS12796736TWZ91F5FMC	OpenGL	Specialized_Skill Software
BGS6881C177EEFD37231	OptiTrack	Specialized_Skill Software

< 1 2 >

Total 31

Interactive App: Details

Job Title

.NET Application Architect

A .NET developer is an information technology professional who uses the .NET Microsoft framework to design and maintain software and applications. They collaborate with computer scientists, other web developers and clients to create a user-friendly, scalable application. They are involved with creating original code and providing consistent user support after the application is released.

A Software Architect serves as the team leader for the innovation and creation of new company software and program features. Generally found in tech-heavy industries and large corporations, a Software Architect will oversee a team of programmers. They seek to manage and facilitate the proper design of large websites or programs within products. From software coding to innovative design, a Software Architect is the key to creating a seamless software experience for customers. . A Software Architect will usually hold an advanced degree in Computer Science or Computer Engineering. A Software Architect works on both technical and design aspects of a project. Creativity as well as a detailed understanding of coding and leadership skills are essential. Additionally, employers may seek to hire those with specialized certifications in computer languages such as Java or PHP. A proficient Software Architect will possess leadership qualities and seek to continually improve their skill-set.

Details

Responsibility

- Designing interfaces for client use
- Identifying the cause of application errors and coming up with solutions
- Creating code for interacting with a computer or web program
- Providing user support and implement feedback
- Testing software and making adjustments to improve performance

Salary

Annual Salary: \$174,308.00

Required Skills

Azure MFA
ASP.NET Core
ASP.NET
JavaScript (Programming Language)
Agilent VEE (Domain-Specific Programming Language)
Angular (Web Framework)
C# (Programming Language)
Communications
Relational Databases
Design Patent
Drupal
Entity Framework
Frameworkx
MAPICS
SAS OLAP Servers
NCSS (Statistical Software)
Codesign
Cloud9 (Software)
R.net
AWS CLI (Command Line Interface)

Related Job Positions

Enterprise Architect
Software Engineer
Systems Architect
Infrastructure Architect

Interactive App: Advance Query

Find the Position that Suits You Best

Python (Programming Language) × Data Mining ×

Enter

Result

Data Analyst/Developer

A data analyst collects data, organizes and uses it to reach meaningful conclusions. Typically, a data analyst uses computer systems and calculation applications to determine specific factors. They are responsible for digesting the data and creating a report to explain the findings. These resulting reports will help to identify various inefficiencies and other business problems that may exist.

Data analysts research and use data to solve problems, optimize profit, minimize turnover, or streamline logistics, and to help companies make better business decisions. They assess a company's complex information including sales numbers, market research, or behavior, with the goal of reaching simpler, smarter conclusions, and use their technical expertise to stress test the data for quality and accuracy. . Data analysts collect, process, and perform statistical analysis of data and translate the numbers into a layman's terms. By identifying trends and making predictions about the future, they help companies make sense of how they work. Data analysts regulate, normalize, and calibrate data to extract that can be used alone or with other numbers and use charts, graphs, tables, and graphics to explain what the data mean across specific amounts of time or various departments. Data analysts need a bachelor's degree in mathematics, finance, statistics, economics, or computer science.

Required Skills: [Analytical Skills](#) [Analytics](#) [Aws Cli \(Command Line Interface\)](#) [Communications Dashboard](#) [Data Analysis](#) [Data Collection](#) [Data Management](#) [Data Mining](#) [Data Visualization](#) [Data Warehousing](#) [Databases](#) [Microsoft Excel](#) [Power Bi](#) [Python \(Programming Language\)](#) [Query String](#) [Relational Databases](#) [Sql Services](#) [Statistics](#)

[More Details..](#)

Provider Data Analyst



Strategic Data Analyst



Consulting Data Analyst



Data Analyst/Engineer

