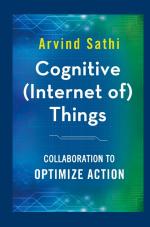


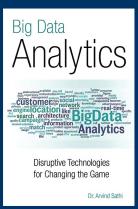
Use Case - Resume Consultant

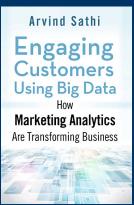
Feb 4, 2024

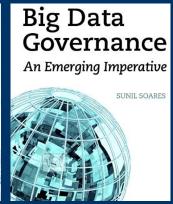
Bridging Real-world Challenges with Generative Al

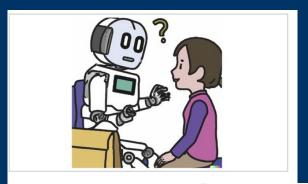
Ms. Neena Sathi Faculty Applied Al Institute











Build Conversational Al using GPT-4

Utilize Generative **AI** capabilities to deliver a magical end-user experience

Neena Sathi



User Profile & Usage Situation

Michelle is Senior HR Manager at ABC Corporation

- She receives 100+ requests per week in identifying best-fit candidate for various client projects.
- She goes through time-consuming process of screening and interviewing numerous candidates.
- She is looking for
 - Balancing the need for urgent placements with the desire to find the perfect skill match.
 - Retaining talent within the organization and providing growth opportunities.

Alex is a Software Development Engineer at ABC Corporation

- As AI, Generative AI and Analytics are growing areas these days, he is looking for projects where he can grow his skills in the area of AI and Analytics.
- He is looking for
 - Current market trend for Al and Analytics job roles
 - Key Skills required to perform successfully in the job roles selected by him.



Michelle Langford; Senior HR Manager



Alex Chan; Software Development Engineer Image created using Midjourney₂



System

You will provide support to all Human resource gueries associated with skill, job and resume matching. You are friendly and concise. You only provide factual answers to queries, and provide answers using credible sources, including job boards, market trends and technical skills. For a recommendation, you need to understand skill requirements, and use leading questions and engage in a conversation to understand job requirements before providing a response on potential candidate.

I am Human Resource Manager and am interested in creating a job description for Machine

Michelle can interact with the Bot to craft a job description for Machine Learning Engineer which her client

is looking for

Learning Engineer. Can you please help draft key qualifications for this role

Absolutely, here are the key qualifications for a Machine Learning Engineer:

1. Education:

- o Bachelor's degree in Computer Science, Mathematics, Data Science, or related 3. Professional Experience: Master's or Ph.D. would be a plus.
- 2. Technical Skills:
 - Proficient in programming languages like Python, R and Java.
 - Strong understanding and application of algorithms and machine learning cor
 - Experience with machine learning frameworks (like Keras or PyTorch) and libra 4. Non-Technical Skills: scikit-learn).
 - Knowledge of data structures and data modeling.
 - Experience with distributed computing.
 - Proficiency with version control systems, such as Git.
 - Familiarity with cloud services (AWS, Google Cloud, or Azure) is a plus.

- - Proven experience as a Machine Learning Engineer or similar role.
 - Solid experience in data analysis and visualization.
 - Experience in full AI/ML pipeline from model creation, training, optimization to deployment.
- - Strong problem-solving skills.
 - Ability to work in a team, as well as independently.
 - Strong communication skills to effectively collaborate with other teams and stakeholders.
 - Excellent understanding of business operations and analytics tools for effective designs and delivery.
- 5. Certifications (optional):
 - Certifications like Professional Machine Learning Engineer from Google Cloud or Certified Machine Learning Specialist (CMLS) would be an added advantage.





Can you please draft this job description utilizing following section: Job Role, job summary, Qualifications, Responsibilities, Additional Qualifications and Additional Responsibilities where job Role is Machine Learning Engineer



Absolutely, here's a sample job description for the Machine Learning Engineer position:

Michelle needs Job description in a specific format as required by her company Job Role: Machine Learning Engineer

Job Summary: We are seeking a skilled and experienced Machine Learning Engineer to join our dynamic team. In this role, you will be responsible for creating innovative machine learning models and using a broad set of analytical skills to develop and maintain analytical technologies

that drive our business forward.

Responsibilities:

- Design, develop and maintain robust machine learning models with a focus on scal accuracy, and performance.
- Collaborate with data scientists and cross-functional teams to understand data need deliver comprehensive AI solutions.
- Work on the full AI/ML lifecycle management that includes training, validation, test deployment, and iterative refinement of the models.
- Keep abreast of developments in the field to ensure the best techniques and tools a used.

Qualifications:

- A Bachelor's degree in Computer Science, Mathematics, Data Science, or related field. A Master's or Ph.D. would be advantageous.
- Proficiency in Python, R, and Java.
- Strong experience with machine learning libraries and frameworks (like Keras, PyTorch, Tensorflow, and scikit-learn).
- Strong understanding and experience in machine learning algorithms.
- Familiarity with version control systems, such as Git, and cloud services.

Additional Qualifications:

- Relevant certifications related to Machine Learning or AI will be a plus.
- Experience with big data technologies such as Hadoop and Spark.
- Familiarity with SQL or NoSQL databases.

Additional Responsibilities:

- Provide support to the team in model troubleshooting and refinement.
- Effectively communicate complex models and analysis in clear and concise terms to stakeholders.







Absolutely! Here's a sample job description for a Data Scientist position:

Now Michelle can interact with the Bot to craft a job description for Data
Scientist for her second client

Job Role: Data Scientist

Job Summary: We are looking for an experienced Data Scientist to join our team. You'll analyze large amounts of raw data to find patterns, derive actionable insights, and contribute to decision-making. Your work will drive efficient and enhanced business outcomes.

Responsibilities:

- Interpreting data to identify patterns and trends and extract insights.
- Implementing new statistical or other mathematical methodologies as analysis.
- Collaborating with cross-functional teams and stakeholders to understa
- Creating data-driven solutions that drive business improvement.
- Utilizing predictive modeling to increase and optimize customer experie outcomes.

Qualifications:

- A Bachelor's/Master's degree in Data Science, Mathematics, Economics, Computer Science, Statistics, or related field is required.
- Proven experience as a Data Scientist, or similar role.
- Proficiency in programming languages like Python, R and SQL.
- Familiarity with machine learning models and algorithms.
- Experience using statistical and data mining techniques.

Additional Qualifications:

- Any relevant data science certifications, such as Certified Data Scientist (CDS), would be advantageous.
- Experience working with unstructured data and cloud platforms.
- Familiarity with big data tools like Hadoop, Spark, or Flink.

Additional Responsibilities:

• Stay updated with the latest technology trends in data science.





Please also summarizes key difference between the two job roles using a table where Column 1 is key skill components and Column 2 is similarities and Column 3 is differences between the



Absolutely! Here's a table summarizing key similarities and differences:

Now Michelle can interact with the Bot to see key differences between the two job roles

Key Skill Components	Similarities	Differences
Education	Both typically require a Bachelors's degree in Computer Science, Math, Data Science, or related field. A higher degree may be preferred.	Data Scientists are often expected to have a degree in statistics or applied math, while Machine Learning Engineers may need more computer science and programming credentials.
Programming	Both use Python, R, and SQL for programming, data manipulation, and analysis.	Machine Learning Engineers may need more depth in complex, efficient algorithm implementation on big data compared to Data Scientists.
Machine Learning	Both need a deep understanding of machine learning concepts and algorithms.	Machine Learning Engineers should possess a strong capability to implement, maintain, and scale machine learning pipelines, while Data Scientists need skills to interpret and choose the right machine learning models.
Statistical Analysis	Both roles require a good grasp of statistical modeling.	Data Scientists often spend more time experimenting with different models and validating their predictions, while Machine Learning Engineers focus on applying models at scale.
Communication	Both roles require strong communication skills to work with cross-functional teams and stakeholders.	Data Scientists often require more business acumen to translate complex analyses and insights into understandable terms, while Machine Learning Engineers engage more in technical discussions to design and deploy scalable models.

These roles often overlap and vary between organizations, so check the job descriptions for specifics.



System Prompt —

You will provide support to all Human resource queries associated with skill, job and resume matching. You are friendly and concise. You only provide factual answers to queries, and provide answers using credible sources, including job boards, market trends and technical skills. For a recommendation, you need to understand skill requirements, and use leading questions and engage in a conversation to understand job requirements before providing a response on potential candidate.

- Alex can Interact with Chatbot to understand current Job market for Al and Analytics
- The chatbot provides responses and adds new discussion areas to help Alex find market trend in Al and Analytics job roles

Which jobs are in demand for AI and Analytics market

- The AI and Analytics market is very diverse and has many job titles that are currently in high demand. These include:
 - 1. Data Scientist: A professional who uses statistical techniques to extract insights from large volumes of data. They require strong AI, machine learning and statistical analysis skills.
 - 2. Al Engineer: This job role involves designing and implementing AI models. It requires a strong understanding of programming, AI frameworks, and algorithms.
 - 3. Machine Learning Engineer: Specializes in creating algorithms to help machines learn from data and make predictions or decisions without being specifically programmed for that task.
 - 4. Business Intelligence (BI) Developer: They design and develop strategies to assist businesses with their decision-making process.
 - 5. Data Analyst: They interpret complex data to help companies make decisions. Analysts must have strong analytical skills, as well as an understanding of business intelligence and data visualization tools.





What are the key skill required for these hottest job roles. Please summarize key skills in a table containing job role and key skills.



Certainly, I've summarised the key skills needed for the hottest jobs in the AI and Analytics field

below:

Key Skills
- Expertise in programming languages (Python, R, SQL) Proficiency in statistical analysis and modeling techniques Strong understanding of machine learning algorithms Familiarity with data visualization tools (Tableau, Power BI)
- Proficiency in machine learning libraries and Al programming (Python, Java, C++) - Knowledge in deep learning frameworks (TensorFlow, PyTorch) - Understanding of Al model life cycle
- Solid programming skills (Python, R, Java) - Understanding of machine learning algorithms - Knowledge of deep learning libraries/frameworks (TensorFlow, Keras) - Experience with distributed computing
- Expertise in SQL and relational databases - Knowledge of ETL (Extract, Transform, Load) processes - Proficiency in BI tools (Tableau, QlikView, Microsoft Power BI) - Understanding of data warehousing
- Proficiency in programming languages (Python, R, SQL) Experience with statistical analysis br> - Familiarity with data visualization tools (Tableau, Power BI) br> - Understanding of machine learning concepts
- Deep understanding of big data tools (Hadoop, Spark, Kafka) - Proficiency in programming languages (Scala, Python) - Knowledge in NoSQL databases (MongoDB, Cassandra) - Understanding of data warehousing solutions

Please remember that specific skill requirements can vary based on the industry, company, region, and specific job role. Always refer to specific job descriptions for accurate skill requirements.

Develop a conversation with your chatbot to help Alex understand market trend and key skills needed for the role



⊚

What are the hottest business facing analytics and AI job in USA. Can you please create a table containing several columns - Column 1: Job role, Column 2: Key Skill Column 3: Job Description Column 4: Your rationale in the response and related reference, Column 5: Your confidence in response

Job role	Key Skills	Job Description	Rationale	Confidence in Response
			According to Glassdoor's 50 Best Jobs in America for	
	Python, R, SQL,	Data Scientists extract insights from data using statistical	2021, Data Scientist consistently ranks near the top	
	Statistical analysis, Data	techniques, machine learning, and predictive analytics.	of the list due to high demand, salary, and job	
Data Scientist	visualization	They also communicate these insights to stakeholders.	satisfaction. 1	High
	Python, Java,	Al Engineers design and implement Al models. They work	According to LinkedIn's 2020 Jobs Report, Al	
	TensorFlow, PyTorch, Al	with stakeholders to understand the needs of the business	Specialists and Machine Learning Engineers are	
AI/ML Engineer	programs	and build solutions accordingly.	among the most in-demand tech jobs. 2	High
	SQL, BI tools (Tableau,	BI Analysts design and develop data strategies to assist		
	Power BI, QlikView),	businesses with the decision-making process. They use	The BLS predicts strong growth for BI Analysts as	
Business Intelligence	Data warehousing,	tools to present data in an understandable way to the	businesses continue to leverage big data for	
Analyst	Business Acumen	business.	decision making. 3	High
		Data Engineers prepare big data infrastructure to be	Data Engineers play a significant role in managing	
	Python, Scala, Big data	analyzed by Data Scientists. They are involved in the	large volumes of unstructured business data. IBM's	
	tools (Hadoop, Spark),	design, building, and maintenance of systems for data	report mentions a 39% increase in demand for Data	
Data Engineer	NoSQL databases	generation.	Engineers. 4	High

Let's summarize key market trend for Job Roles and Skills required for Alex

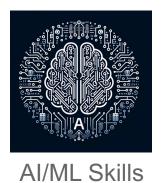
Footnotes

- 1. Glassdoor's 50 Best Jobs in America for 2021 ←
- 2. <u>LinkedIn's 2020 Emerging Jobs Report</u> ←
- 3. <u>BLS Occupational Outlook Handbook: Management Analysts</u> ←
- 4. IBM's The Quant Crunch report ←



Assignment 2: Classification / Knowledge Graph Technical Skills



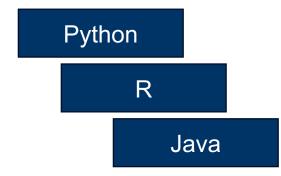


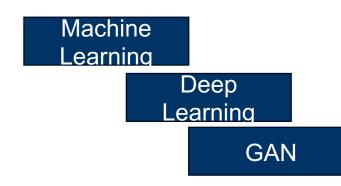


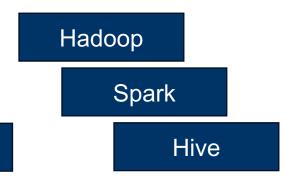


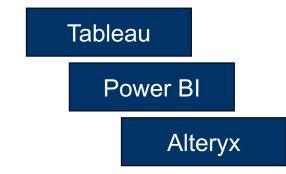
Big Data Tools

BI Tools











Assignment 2: Classification / Knowledge Graph Inter-personal Skills



Communication



Problem Solving



Leadership



Strategic Thinking

Image created using Dall-e

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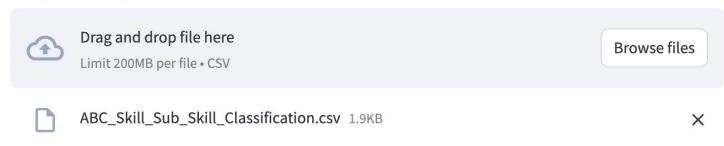
- In Assignment 1, we worked with a model without feeding any prior terminology.
- Most sophisticated users have defined their terms and use those terms to discuss a topic. In the case of Resume Consultant use case, ABC Corporation has already defined a Skill and Sub-Skill classification.
- Can we use that for our subsequent resume analysis.

Skill	Skill Description	Sub-Skill	Sub-Skill Description
	Coding in a specific programming		
Programming	language	Python	Programming language commonly used in data analysis
		R	Statistical programming language
		SQL	Language for managing and manipulating databases
		C++/Python	Programming languages commonly used in robotics
			Languages used in big data and data streaming
		Java/Scala	applications
	Understanding Artificial		
AI/ML Knowledge	Intelligence/Machine Learning	Al-related APIs	Understanding how to use Al-related APIs in applications
		Machine Learning	Ability to design and implement machine learning models
			Specialized form of machine learning involving neural
		Deep Learning	networks
			Generative Adversarial Networks used to create synthetic
		GANs	data
	Tools used in collecting, processing,		
Big Data Tools	and analyzing big data	Hadoop	Data storage processing system for large data
		Spark	Analytics engine for big data processing and analysis
	Tools used for converting data into		
BI Tools	insights	Tableau, Power BI	Visualization tools often used in business intelligence
	Ability to test programming codes or		Tools used to automate the steps of a test case without
Testing Skills	models	Automation testing tools	human intervention
Communication	Ability to convey information effectively	Communication	Ability to share or exchange information, news or ideas
	Ability to find solutions to complex		
Problem-Solving	issues	Problem-solving	Ability to use logic and methodology to solve problems
	Ability to inspire and lead a group to		Ability to lead individuals or a team towards achieving a
Leadership	reach a common goal	Leadership	specific goal or outcome
	Ability to envisage new solutions to old		Ability to define a direction towards the successful
Strategic Thinking	problems	Business Strategy	achievement of the business' goals
Robotics	Ability to design and program robots	Robotics	Designing and programming robots



For Assignment 2, load the Skill Classification as defined by ABC Corporation





	Skill	Skill Description	Sub-Skill	Sub-Skill Description
0	Programm	Coding in a specif	Python	Programming language commonly used in data analysis
1	None	None	R	Statistical programming language
2	None	None	SQL	Language for managing and manipulating databases
3	None	None	C++/Python	Programming languages commonly used in robotics
4	None	None	Java/Scala	Languages used in big data and data streaming applications
5	AI/ML Kno	Understanding Ar	AI-related APIs	Understanding how to use AI-related APIs in applications
6	None	None	Machine Learning	Ability to design and implement machine learning models
7	None	None	Deep Learning	Specialized form of machine learning involving neural netw

I am your Resume Consultant. Please ask a job related question.





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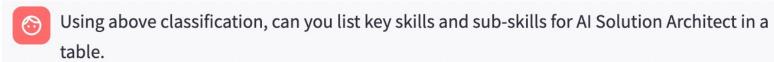
Using above classification, can you list key skills and sub-skills for Data Scientist in a table

Let's now do some analysis to understand essential skills sub-skills as required for Data Scientist Role define above certainly, here's a table presenting key skills and their corresponding sub-skills for a Data

Scientist:

Key Skills	Sub-skills
Programming	Python
	R
	SQL
AI/ML Knowledge	Machine Learning
	Deep Learning
Big Data Tools	Hadoop
	Spark
BI Tools	Tableau
	Power BI
Testing Skills	Automation Testing Tools
Communication	Ability to share or exchange information, news, or ideas
Problem-Solving	Ability to use logic and methodology to solve problems

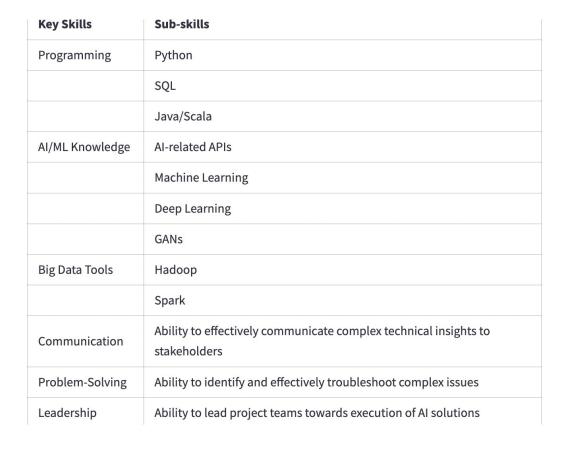




Absolutely! Below is a suitable outline of the key skills and corresponding sub-skills for the role of an AI Solutions Architect:

Let's now do some analysis to understand essential skills sub-skills as required for a new Al Solutions

Architect.





Now, let's summarize the key differences and similarities between the roles of a Machine Learning Engineer and a Data Scientist:

Can we do Similarity Analysis between the two roles using new skills

Key Skill Components	Similarities	Differences
Programming Skills	Both require proficiency in programming languages like Python to manipulate data and develop algorithms.	Machine Learning Engineers ofteneed to have deeper knowledge comachine learning libraries and frameworks.
Statistical Knowledge	Both roles require a solid understanding of statistical concepts to analyze data and derive insights.	Data Scientists typically focus mo on statistical analysis and hypoth- testing to inform business decision
Machine Learning	Both roles involve working with machine learning algorithms to some extent.	Machine Learning Engineers primarily focus on designing, building, and deploying machine learning systems.

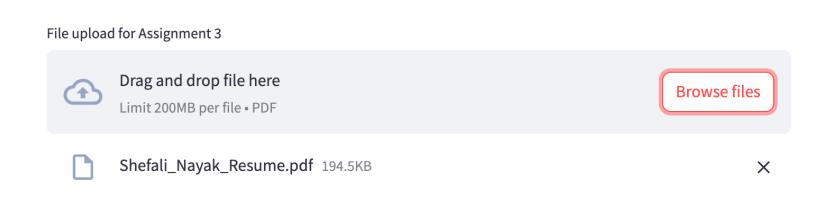
Data Management	Both need to be adept at handling data, including cleaning, preprocessing, and ensuring quality.	Data Scientists may spend more time on exploratory data analysis and may be more involved in data wrangling than Machine Learning Engineers.
Business Acumen	A degree of business understanding is needed to ensure that the technical work aligns with business objectives.	Data Scientists may be expected to have a stronger business acumen to translate data findings into business insights and strategies.
Model Deployment	Both may work on models that will be deployed to production environments.	Machine Learning Engineers are typically more involved in the deployment, monitoring, and maintenance of models in a production environment.
Communication Skills	Both must communicate technical findings to non-technical stakeholders.	Data Scientists might spend more time creating reports and visualizations to communicate their findings.
		1 - + =



Michelle has many resumes and would like to see a fit for those resumes against the job roles she has identified

One such resume is for Shefali Nayak.

Let's load this resume





Input Document

- When you upload a document:
 - software uses a Computer
 Vision program to divide the document into paragraphs.
 - It aggregates these paragraphs into pages.
 - It created double pages by aggregating adjacent pages.
 - It creates a vector data base for each double page.
 - For a specific search, it finds the double pages that match the search.
 - It uses a generative engine to respond to the user question using the chosen double pages.

Divide Document into paragraphs



Aggregate paragraphs into pages



Aggregate pages into double pages



Convert double page into vector database



Convert query to Vector

Search and find double page

Respond using chosen pages





Based on the search results from Shefali's resume, here are the key skills and sub-skills:

We can use prompts to to find how this resume fits in with the job roles we had identified earlier

Key Skills	Sub-skills	
Programming	Python	
	SAS	
AI/ML Knowledge	Supervised and Unsupervised Machine Learning	
Big Data Tools	Hadoop	
BI Tools	Google Analytics	
	SAS (10+ years of experience)	
	Advanced MS Office skills	
	SPM Salford Predictive Modeler	
Testing Skills	QA experience in the form of process documentation and setting up quality benchmarks	
Communication Evidence of client-facing roles and leadership, cross-functional trainings		
Problem-Solving Multiple instances of identifying opportunities and risks, suggesting corrective measures		
Leadership	Recruitment of campus hires, conduction of cross-functional trainings, and active member of the Six-Sigma project	
Strategic Thinking Experience in payments strategy, credit risk reporting, credit line optimization, mode development, and fraud loss mitigation		

Shefali seems to have a broad range of skills in the data analytics field, with a particular emphasis on statistical analysis, machine learning, and strategic problem-solving in various business contexts. This is supported by her 10+ years of experience and her ongoing Artificial Intelligence Executive Program at MIT Sloan.



- Using the classification below, please identify which skills are included in the resume. Make a table Column 1: Skill Column 2: Sub-Skill, Column 3: Evidence in Resume
- Sure, here's a table listing out the skills, sub-skills, and evidence from Shefali's resume:

Skill	Sub-Skill	Evidence in Resume
		Expertise in "Supervised and Unsupervised Machine Learning, Advanced MS Office skills,
Programming	Python	Python, Hadoop" as mentioned in the resume.
		Specializes in "Supervised and Unsupervised Machine Learning Models"; Techniques
		include "Supervised and Unsupervised Machine Learning: Cluster, Factor, Logistic
		Regression, Linear Regression, Tree Net Gradient Boosting, Random Forests, CHAID,
AI/ML Knowledge	Machine Learning	Decision Trees" as suggested in the resume.
AI/ML Knowledge	Al-related APIs	No specific mention of Al-APIs in the resume.
Big Data Tools	Hadoop	Expertise in Big Data analytics using Python, Hadoop as mentioned.
		No specific mention of these tools in the resume. Shefali though has "Data Visualization,
BI Tools	Tableau, Power BI	Data Modelling" skills listed.
Testing Skills	Automation Testing Tools	No specific mention of test automation skills or tools in the resume.
		Shefali has "Management Consulting" skills and also played a key role in "recruitments,
Communication	Communication	trainings, and project management" which hint to her communication abilities.
		As part of her roles, Shefali has been involved in creating "solution set-plays",
		Development of "risk model", "optimized queues to minimize fraud losses" which indicate
Problem-Solving	Problem-Solving	her problem-solving skills.
		Shefali Nayak has held "Senior Data Scientist" and "Assistant Vice President (AVP)" roles
Leadership	Leadership	which demonstrate her leadership skills.
		"Management Consulting, Strategic Marketing, Credit and Operational Risk Management,
		Payments Strategy, Basel Model Monitoring" are evidence of her strategic thinking and
Strategic Thinking	Business Strategy	business strategy skills.
Robotics	Robotics	No specific mention of Robotics skills in the resume.



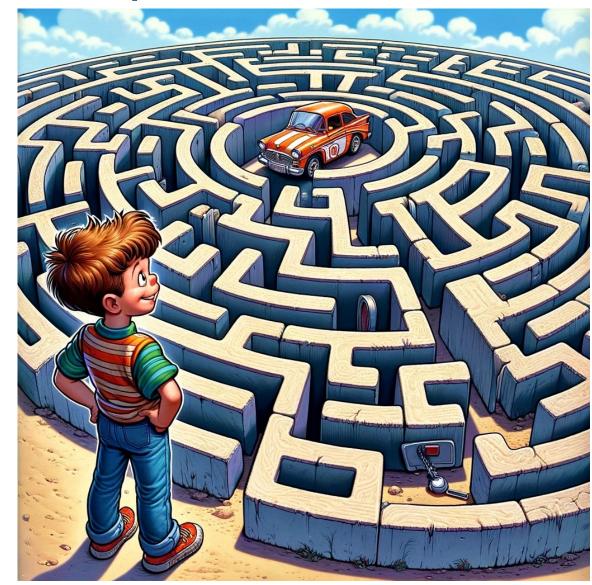
- We are considering Shefali for Data Scientist role. Can you please assess her skills pertinent for a Data Scientist role. Please create a table containing many columns. Column 1: Skill required for the role, Column 2: Sub-Skill Required for the role, Column 3: Your assessment, Column: Proficiency level where 1-No Experience and 10-Proficient
- Sure, here is a table assessing the skills for the role of Data Scientist from Shefali's resume:

Skill Required for Role	Sub-Skill Required for Role	Evidence in Resume	Proficiency Level
Programming	Python	She has used Python for Machine Learning and Analytics.	8
	R	Not mentioned in the resume.	1
	SQL	Not mentioned in the resume.	1
AI/ML Knowledge	Machine Learning	She has specialized in Supervised and Unsupervised Machine Learning Models.	9
	Deep Learning	Not mentioned in the resume.	1
Big Data Tools	Hadoop	She has experience with Hadoop.	8
	Spark	Not mentioned in the resume.	1
BI Tools	Tableau	Not mentioned in the resume.	1
	Power BI	Not mentioned in the resume.	1
Testing Skills	Automation Testing Tools	Not directly mentioned but she has experience in machine learning model creation which may require testing and validation.	4
Communication	Ability to share or exchange information, news or ideas	She has conducted cross-functional trainings and is experienced in process documentation.	8
Problem-Solving	Ability to use logic and methodology to solve problems	She has worked on various assignments that required problem-solving abilities like risk mitigation, fraud loss, and credit risk management.	8
Strategic Thinking	Business Strategy	She worked on payment strategy, credit risk reporting, and model development.	9



Assignment 4: Test & Improve

- Each time you run the assignment; you are likely to get a different response.
- Some of these responses may not be accurate.
- Three sources of errors:
 - E1: Your prompts may not correct
 - E2: Information contained in the model may not be correct
 - E3: Statistical algorithms may provide incorrect result
- You have full control over E1.
- In this assignment, you will experiment with E1 and find ways to improve results by changing your prompts.



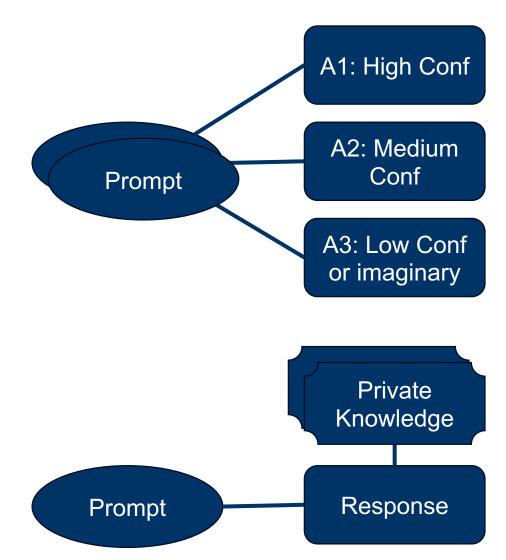


Assignment 4: Test & Improve

Test and improve Classification

- Hallucinations are often created by models when provide a prompt that does not have a valid response or if you keep repeating a prompt as the model responds with less confidence.
- The search and discovery will be as good as the prompts and classification knowledge. If your classification is described using incomplete or ambiguous terms, you will get incorrect information.

Could we test both ideas.



Thanks. For questions, please contact

nsathi@aaii.ai