



विद्या परं दैवतम्

IIM
VISAKHAPATNAM



Business Cluster
Indian Institute of Management - Visakhapatnam
Innovate. Implement. Impact.



ANK
IT & ANALYTICS CLUB
IIM VISAKHAPATNAM

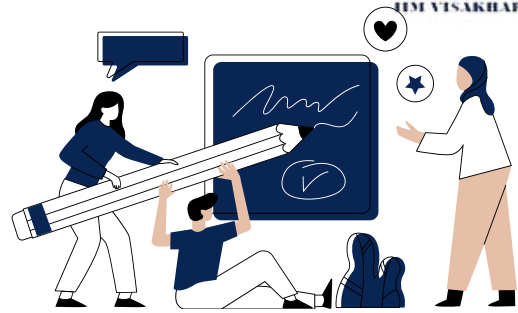
ANKRONICLE

Compendium '25

DATA AND BEYOND

ANK - IT & ANALYTICS CLUB

TABLE OF CONTENTS



01

Introduction

- About Ank
- IT industry | Importance and relevance
- A-Z

02

Core Concepts in IT & Analytics

- Data Storage
- Big Data
- Machine Learning
- Neural Network

03

Tools and Technologies

- Excel Basics
- Python Basics
- SQL Basics
- Power BI/ Tableau

04

Roles & Responsibilities

- Opportunities
- Companies Benefited from Data-Driven Decision Making
- Major Roles
- Past Year Recruiters and Roles Offered in IT & Analytics domain

05

Emerging Trends and Technologies

- Artificial Intelligence and Machine Learning
- Internet of Things (IoT)
- Blockchain in Analytics
- Predictive Analytics
- Automation and AI in Business Processes
- Prompt Engineering
- GenAI

06

Professional Development

- Courses & Professional Development

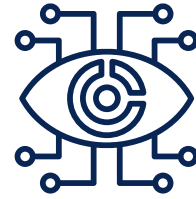
Introduction





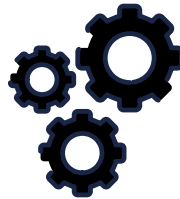
WHO WE ARE

- IT and Analytics Club of IIM Visakhapatnam
- Established: 2020



VISION

Stay ahead of the evolving technology by creating awareness of the skills demanded by corporate



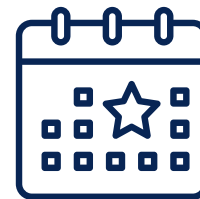
WHAT WE DO

- Skill-Building Workshops
- Expert Guest Talks
- Innovative Competitions



MISSION

Make the future managers ready to transform business through technology



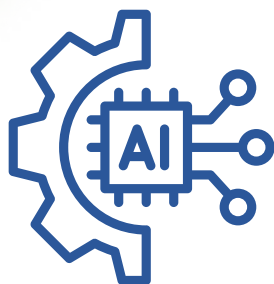
FLAGSHIP EVENTS

- Datawars: Analytics Challenges
- ANK Ganit: Case Competitions
- Vaktavya: Inspiring Talks
- Engaging Events and More

STAY UPDATED: FOLLOW US



Industry Insights



Tech Industry Categories



IT Services



Telecommunications



Data Analytics and BI



EdTech



AI and ML

IT Analytics Impact and applications

- Network optimization
- Customer churn prediction
- Service customization

Telecommunication
11.8%

Manufacturing
11.8%

Finance
35.3%

Retail
17.6%

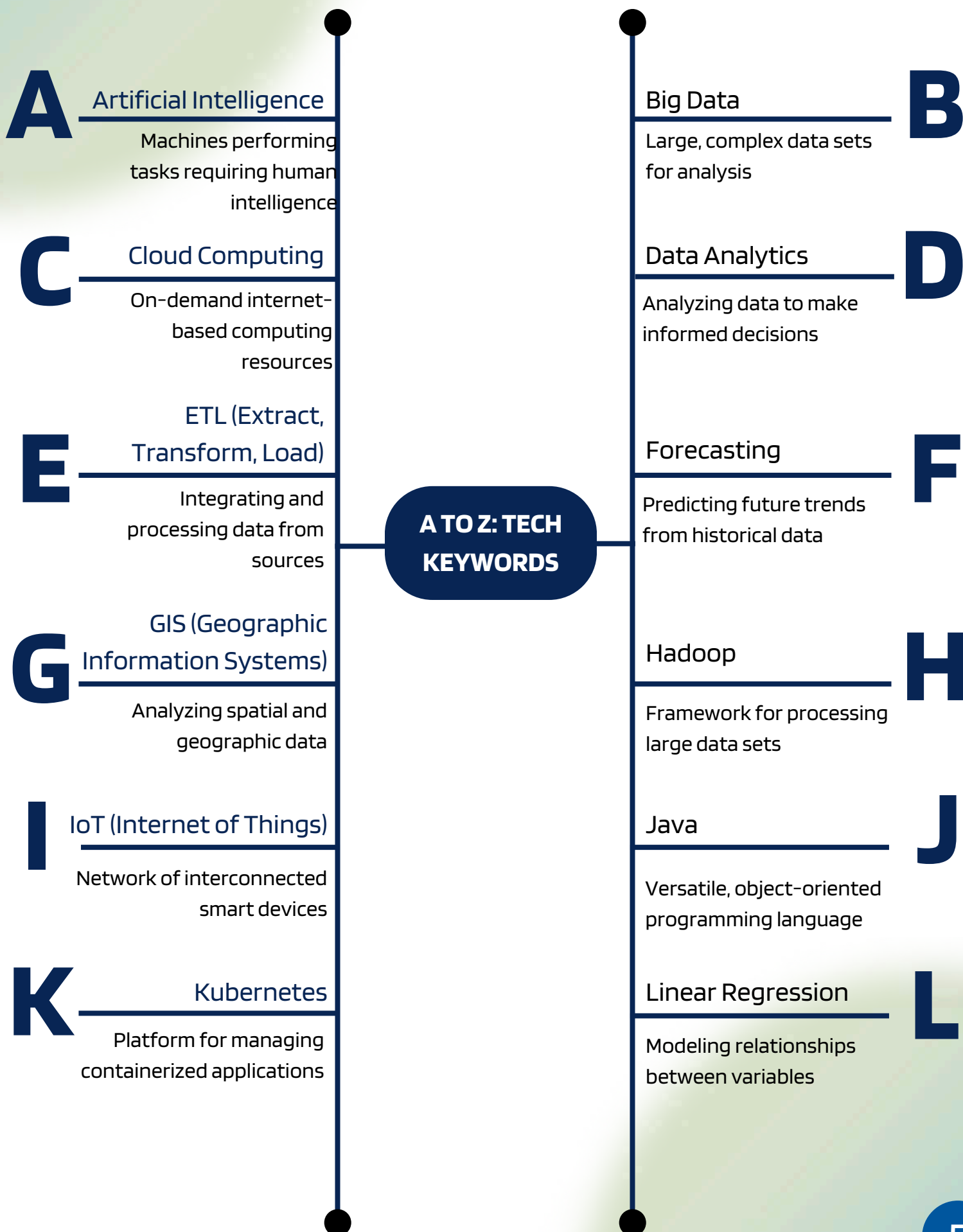
Healthcare
23.5%

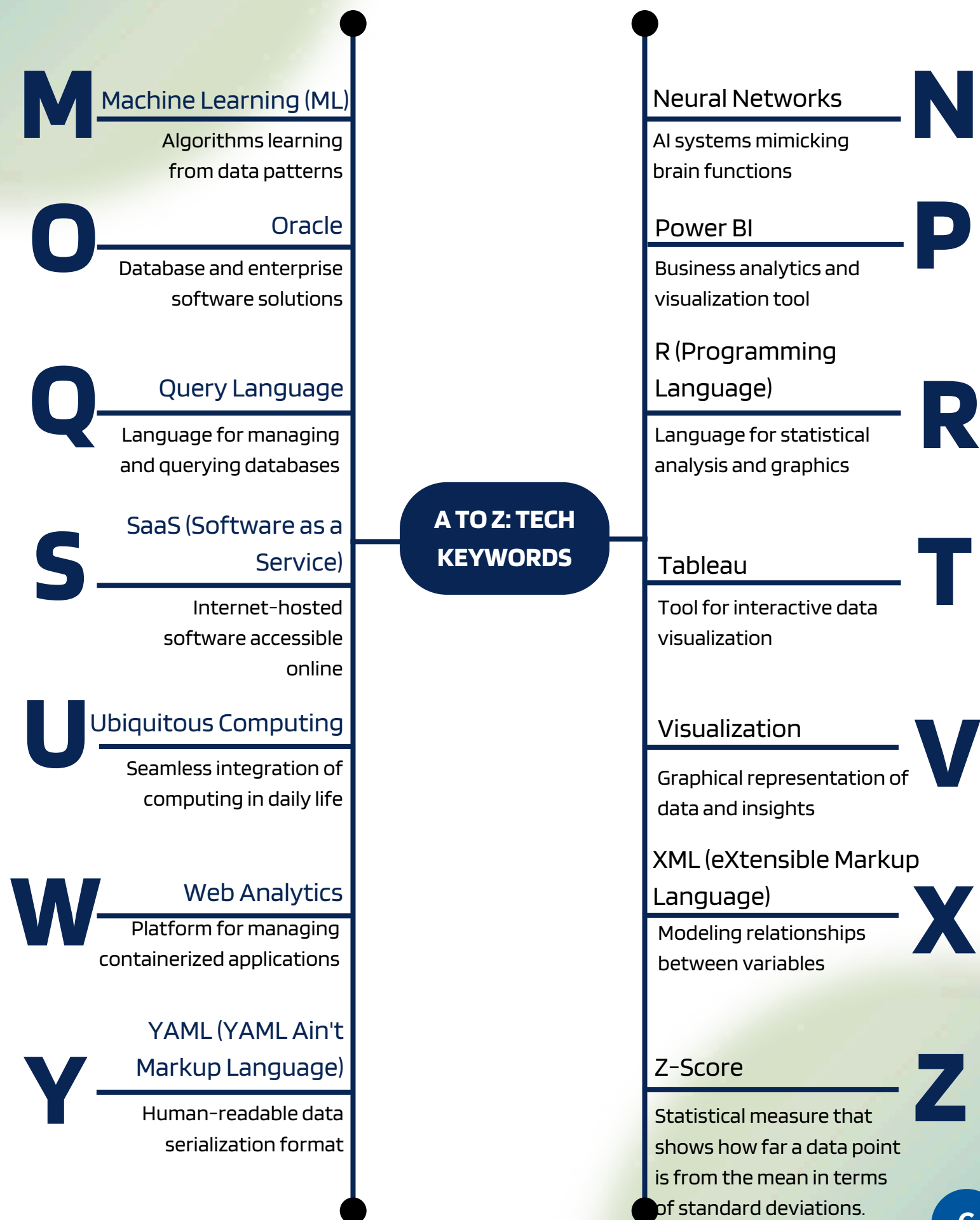
- Predictive maintenance
- Supply chain optimization
- Process automation

- Real-time fraud detection
- Algorithmic trading
- Financial forecasting

- Customer segmentation
- Personalized marketing
- Demand forecasting

- Predictive analytics for patient outcomes
- Operational efficiency
- Resource management





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Core Concepts in IT & Analytics



Data Storage

Data storage is the method of recording, preserving, and managing digital information. It is a critical component in IT and analytics, ensuring that data is securely stored, easily accessible, and efficiently managed for analysis and decision-making. Data is stored in Relational Databases and NoSql Databases.

SQL

- Stores data in a well structured tables defined by keys.
- There is relationships between tables and which provides less flexibility for changes.

NoSQL

- Stores data in un-structured or semi structured tables.
- There is less relationships between tables and provides more flexibility for changes.

SQL Databases



NoSQL Databases



Big Data

Big Data refers to extremely large and complex datasets that are difficult to process and analyze using traditional data processing tools. The term also encompasses the technologies and methods used to collect, store, manage, and analyze these vast quantities of data to uncover patterns, trends, and associations, especially relating to human behaviour and interactions.

Characteristics of Big Data:

- **Volume:** The sheer amount of data generated and stored, ranging from terabytes to petabytes. eg- Data generated from social media
- **Velocity:** The speed at which data is generated, collected, and processed.
- **Variety:** The different types of data, both structured and unstructured, including text, images, videos, and more.
- **Value:** The potential to turn large volumes of data into valuable insights that can drive decision-making.

Types of Big Data

Structured Data

It refers to information that is highly organized and easily searchable within fixed fields in a database.

Unstructured Data

It refers to information that doesn't have a predefined data model or isn't organized in a predefined manner.

Machine Learning(ML)

It is a subset of artificial intelligence (AI) that enables systems to learn from data, identify patterns, and make decisions with minimal human intervention. It involves feeding data into a ML algorithm and adjusting the algorithm's parameters to minimize errors and improve predictions.



Types of Machine Learning

Supervised learning

- Model is trained on labelled data
- Model learns to predict the output from the input data.
- Eg: Image classification, spam detection
- Algo: Linear Regression, Decision Tree

Unsupervised Learning

- Model is trained on unlabelled data.
- Model tries to learn the structure of the data without specific outputs.
- Eg: Clustering, anomaly detection
- Algo: K-Means Cluster, Hierarchical Clustering

Reinforcement Learning

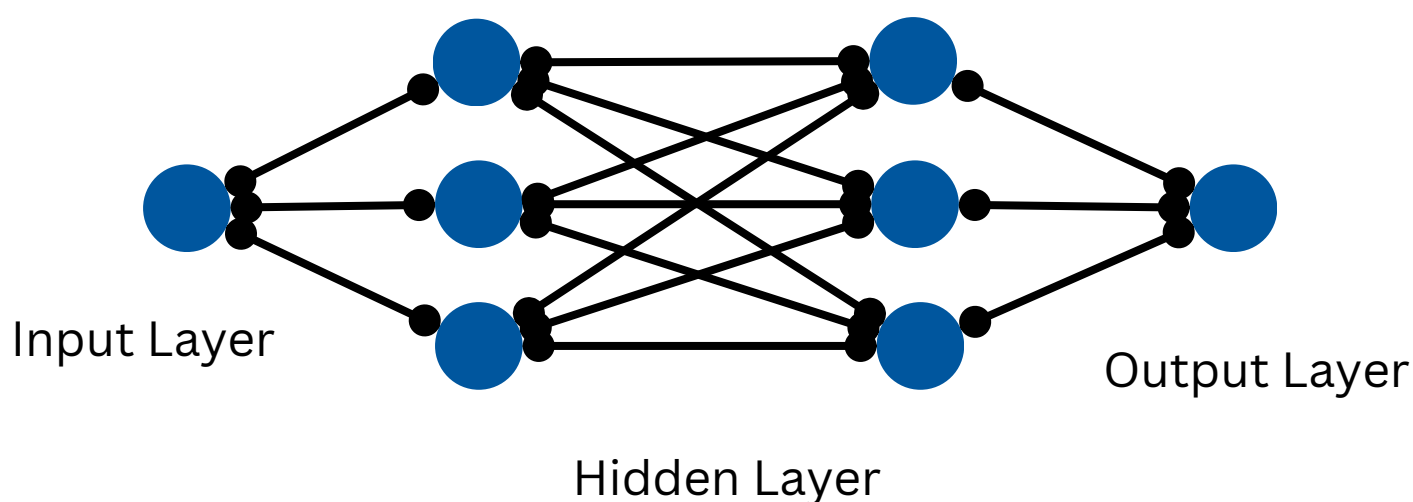
- Model interacts with the environment and learns through rewards and penalties.
- Aims to maximize long-term rewards.
- Eg: Self-driving cars learn safe driving this way.

Neural Network

Neural Networks are a class of machine learning models inspired by the structure and functioning of the human brain. They are a key component of deep learning algorithms and are used for tasks such as image and speech recognition, natural language processing, and more.

Components of Neural Network:

- **Nodes:** The fundamental building blocks of a neural network, similar to biological neurons.
- **Layers:** Layers act as a stage to receive the data and transmit it. It includes input layer, hidden layer and output layer.
- **Weights:** Each connection between neurons has an associated weight. Weights determine the strength and direction (positive or negative) of the signal being passed from one neuron to another.
- **Forward Propagation:** The process by which input data is passed through the layers of the network to produce an output.



A Two Layer Neural Network

The background is a dark blue gradient. It features several white and light blue circuit-like lines, some of which form concentric circles around the central text. There are also some dashed lines and a small, stylized lightbulb icon in the bottom right corner, composed of a network of colored dots and lines.

Tools and Technologies

Software Skills

The collection of software skills equips IT and analytics professional managers with the tools necessary to orchestrate projects, empower teams, and make informed decisions. From mastering project management platforms and collaboration tools to delving into data analytics software and cloud services, these skills foster efficient communication, data-driven insights, and strategic alignment.



Microsoft Excel



Tableau



PowerBI



SQL



R Programming



Python

Basic Formulas Excel

- **SUM:** =SUM(A1:A10) - Adds up numbers in a range.
- **AVERAGE:** =AVERAGE(A1:A10) - Calculates the average of numbers in a range.
- **MIN/MAX:** =MIN(A1:A10), =MAX(A1:A10) - Finds the minimum or maximum value in a range.
- **COUNT:** =COUNT(A1:A10) - Counts the number of numeric cells in a range.
- Basic Functions:
- **IF:** =IF(condition, value_if_true, value_if_false) - Performs a conditional test.
- **VLOOKUP/HLOOKUP:** =VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup]) - Searches for a value in a table.
- **CONCATENATE:** =CONCATENATE(A1, " ", B1) - Combines text from multiple cells.
- **TRIM:** =TRIM(A1) - Removes extra spaces from text.
- **SUMIF:** =SUMIF(B2:B20, "North", C2:C20) - adds the numbers in a range only if they meet a specific condition.



Python Basics

- **Import Libraries:** import numpy as np, import pandas as pd, import matplotlib.pyplot as plt, import sklearn, import seaborn as sns
- **Read Data:** Use pd.read_csv() for CSV files, pd.read_excel() for Excel files
- **Basic Statistical Functions:** Use np.mean(), np.median(), np.std(), stats.mode()
- **Line Plot:** plt.plot()
- **Bar Plot:** plt.bar()
- **Histogram:** plt.hist()
- **Scatter Plot:** plt.scatter()
- **Export Data:** Use df.to_csv() or df.to_excel() to save DataFrame to file



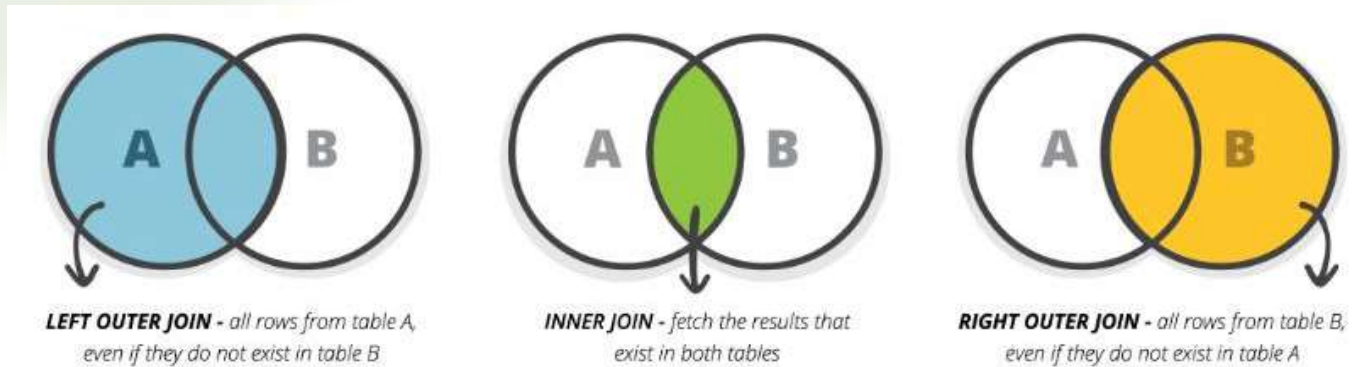
Power BI – DAX Basics

- **Aggregation Functions:** SUM(column), COUNT(column), COUNTA(column)
- **Logical Functions:** SWITCH(expression, value1, result1, ..., else_result), AND(condition1, condition2), OR(condition1, condition2), NOT(condition)
- **Text Functions:** CONCATENATE(text1, text2), LEN(text), TRIM(text).
- **Date and Time Functions:** TODAY(), DATEDIFF(start_date, end_date, interval), DATE(year, month, day)
- **Filter Functions:** CALCULATE(expression, filters...), FILTER(table, condition), RELATEDTABLE(table), RELATED(column)
- **Measure:** DAX expression that calculates values dynamically.
- **Parameter:** User-defined value selector (e.g., What-if analysis).

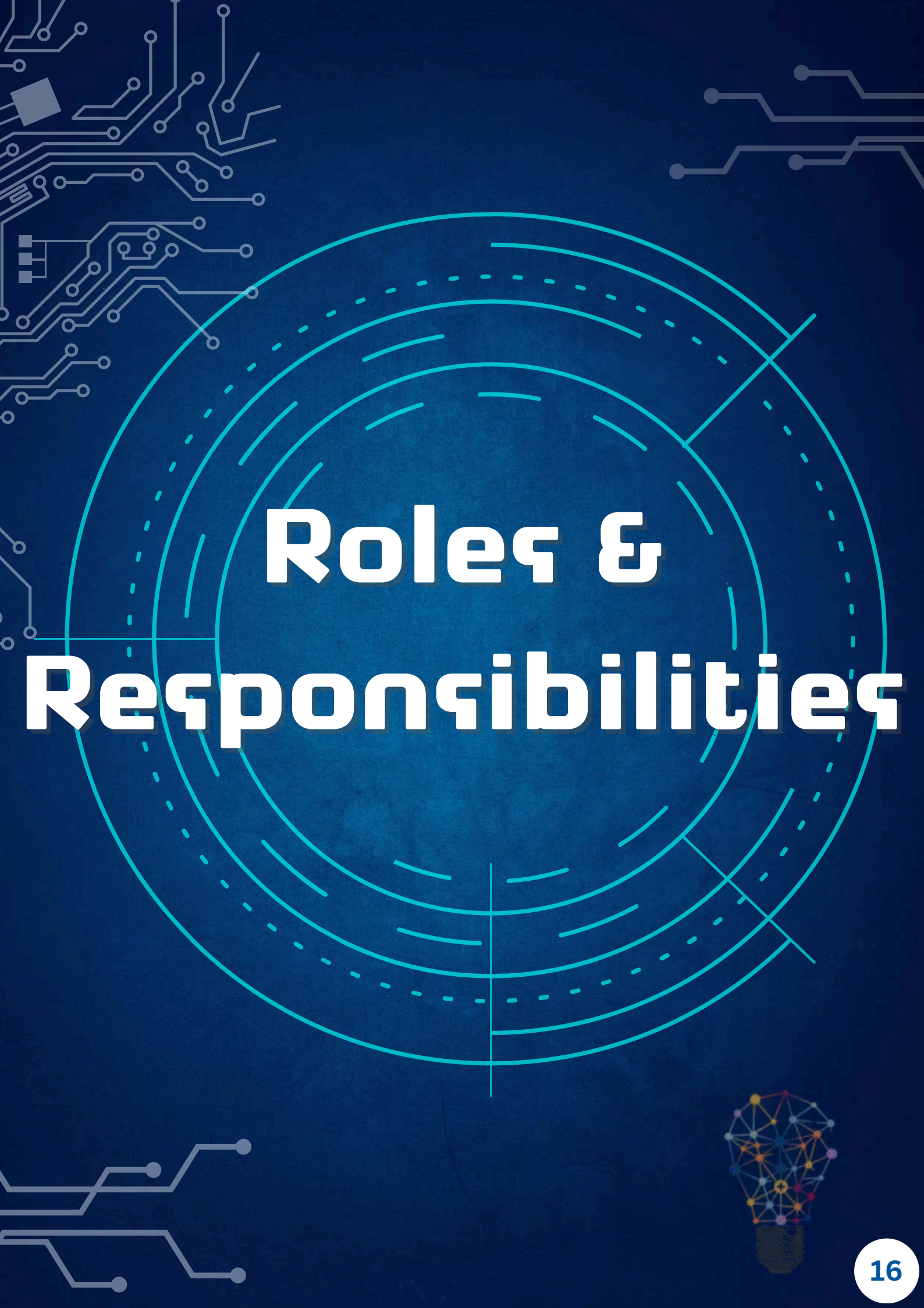
TABLEAU

- **Aggregation Functions:** SUM()– adds value, AVG()– average of values, COUNT()– count records, MIN()– smallest value, MAX()– largest value
- **Logical Functions:** IF condition THEN result ELSE result END– Conditional logic, CASE expression WHEN value THEN result END– Multiple conditions
- **String Functions:** LEFT(string, n)–First n character, RIGHT(string, n)–Last n characters, LEN(string)– String length, TRIM(string)– Remove spaces, CONCAT(string1, string2)–Join strings
- **Date Functions:** TODAY()–Current date, NOW()–Current date & time, DATEDIFF('day', start_date, end_date)–Date difference, DATEADD('month', n, date)– Add to date, DATENAME('month', date)– Return name
- **Number Functions:** ROUND(number, decimals)– Round number, FLOOR(number)– Round down, ABS(number)– Absolute value
- **Table Calculations:** RUNNING_SUM(expression)–Cumulative total, INDEX()–Row index, RANK()–Ranking values, WINDOW_SUM(expression)–Windowed sum
- **LOD Expressions:** { FIXED dimension : expression }– Fixed level, { INCLUDE dimension : expression }– Add dimension, { EXCLUDE dimension : expression }– Remove dimension

SQL Basics



1. **SELECT:** Retrieve data from a table.
2. **WHERE:** Filter records based on specific conditions.
3. **ORDER BY:** Sort records in ascending or descending order.
4. **INSERT INTO:** Add new records to a table.
5. **UPDATE:** Modify existing records in a table.
6. **DELETE:** Remove records from a table.
7. **JOIN:** Combine rows from two or more tables based on related columns.
8. **GROUP BY:** Group records with similar values.
9. **HAVING:** Filter groups based on aggregate conditions.
10. **DISTINCT:** Return unique values in a column.
11. **LIKE:** Search for a pattern in a column.
12. **LIMIT:** Restrict the number of returned records.
13. **IN:** Match values within a specified set.
14. **BETWEEN:** Filter records within a specified range.
15. **COUNT, SUM, AVG, MIN, MAX:** Perform aggregate functions on records.



Roles & Responsibilities



Opportunities

- Analysts are highly sought-after in this digital age.
- According to PwC's latest report, data-driven organizations are three times more likely to make sound, informed decisions than those who do not use such strategies.
- As organizations become increasingly data-driven, analyst roles and responsibilities have become even more important.



Companies Benefited from Data-Driven Decision Making

- **Netflix** – Using data to create viral content & web series.
- **Google** – Utilizing people analytics for a better workplace.
- **Coca-Cola** – Using customer data to achieve marketing efficiency.
- **Uber** – Providing faster rides using data.



UBER

What does a data analyst do?

The answer to this question will vary depending on the type of organization and the extent to which a business has adopted data-driven decision-making practices. Generally speaking, though, the tasks data analysts must perform on a daily basis include the following:

- Designing and maintaining data systems and databases
- Mining data from primary and secondary sources. reorganizing the data that can be easily read
- Using statistical tools to interpret datasets and finding trends and patterns.
- Preparing reports for executive leadership that effectively communicate trends, patterns, and predictions.
- Creating appropriate documentation for stakeholders to understand data analysis process.

Simply put, data analyst roles and responsibilities involve collecting and analyzing data to identify patterns, trends, insights, and solutions. This requires applying knowledge gained from fields such as math, statistics, economics, and computer science.

Why Career in Data Analytics?

Variety of
roles

Job security

Use of
technology

Career
advancement

Impactful
work

Major Roles

The IT & Analytics field offers a diverse range of career opportunities that are crucial to the functioning of modern organizations.

Financial Analyst

- Dedicate themselves to analyzing an organization's financial data to steer strategic decisions
- Assess financial performance, market trends, and investment opportunities

Marketing Analyst

- Assess market trends, customer preferences, and competitive landscapes to guide marketing strategies
- Analyze consumer behavior and campaign effectiveness

Operations Analyst

- Concentrate on optimizing internal processes and workflows.
- Identify bottlenecks, streamline operations, and enhance overall efficiency

BI Analysts

- Pivotal in converting raw data into actionable insights.
- Analyze diverse data sources to identify trends, patterns, and opportunities

Risk Analyst

- Evaluate potential risks and develop strategies to mitigate them
- Assess factors that could impact projects or the overall business, such as economic trends or regulatory changes

IT Business Analyst

- Bridge gap between business needs and technology solutions
- Gather requirements from stakeholders, translate them into technical specifications, work closely with development teams to ensure the successful implementation of IT projects

Systems Analyst

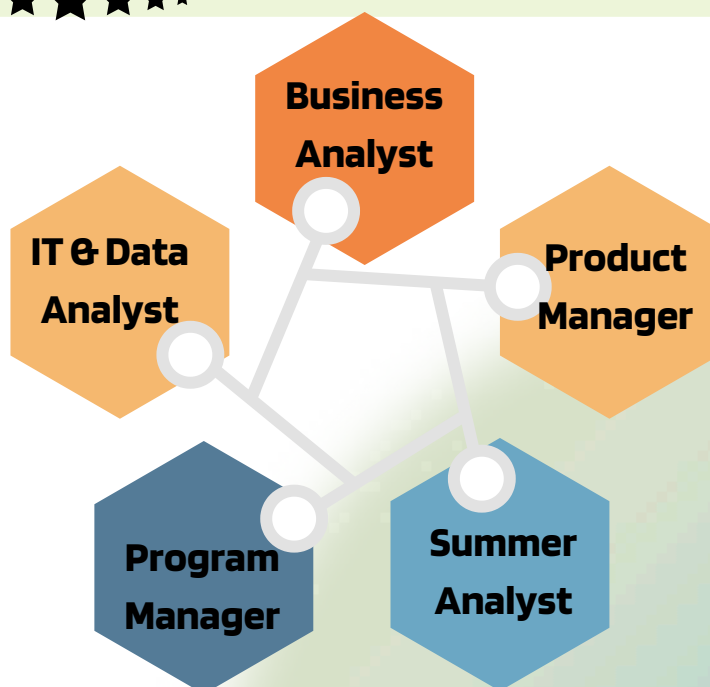
- Evaluate an organization's existing information systems and propose improvements or new systems to enhance efficiency
- Essential in ensuring that technology solutions align with business needs

PAST YEAR RECRUITERS AND THE ROLES OFFERED IN IT&ANALYTICS DOMAIN

For final placement 2024-25, 25% of roles were offered in Analytics domain. Following are some of the prominent recruiters that offered analytics roles:



Some of the roles offered by companies in IIM Visakhapatnam



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Emerging Trends and Technologies



Emerging Trends and Technologies

In today's rapidly evolving technological landscape, several emerging trends and technologies are redefining the way we collect, analyze, and utilize data, driving innovation and efficiency across various industries.

Following are recent or upcoming development in the world of analytics:

1. Artificial Intelligence and Machine Learning

AI and ML are revolutionizing industries by enabling systems to learn from data, automate decision-making processes, and uncover patterns that were previously inaccessible to traditional analytical methods. They are driving advancements in personalized services, predictive maintenance, and autonomous systems.

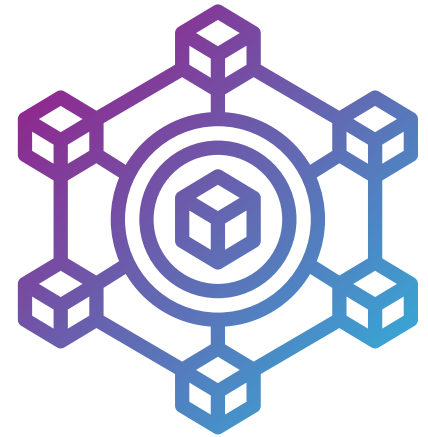


2. Internet of Things (IoT)

The proliferation of IoT devices is generating vast amounts of data, leading to new opportunities in data analytics. IoT enables real-time monitoring, predictive analytics, and enhanced decision-making across various diverse set of sectors like the healthcare, manufacturing, and smart cities.

3. Blockchain in Analytics

Blockchain technology is transforming data analytics by offering enhanced security, transparency, and traceability. Its decentralized nature ensures the integrity of data, making it a valuable tool in areas such as supply chain management, finance, and digital identity verification.



4. Predictive Analytics



Predictive analytics leverages historical data, statistical algorithms, and machine learning techniques to forecast future outcomes. It is becoming increasingly important in fields like marketing, finance, and operations, helping organizations anticipate trends, optimize resources, and improve decision-making.

5. Automation and AI in Business Processes

Automation, powered by AI, is streamlining business processes by reducing manual intervention, improving efficiency, and minimizing errors. From robotic process automation (RPA) to AI-driven customer service chatbots, these technologies are reshaping the way businesses operate, allowing them to focus on strategic initiatives rather than routine tasks.

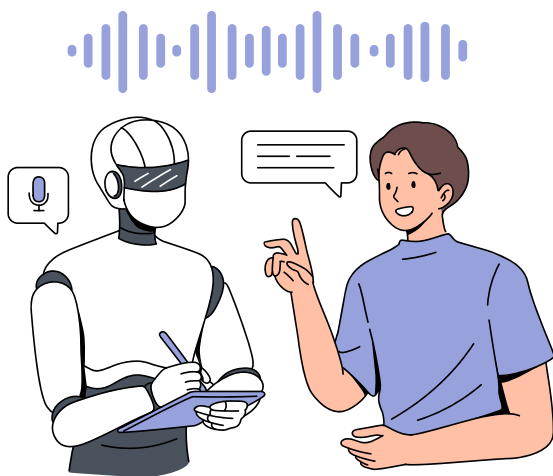


6. Prompt Engineering

Prompt Engineering is the practice of crafting and refining inputs to effectively communicate with AI systems, especially large language models. By structuring queries with clear context and constraints, it guides AI to generate accurate and relevant outputs. Serving as a bridge between human intent and machine intelligence, prompt engineering enhances efficiency, creativity, and reliability across tasks like data analysis, content creation, and decision support.



7. GenAI



Generative AI (GenAI) is a branch of artificial intelligence that creates new content—such as text, images, audio, or code—by learning from patterns in existing data. By turning prompts into context-rich outputs, GenAI enhances creativity, efficiency, and decision-making across business, analytics, and automation. For Eg: Chatgpt, Gamma, DALL·E

Professional Development



Courses & Professional Development

Tired of being just another fish in the digital sea? Want to be the captain of your own data ship? Look no further! In today's world, data is the new gold, and data scientists are the modern-day pirates (in a good way, of course!).

Why learn these courses? Think of them as your secret weapon in the tech battle. They'll turn you from a data newbie into a data ninja, ready to conquer any challenge. Plus, they're like mental gym workouts, strengthening your logical and cognitive muscles. So, what are these magical courses? Let's dive in:

Foundational Courses:

Statistics and Probability provide the foundational tools necessary for the systematic collection, rigorous analysis, and meaningful interpretation of data. These disciplines enable us to make informed decisions, identify trends, and draw accurate conclusions from both small and large data sets.

Below are curated sites which will help someone venture into the world of data analytics.



Links:

Introduction to Statistics:

<https://www.coursera.org/learn/stanford-statistics>

Probability and Statistics for Business and Data Science :

<https://www.udemy.com/share/101XSe/>

Courses & Professional Development

Programming & Tools:

Programming and tools are the backbone of data analytics, providing the necessary framework to extract, manipulate, analyze, and visualize data.

Links:

Data Science: R Basics by Harvard:

<https://shorturl.at/ERSgP>

Python for Data Science & ML:

<https://www.udemy.com/share/101WaU/>

SQL for Data Science:

<https://www.coursera.org/learn/sql-for-data-science?>

Tableau for Data Visualization:

<https://www.udacity.com/course/data-visualization-nanodegree--nd197>

Getting Started with Power BI:

<https://learn.microsoft.com/en-us/training/paths/get-started-power-bi/>

Excel for Data Analysis by Microsoft:

<https://www.edx.org/learn/data-analysis/microsoft-introduction-to-data-analysis-using-excel?>



Advanced Data Analytics:

It takes data analysis to new heights by employing sophisticated techniques to uncover deeper, more actionable insights. It delves into complex patterns, predictions, and prescriptive recommendations.

Courses & Professional Development

Links:

Machine Learning:

<https://www.coursera.org/specializations/machine-learning-introduction?>

IBM: Machine Learning with Python: A Practical Introduction:

<https://www.edx.org/learn/machine-learning/ibm-machine-learning-with-python-a-practical-introduction?>



Specialized Skills:

Some other skills like data mining, predictive analysis, business analysis are some other skills which can help the analysis in a better way

Links:

Data Mining Project:

<https://www.coursera.org/learn/data-mining-project>

Business Analytics:

<https://www.coursera.org/specializations/analytics>

Predictive Analytics for Business - with Case Studies:

<https://www.udemy.com/share/101TZo/>



Courses & Professional Development

PROFESSIONAL DEVELOPMENT



Hands-on Projects:

- Participate in data analytics projects, hackathons, or Kaggle competitions to gain real-world experience and build a portfolio.

Networking and Mentorship:

- Attend webinars, workshops, and conferences to connect with industry professionals.
- Seek mentorship through platforms like LinkedIn, DataCamp, or community forums to receive personalized guidance.

Stay Updated:

- Follow industry blogs, podcasts, and publications like "Towards Data Science" or "KDnuggets" to stay current with the latest trends and tools in data analytics.

Meet Our Team



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THANK YOU

&

ALL THE BEST

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