The Concept of Research in Data Science :

In this Article we talk the Concept of Research in Data Science
Before we begin we can first try to learn about the concept of Research, What is the Concept of Data Science.

What is Research

Research is the detailed and careful study of something to find out more information about it.

What is Data Science

Data science is the domain of study that deals with vast volumes of data using modern tools and techniques to find unseen patterns, derive meaningful information, and make business decisions.

We had discussed the concept of Research, What is the Concept of Data Science. Now we can go to discuss about role of different industries in Data Science.

What is the Role of Different Industries in Data Science

Data Science Applications

Healthcare:
Role: *Analyzing patient data to improve diagnosis, treatment plans, and healthcare operations.*
Example: *Predicting disease outbreaks, optimizing hospital resource allocation.*

Finance:
Role: *Analyzing financial data to make informed investment decisions, detect fraud, and manage risks.*
Example: *Predicting stock market trends, identifying unusual transaction patterns.*

Retail:
Role: *Utilizing customer data for personalized marketing, inventory management, and improving the overall shopping experience.*
Example: *Recommender systems for suggesting products, optimizing pricing strategies.*

Technology:
Role: *Leveraging data for product development, user experience enhancement, and system optimization.*
Example: *A/B testing for website features, analyzing user behavior.*

Manufacturing:
Role: *Enhancing efficiency through predictive maintenance, quality control, and supply chain optimization.*
Example: *Predicting equipment failures, optimizing production schedules.*

Education:
Role: *Analyzing student performance data for personalized learning, improving educational programs.*
Example: *Adaptive learning platforms, early intervention systems.*

Telecommunications:
Role: *Optimizing network performance, predicting equipment failures, and improving customer experience.*
Example: *Predictive maintenance for network infrastructure, customer churn prediction.*

Marketing and Advertising:
Role: *Utilizing data to target the right audience, measure campaign effectiveness, and optimize advertising strategies.*
Example: *Customer segmentation, sentiment analysis on social media.*
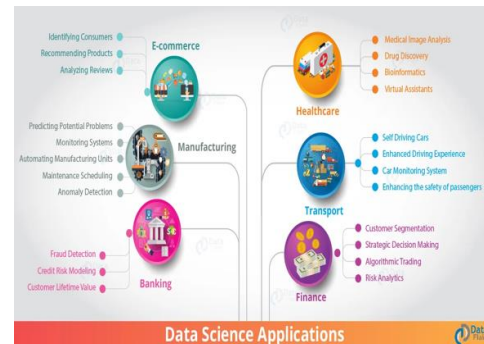
Energy:
Role: *Enhancing resource efficiency, predicting equipment failures, and optimizing energy production.*
Example: *Predictive maintenance for power plants, optimizing energy consumption.*

Transportation and Logistics:
Role: *Optimizing routes, managing inventory, and improving overall logistics efficiency.*
Example: *Route optimization, demand forecasting for inventory management.*

We had discussed the role of different industries in Data Science. Now we can go on to Discuss about the concept of process of Research.
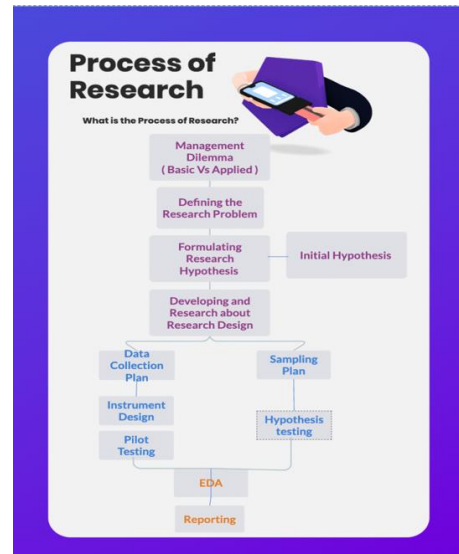
What is the Process of Research?

Management Dilemma or Business Problem :- *The problem that is faced by the business Management.*
Research Problem :- *The problem which is Tailored by Research Team From Business Problem*
Formulating Research Hypothesis or Initial Hypothesis :- *Based on the Research Problem and Given Data, What questions would we get to get explored as a stepping stones for solving the Overall Research Problem.*

Research Design :- *The Questionairre or Feedback Form that we want to create in which the customers want to fill the form and which needs to be treated as a primary data sometimes or as a part of a primary data.*
Pilot Testing :- *A pilot test is an initial test or a miniature version of a larger-scale study or project.*
Sampling Plan :- *The plan we might to develop (whether we should choose the sampling or not. if yes, whether we want to choose simple sampling or stratified sampling or something else.)*

- *One of the most Important Step In research process is, we might need to perform is to Defining and Converting Decision Problem into Research Problem.*
- *Next we might need to Formulate Hypothesis testing by exploring the data and research problem.*
- *Next in perspective of the management, we need to prepare questionnaires, feedback forms, etc which might be the primary data that need to be collected from the customers or clients of the organisation.*

We had discussed the concept of process of Research. Now we can try to Classify and mention the types of Research in the concept of Data Science.
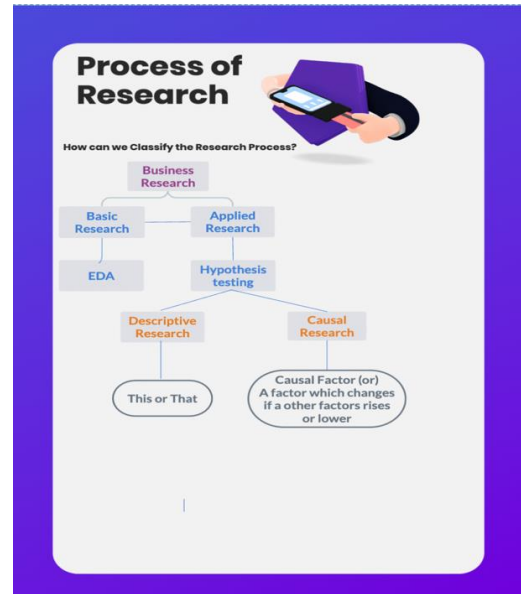
How can we classify the research process?

Business Research :- *Based on the Complexity of Research , it is further subdivided into Basic Research and Applied Research . Actually these two types are Research are interlinked and further subdivided into EDA and Hypothesis Testing based on method of Exploration we want to perform .*

EDA:- *Here the Data is explored with the use of Graphs, Charts and maps.*

Hypothesis Testing *:- Here the Data is explored based on the P value that is Statistical inference.*

Descriptive Research :- *Here the Research is performed between two opposite statements that is null hypothesis and alternate hypothesis.*

Causal Research :- *Here the Research is performed between two opposite statements but here an other column involves here that is Causal Factor. Here we should make the Causal Factor less Involve in the Impact of Data Driven Decisions*

- *The Decision whether to do basic research or Applied Research is Based on the nature of Business. Sometimes it may be a combination of both. So it is Interlinked in Business or organization.*

- *Further the Type of research may be further divided into EDA and Conclusive Research. In EDA the research may be explorative mostly using graphs, maps, etc. In Conclusive research maybe it involves Hypothesis testing mostly using statistical Measurements. The Conclusive research is further sub divided into Descriptive Research and Causal Research. The only difference between them two is Causal factor whether it is present or not.*

We had discussed the types of Research in the field of Data Science.

Resources

- **MBA (Business Analytics) Materials @ MAHE**
- **Data Flair**
- **Erion Idm**

Tools

- **Visme**
- **Canva**

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