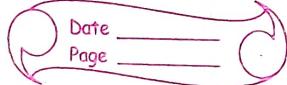


03/03/2025.

Research methodology

Assignment 01.

23 DMMCA052



7. What are the various types of Research? write an article on how large language models such as chatGPT contribute positively to each type of research.

- Descriptive vs Analytical
- Applied vs Fundamental
- Quantitative vs Qualitative
- Conceptual vs Empirical

Descriptive Research is a fact finding investigation which is aimed at describing the characteristics of individual, situation describing the state of affairs as it exists at present.

Analytical Research is primarily concerned with testing hypothesis and specifying and interpreting relationships by analyzing the facts or information already available.

- Fundamental Research is concerned with generalizations and with the formulation of theory. Research concerning some natural phenomenon or relating to pure mathematics are examples of fundamental research. The basic aim is finding information that has a broad base of application.

Applied Research aims at finding a solution for an immediate problem facing a society or business organization. marketing research, trend analysis are examples of applied research.

(2)

Quantitative Research is employed for measuring the quantity or amount of a particular phenomenon by the use of statistical analysis.

Qualitative Research is a non quantitative type of analysis which is aimed at finding out the quality of a particular phenomenon.

Conceptual Research is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones.

Empirical Research is a data based research which depends on experience or observation alone. It is aimed at coming up with conclusions without due regard for system and theory.

ChatGPT's Contribution:

Basic Research:

ChatGPT's Role: LLMs assist by summarizing existing literature, generating hypothesis, and suggesting new directions for theoretical exploration.

Applied Research:

ChatGPT's Role:

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It aids in problem formulation, iteration reviews and data interpretation, accelerating the application of the critical knowledge to real world scenarios.

Descriptive Research:

It helps analyze survey responses, organize qualitative data and generate structured reports based on vast datasets.

Analytical Research:

LLM's support researchers by comparing theories, identifying patterns in data, and automating content synthesis for comparative studies.

Exploratory Research:

It facilitates brainstorming sessions, suggests related studies, and organizing initial findings for deeper investigation.

Quantitative Research:

While not a statistical tool, it helps interpret data reports, explain statistical concepts and suggest methodologies for numerical analysis.

Q2) Consider the problem of putting out wildfires in farming areas using drone technology.

Develop a literature review on this topic in Indian scenario.

→ The integration of drone technology into wildfire management within India's agricultural sectors is emerging field with significant potential

This literature review examines the current state of research and application of drone for wildfire detection, monitoring and management in Indian farming areas.

1. Application of Drones in Agriculture

Drones, or unmanned aerial vehicles (UAVs), have been increasingly adopted in agriculture for various purposes, including crop health monitoring, soil analysis, irrigation management and precise application of agrochemicals.

2. Drones in wildfire Detection and management

Globally, drones have been utilized for early detection and management of wildfires. Equipped with RGB cameras, thermal imaging systems and LiDAR sensors, drones can detect fires at various stages.

from smoldering embers to active flames.

They provide dynamic, high-frequency data that enhances situational awareness during wild events.

3. Integration of drones in India's wildfire management

While the application of drones in agriculture is advancing in India, their specific use in wildfire management within farming areas is still developing. The potential benefit include:

Early detection:

Drones can swiftly identify and locate wildfires, enabling prompt response and mitigation.

Real-time monitoring:

Continuous aerial surveillance provides up-to-date information on fire spread, assisting in effective resource allocation.

Risk assessment:

Data collected by drones can be analyzed to assess fire risks and develop preventive strategies.

4) Challenges and Considerations:

- Implementing drone technology for wildfire management in India faces several challenges:

Regulatory framework:

Establishing clear regulation for drone operations, especially in emergency scenarios, is crucial.

Technical Expertise:

Training personnel to operate drones and interpret data effectively is essential for successful implementation.

Infrastructure:

Developing the necessary infrastructure for drone deployment and data processing is vital for efficient operations.

Future prospect:

To harness the full potential of drones in wildfire management within India's agricultural context, the following steps are recommended:

• Research and Development:

Investing in R&D to adapt drone technology for specific regional needs and wildfire scenarios.

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Section 7: Wildfire Management

- Pilot Programs: Implementing pilot projects to evaluate the effectiveness of drones in real-world wildfire management situations.

- Policy Development: Formulating policies that facilitate the integration of drones into existing disaster management frameworks.

Drone Integration in Fire Prediction Models

(cont'd) Analysis of drone data

Additional analysis and visualization

Reliable data collection for fire prediction models
using drones and sensors

Efficient and accurate fire prediction models

Addressing challenges related to drone usage

Fire prediction models using drone data

Efficient and accurate fire prediction models

Addressing challenges related to drone usage

Efficient and accurate fire prediction models

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Efficient and accurate fire prediction models

Addressing challenges related to drone usage

(Q3) What is citation index?

What are popular citation indexes used in scientific Research?

What does these numbers indicate?

How are they computed?

→ A citation index is a database that tracks how often and where research papers are cited by other papers. It helps measure the impact and relevance of a research work within the academic community.

citation indexes are crucial in evaluating the influence of journals, researchers, and institutions.

popular citation indexes used in Scientific Research are:-

1. Web of Science (WoS)

- maintained by Clarivate Analytics
- It covers a vast range of disciplines and provides metrics such as the impact factor.

2. Scopus - managed by Elsevier, it is one the largest abstract and citation database of peer reviewed literature. It provides metric such as the CiteScore.

3. Google Scholar Citations -

A free citation tracking service that covers a wide range of scholarly source.

including books and conference papers.

4) IEEE Xplore - A citation index focused on research in engineering, computer science, and electronics.

How these indicate.

- impact factor (IF) - measures the average number of citations received by articles in a journal over a specific period.
- h-index - evaluates the productivity and citation impact of an individual researcher. A scientist with an h-index of 20 means they have 20 papers cited at least 20 times.
- Citescore - used by Scopus, it is similar to the impact factor but calculated over four years instead of two.
- Eigenfactor score - measures the total influence of a journal based on the number of times articles from the journal are cited, adjusting for citation patterns.

How are citation index numbers computed?

1. Impact factor (IF)

$$IF = \frac{\text{Total citations in year } x \text{ to articles published in year } (x-1)}{\text{Total articles published in years } (x-1) \text{ to } (x-2)}$$

2. h-index

A researcher has 'h'-index of h if they have at least h papers cited h times each.

3. Cite score

$$\text{Citescore} = \frac{\text{Total citations in a year to papers from last 4 years.}}{\text{Total papers published in the last 4 years.}}$$

4. Eigenfactor score

- considers importance of citing journals rather than just citation count.
- A journal's score is determined based on the time researchers spend reading its articles.

5. Altmetric computation

- measures social media mentions, downloads.
- uses tracking tools like Altmetric.com to generate a weighted score.