



Mansoura University
Faculty of Computers and Information
Department of Information Technology



Research Methodology

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Chapter 2

How to Select Research Topics

OUTLINE

- Preamble
- Identify an Area of Interest
- Browse the Literature
- Pick a Topic and Dive
- Identify a Research Question
- Artificial Intelligence a Trending Topic in Computer Science and Technology

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PICK A TOPIC AND DIVE

- After being aware with multiple topics, it is the time to ask yourself:

What exactly you want to study in one word?

- For this purpose, throughout your reading process, write everything that attracts you. To do that:
 - You don't need to format using certain format.
 - Be sure to write enough information about the listed things to help you when re-read it to remember it.

Ex: if you wrote a term without information what it means, this might lead you to re-read the sources that you read to remember what it meant.

PICK A TOPIC AND DIVE (CONT.)

- After writing what interests you, start read and re-read the list until **decide what topic that mostly attracts you.**
- Important note: you have to **KEEP YOUR TOPIC MANAGEABLE.**
Neither too broad nor too narrow.
- Common ways that can be followed **to limit the chosen topic:**
 - Limit it by a certain **geographical region.**
 - Limit it by a certain **culture.**
 - Limit it by a certain **time frame.** Ex: over last 10 years.
 - Limit it by a certain **discipline.** Ex: business field, education field, etc.
 - Limit it by a certain **population group** Ex: seniors citizens.

PICK A TOPIC AND DIVE (CONT.)

- The reasons for making the chosen topic too difficult can include:
 - Being locally confined. This type of topics can be covered in local newspapers for example.
 - Being recent. The difficulty here will arise in finding resources (e.g., books and articles) since it will not be available. But resources such as newspapers and magazine articles will be available. While the web sites can either be available or not.
 - Being broadly interdisciplinary. Because working in such topics will results in being overwhelmed with the available information.
- **Note:** *You should discuss your chosen topic with the instructors throughout your work.*

PICK A TOPIC AND DIVE (CONT.)

- Two points to consider when choosing a topic to study:

- You should have a **solid interest** in the chosen topic.

Because you will spend some time working on it.

Also, to not lose your passion during your work.

Finally, because enjoying the chosen research topic will encourage you to do other.

- **Do not attempt to solve all the world's problems** in your research study.

The one can spend his lifetime in research but cannot solve all the world's problems.

We are contributing to the science knowing that the small questions have in turn scientific impact.

IDENTIFY A RESEARCH QUESTION

- After reading different resources, and finding the target topic, you will probably have a clear idea and imagination of what attracts you and want to study, how will you study it, and even how to measure it.
- Before start working on the topic, you have to identify your **research question** that in turn might be defined as:

The semi-broad question about the relationship between all the variables that you want to consider in your research.

- Keep in your mind that the research question is not about stating the cause and effect or even to state the direction of a relationship between the variables. - - - > **THIS SHOULD BE IN THE RESEARCH HYPOTHESIS**

ARTIFICIAL INTELLIGENCE A TRENDING TOPIC IN COMPUTER SCIENCE AND TECHNOLOGY

WHAT IS ARTIFICIAL INTELLIGENCE?

- To define Artificial Intelligence (AI) let we talk about its two terms, **intelligence**, and **artificial**.
 - **Intelligence** is the **capacity to learn and solve new problems** in a changing environment.
Not the computational part of our ability to achieve certain goals.
 - It is **artificial** since it moved entirely by data with no prior knowledge of the nature of the relationship among those data.
*While human being actions proceed from **observing** the physical world and **deriving underlying relationships** that link cause and effect in natural phenomena,*
- Therefore, **Artificial Intelligence** can be defined as:

A system that can learn how to learn.

Or a series of instructions (an algorithm) that allows computers to write their own algorithms without being explicitly programmed for.



ARTIFICIAL INTELLIGENCE A TRENDING TOPIC IN COMPUTER SCIENCE AND TECHNOLOGY

DIFFERENCE/RELATION BETWEEN AI AND OTHER BUZZWORDS

- AI is sometimes seen as a/an **interdisciplinary field/ bucket of different aspects**.

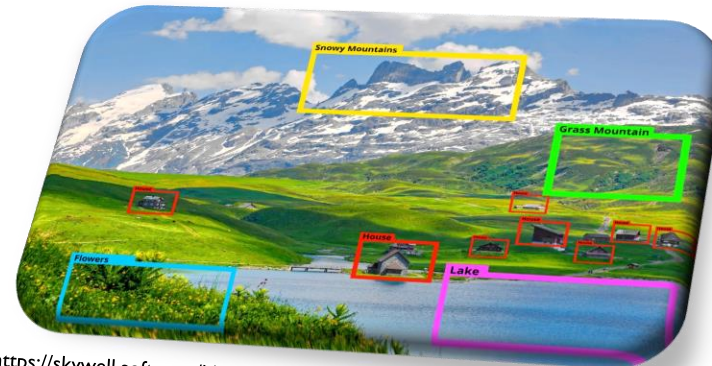
Which **covers** (and **requires**) **the study of manifold sub-disciplines**, such as natural language processes, computer vision, as well as Internet of things and robotics.

- **THE KEY** is that AI is somehow trying to be similar to a fully-functional living being. Therefore:
 - It has to possess a **brain**, which carries out a variety of tasks and is in charge of specific functions such:
 1. The language (through natural language processing **NLP**).



<https://thinkpalm.com/blogs/natural-language-processing-nlp-artificial-intelligence/>

2. The sight (through computer vision).



<https://skywell.software/blog/top-6-computer-vision-techniques-and-algorithms/>

etc...

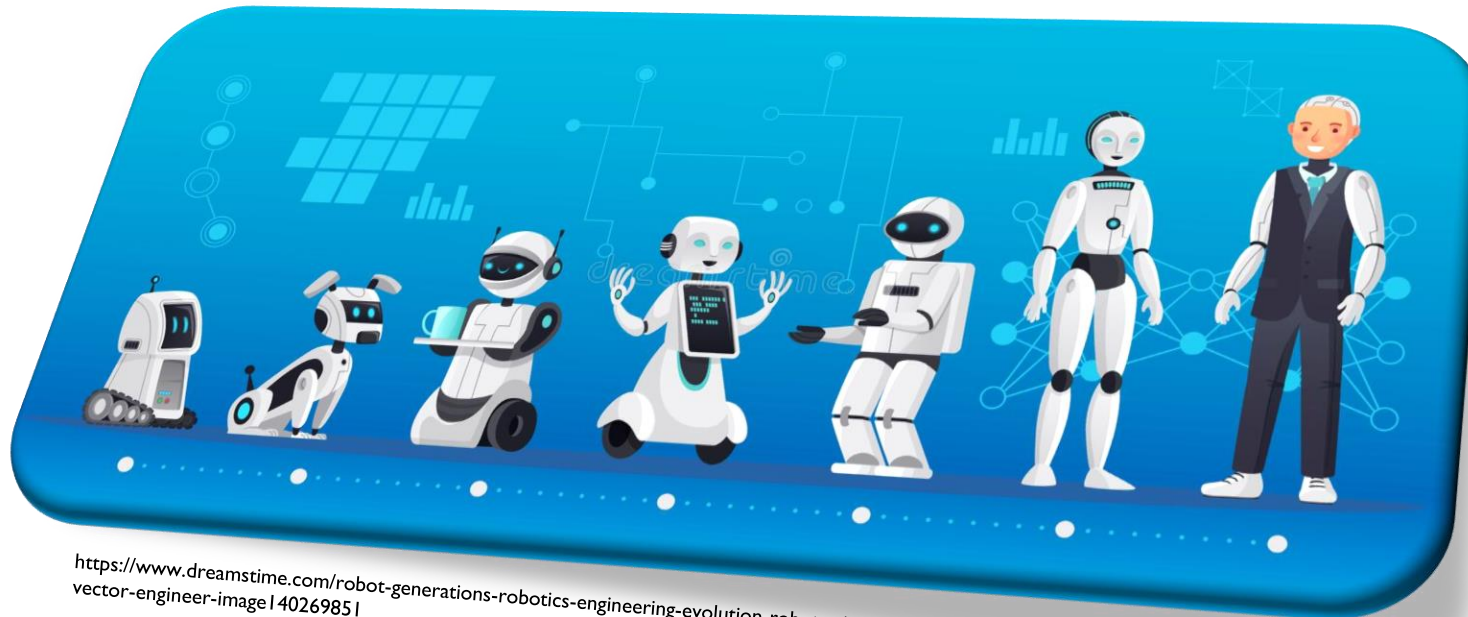
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- **THE KEY** is that AI is somehow trying to be similar to a fully-functional living being. Therefore:
 - There is a **body** that normally is made of bones/muscles, as much as a **robot** is made by circuits and metals.



<https://www.dreamstime.com/robot-generations-robotics-engineering-evolution-robots-ai-technology-humanoid-computer-generation-cartoon-vector-engineer-image140269851>

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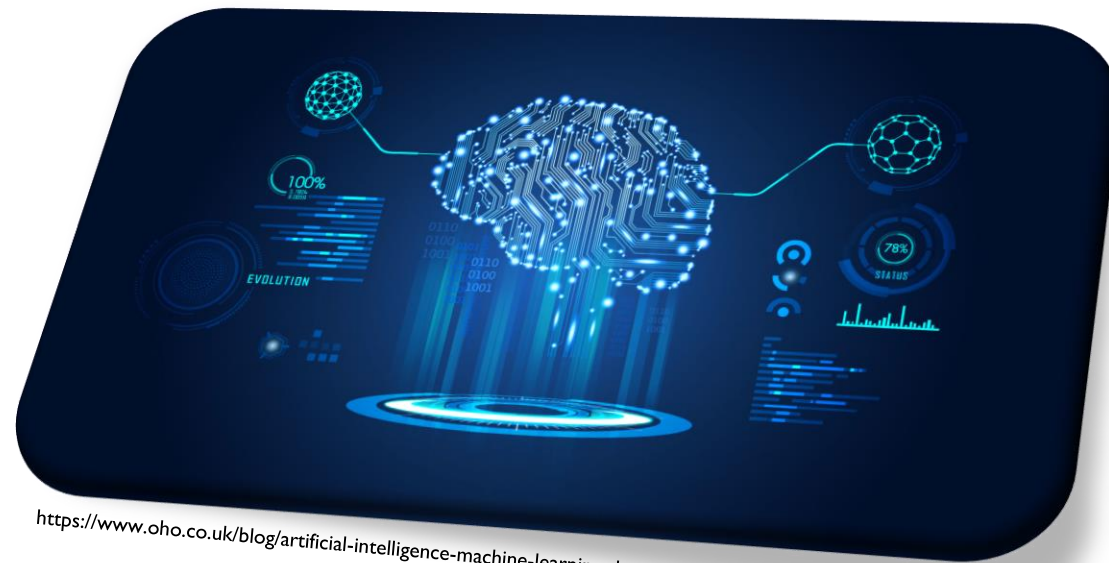
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- There is the **learning**, through **machine learning**, that can be seen as specific movements, action or thoughts we develop and that we fine-tune by doing.



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 - There is the **Internet of things (IoT)** that corresponds to the human **senses**, which is the way in which we perceive the world around us.



<https://iot4beginners.com/iot-enabled-vs-non-iot-enabled-devices-an-overview/>

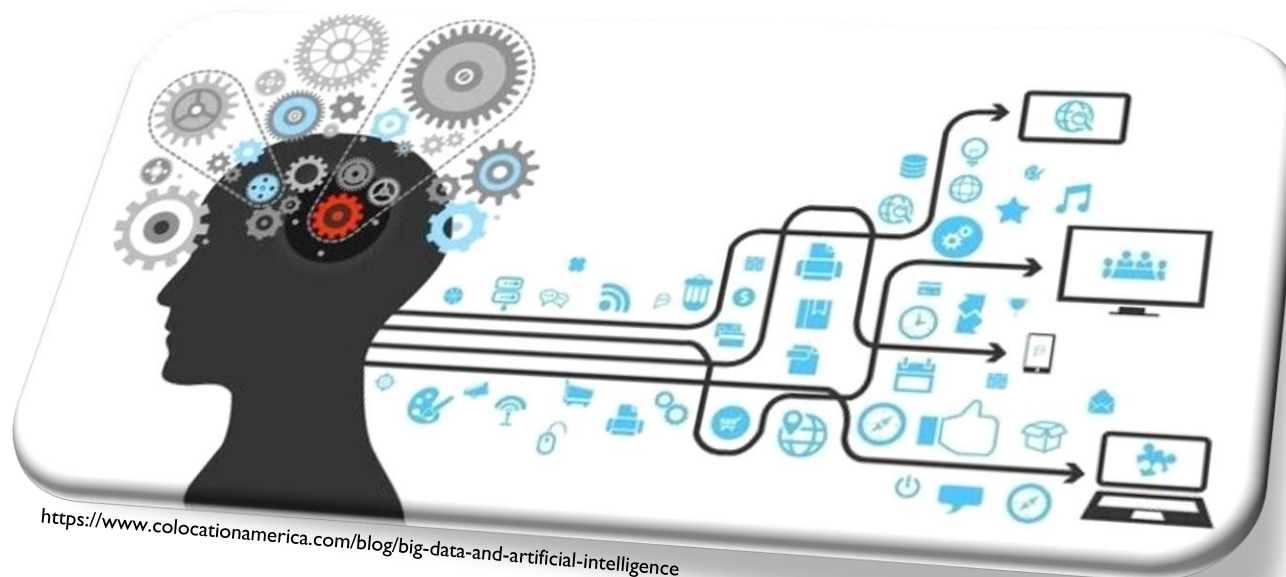
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- **THE KEY** is that AI is somehow trying to be similar to a fully-functional living being. Therefore:
 - There is the **big data** is the equivalent of the **food** we eat and the **air** we breathe, i.e., the **fuel** that makes us tick, as well as **every input** we receive from the external world that is captured by our senses.



ARTIFICIAL INTELLIGENCE A TRENDING TOPIC IN COMPUTER SCIENCE AND TECHNOLOGY

A BRIEF HISTORY OF AI

HISTORY OF AI

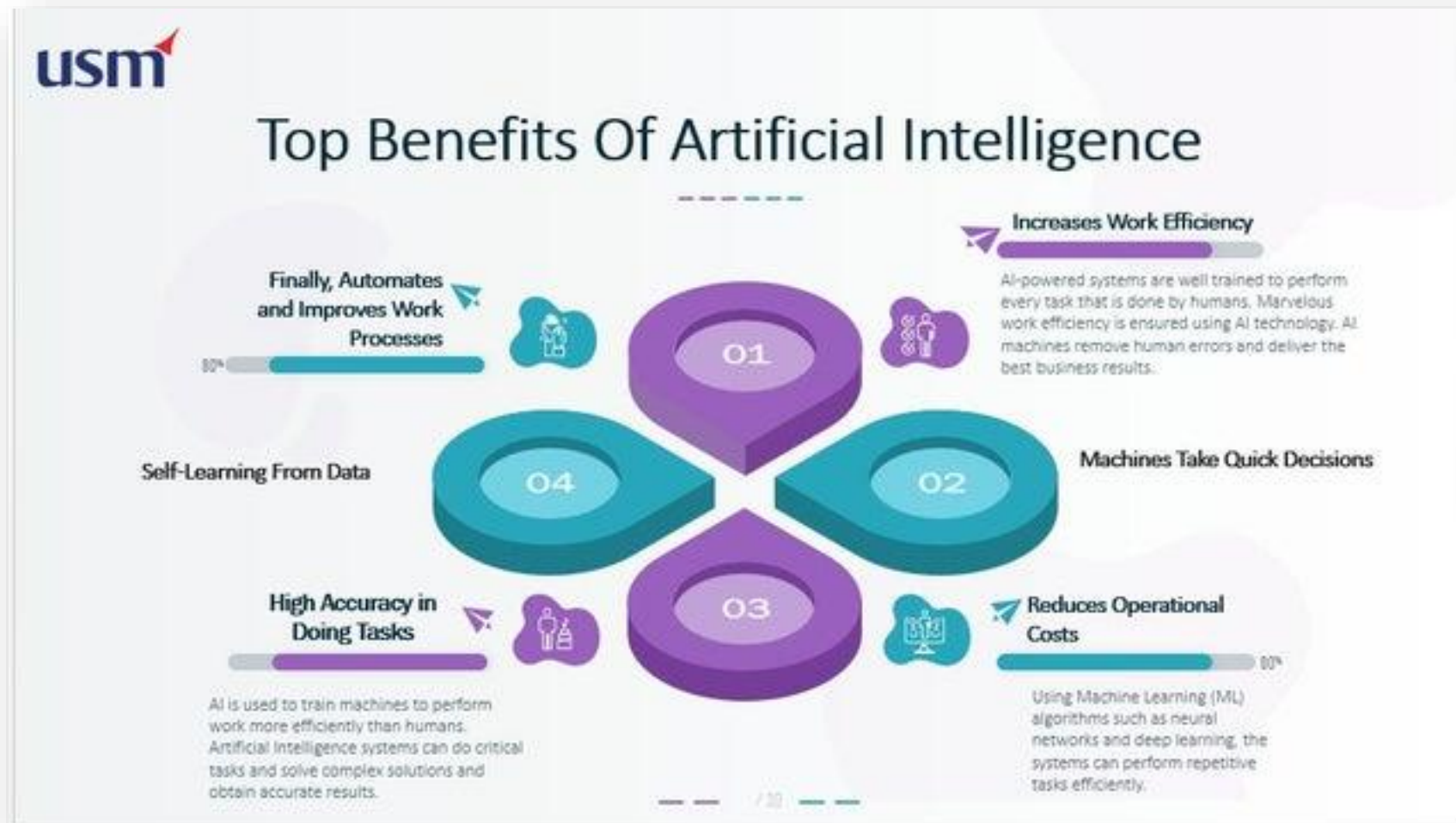
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TYPES OF AI



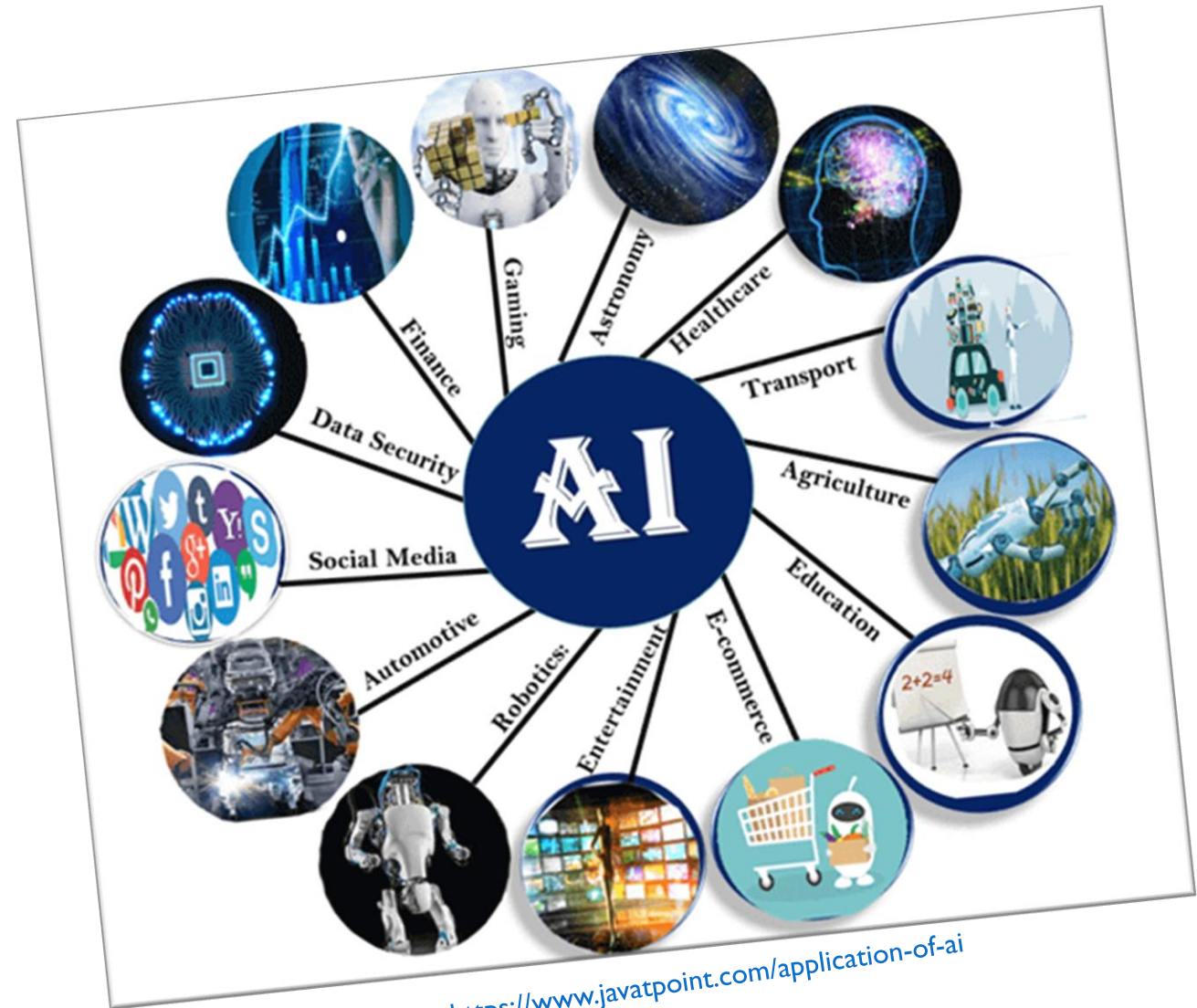
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BENEFITS OF AI



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SOME APPLICATIONS OF AI



<https://www.javatpoint.com/application-of-ai>

ARTIFICIAL INTELLIGENCE A TRENDING TOPIC IN COMPUTER SCIENCE AND TECHNOLOGY

DIGITAL AGENCIES



REFERENCES

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- Corea, F., An Introduction to Data: Everything You Need to Know About AI, Big Data and Data Science. Studies in Big Data. Springer International Publishing 2018. isbn=9783030044688.



Thank you 😊