كلية الكوت الجامعة
Kut University College

COMPUTER APPLICATIONS

Lecture 1
Security and Networking

Assistant Lecturer: Ali Kareem

Contents

1.1 Introduction to Networking

Network is a group of connected devices, including computers, servers, and other devices, that can communicate with each other, and with each other's data, resources, and information. Different sizes, topologies, and uses of networks can be defined for different purposes. For example, a local area network (LAN) connects devices in a specific location, for example, a home or an office, and a wide area network (WAN) is spread over larger areas, for example, a city or a planet like the Internet. Communication, resource sharing, and high-speed data transfer are done through networks, which is the need of the day for today's modern computing environment. Communication protocols such as TCP/IP (Transmission Control Protocol/Internet Protocol) are used to connect devices in a network in such a way that data sent over the network is successfully delivered and received in the correct manner. Depending on the infrastructure and use case, networking technologies can be connected either wired using Ethernet cables, or wirelessly using Wi-Fi.

1.2 Types of Networks

- **Local Area Network (LAN)**

  LAN is a network of computers and devices within a small, confined area, e.g., a building, an office, a school, or a home. It is normally used to share resources such as files, printer, to software applications between the devices. The short distance between your connected device coupled with high speeds (up to 1 Gbps or more) lend to LANs having low latency.

  Example: A school computer lab, or a home network of a few devices connected to a router. [1]

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[1] Tanenbaum, A. S., & Wetherall, D. J. (2011). *Computer Networks* (5th ed.). Pearson

- **Wide Area Network (WAN)**

  WAN is a bigger geographical area than LAN, connected some or more LANs located in different cities, regions or countries. Organizations with multiple branches usually use WANs or the internet is itself a WAN. WANs usually are slower than the typical LAN communications, and usually have leased communication lines, satellite links, or fiber optic cables due to the longer distances over which communication occur[2].

  Example: Office network — corporate network connecting various offices in different cities or Internet.

- **Metropolitan Area Network (MAN).**

  Is a large computer network that usually spans a city or a large campus. A MAN is optimized for a larger geographical area than a LAN, ranging from several blocks of buildings to entire cities. A MAN might be owned and operated by a single organization, but it usually will be used by many individuals and organizations

  Example: A university campus network, or a citywide Wi-Fi network.

- **Personal Area Network (PAN)**

  PAN is a small network typically used for connecting devices within an individual's workspace. It covers a range of a few meters and is often used for connecting personal devices like smartphones, laptops, and wearables. Bluetooth and infrared are common technologies used in PANs[3].

  Example: A Bluetooth connection between a smartphone and wireless headphones.

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[2] Tanenbaum, A. S., & Wetherall, D. J. (2011). *Computer Networks* (5th ed.). Pearson
[3] Forouzan, B. A. (2017). *Data Communications and Networking* (5th ed.). McGraw-Hill Education

- **Wireless Local Area Network (WLAN)**

  WLAN is a type of LAN that uses wireless communication technologies, such as Wi-Fi, to connect devices instead of physical cables. WLANs are commonly used in homes, offices, cafes, and public places to allow devices to connect to the network wirelessly.

  Example: A home Wi-Fi network.

- **Campus Area Network (CAN)**

  CAN is a network that connects multiple LANs within a limited geographical area, such as a university, corporate campus, or a group of buildings. It is larger than a LAN but smaller than a MAN and is used to share resources efficiently between various departments or buildings [4].

  Example: A university connecting different buildings across a campus.

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[4] Forouzan, B. A. (2017). *Data Communications and Networking* (5th ed.). McGraw-Hill Education.

1.3 Network Components

A network therefore encompasses a web of multiple hardware and software elements space that is designed will allow communication and share of data between devise. Knowledge of these components is crucial in creation, operation and sustaining of a network. Here's an overview of the key network components:

1. Hardware Components

These are the terminologies that are the physical devices to the network that helps in communication.

Network Interface Card (NIC):

The NIC is an important part of a device that enables it (like computers, printers, etc.) to be connected to a network. This one can also be either direct (Ethernet) or wireless (Wi-Fi). It also ensures that thru the NIC, the device is capable to transmit and receive data over the network[5].

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[5] Tanenbaum, A. S., & Wetherall, D. J. (2011). *Computer Networks* (5th ed.). Pearson

Router:

A router is a device that guides data traffic within different networks. It sets the course that data takes from source to destination; normally used to interconnect LANs to WANs. Others even control traffic to ensure that the network does not get congested by too much traffic[5].

Switch:

This is a device that links various facilities in a LAN and enhances proper interaction among these facilities. While routers are use in interconnecting different networks, switches are computers that facilitate the flow of data in a certain network by forwarding such data to the desired device only[6].

Modem:

A modem encodes and decodes signals in order to facilitate the use of the internet. It modulates digital data from a computer to an analog format required to transmitted through phone lines for DSL modem or to coaxial cables for cable

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[6] Forouzan, B. A. (2017). *Data Communications and Networking* (5th ed.). McGraw-Hill Education

modem and demodulates an analog signal back to digital format required by a computer[6].

Access Point (AP):

An access point enables wireless equipment to connect to the wired network by influencing WI-FI. It is loosely implemented in wireless LANs (WLANs) and acts as a signal booster of a network.

Cables (Ethernet Cables):

In wired networks, equipment's(frequently Ethernet cables) are conveyed to hook up devices to a network. For example for speed and distance requirements cables such as Cat5e, Cat6 cables are used in a network.

2. Software Components

These are the protocols, services, and tools that manage data transmission and network operations.

- **Operating System (OS):**
  Every networked device runs on an operating system, like Windows, Linux, or macOS, which manages network services. For servers, network-focused operating systems like Windows Server or Linux-based distributions are common.
- **Protocols:**
  Networking protocols define how data is transmitted between devices. Important protocols include:
    - **TCP/IP (Transmission Control Protocol/Internet Protocol):** The most common protocol suite used for internet communications. TCP ensures data is transmitted reliably, while IP handles addressing and routing.
    - **DHCP (Dynamic Host Configuration Protocol):** Automatically assigns IP addresses to devices on a network, reducing the need for manual configuration.

- **DNS (Domain Name System):** Translates domain names into IP addresses, allowing users to access websites by typing human-readable names instead of numeric addresses.
- **Firewall:**
  A firewall is a security device or software that monitors and controls incoming and outgoing network traffic based on predetermined security rules. It acts as a barrier between the trusted internal network and untrusted external networks, such as the internet.
- **Network Management Software:**
  Network management tools allow administrators to monitor, configure, and manage network resources. Popular tools include Wireshark for traffic analysis, SolarWinds for performance monitoring, and Nagios for network health monitoring.

3. **Network Servers**

A server is a computer or system that provides resources, data, or services to other devices (clients) on a network. Types of network servers include:

- **File Server:** Stores and manages files for network users.
- **Web Server:** Hosts websites and manages HTTP requests from clients.
- **Mail Server:** Manages and stores email communications.
- **Database Server:** Provides database services and responds to queries from network users.

1.4 Network security

Network security is a critical aspect of ensuring the confidentiality, integrity, and availability of data as it travels through network systems. Here's a breakdown of the basics of network security:

1. Confidentiality, Integrity, and Availability (CIA Triad)

The fundamental principles of network security are encapsulated in the **CIA triad**: **Confidentiality, Integrity,** and **Availability**. Confidentiality ensures that sensitive information remains accessible only to authorized individuals. Integrity guarantees that data remains accurate and unaltered during transmission. Availability ensures that authorized users have timely access to network services and data when needed [7].

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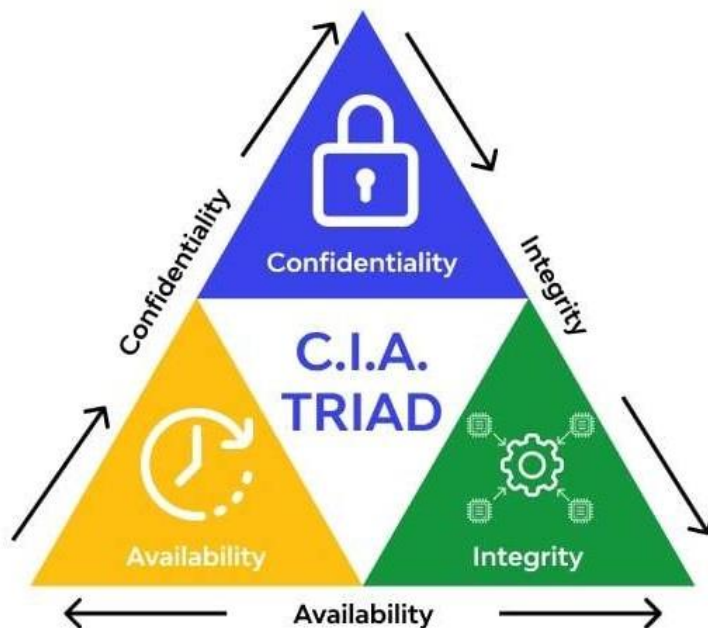
[7] Kizza, Joseph Migga. *Guide to Computer Network Security*. Springer, 2020

2. Firewalls

Firewalls serve as critical components in network security by monitoring and controlling incoming and outgoing traffic based on predetermined security policies. They act as a barrier between trusted internal networks and untrusted external networks, thereby preventing unauthorized access and potential threats [8].

3. Encryption

Encryption is a vital method used to secure data by transforming it into an unreadable format for unauthorized users. This technology is implemented in various protocols, such as **SSL/TLS** for secure web communications and **VPNs**, which provide a secure channel for remote access to networks[9]

4. Intrusion Detection and Prevention Systems (IDPS)

Intrusion Detection and Prevention Systems (IDPS) play a crucial role in monitoring network traffic for suspicious activities and violations of security policies. An Intrusion Detection System (IDS) alerts administrators to potential breaches, while an Intrusion Prevention System (IPS) actively blocks these threats .

5. Virtual Private Network (VPN)

A Virtual Private Network (VPN) establishes a secure and encrypted connection over a public network, such as the internet. This technology enables remote users to access private networks securely, ensuring data privacy as it travels through potentially unsafe networks .

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[8] Stallings, William. *Network Security Essentials: Applications and Standards*. Pearson, 2016
[9] Kizza, Joseph Migga. *Guide to Computer Network Security*. Springer, 2020

6. Antivirus and Anti-Malware Software

Antivirus and anti-malware programs are designed to identify, prevent, and eliminate malicious software from networks. These applications protect against a variety of threats, including viruses, ransomware, and spyware, thereby enhancing overall network security

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COMPUTER APPLICATIONS & AI

Lecture 5:
AI in Our Daily Life

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Contents

Introduction

In this lecture, we will explore how AI influences our everyday routines, with a focus on AI in smartphones and virtual assistants such as Siri and Google Assistant. By the conclusion of this lecture, you will gain a comprehensive understanding of how these technologies operate, their various applications, and their broader implications.

Figure 1 Interaction of AI in our daily life

Outline

- What is AI?

- AI in Smartphones

- Virtual Assistants (Siri, Google Assistant, Alexa)

- Real-World Examples

- Ethical Considerations

- Q&A Session

What is AI?

AI is the simulation of human intelligence in machines, enabling them to perform tasks such as learning, reasoning, problem-solving, perception, and language understanding. It's integrated into various technologies we interact with daily.[1]

Examples:

- Self-driving cars
- Facial recognition
- Personalized recommendations on platforms like Netflix or Spotify

Figure 2 AI in Different areas

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[1] Russell, S., & Norvig, P. (2016). *Artificial Intelligence: A Modern Approach*. Pearson.

AI in Smartphones

Smartphones are embedded with numerous AI-powered features that enhance user experience:

1. **Facial Recognition:** Used to unlock phones, ensuring security and privacy.
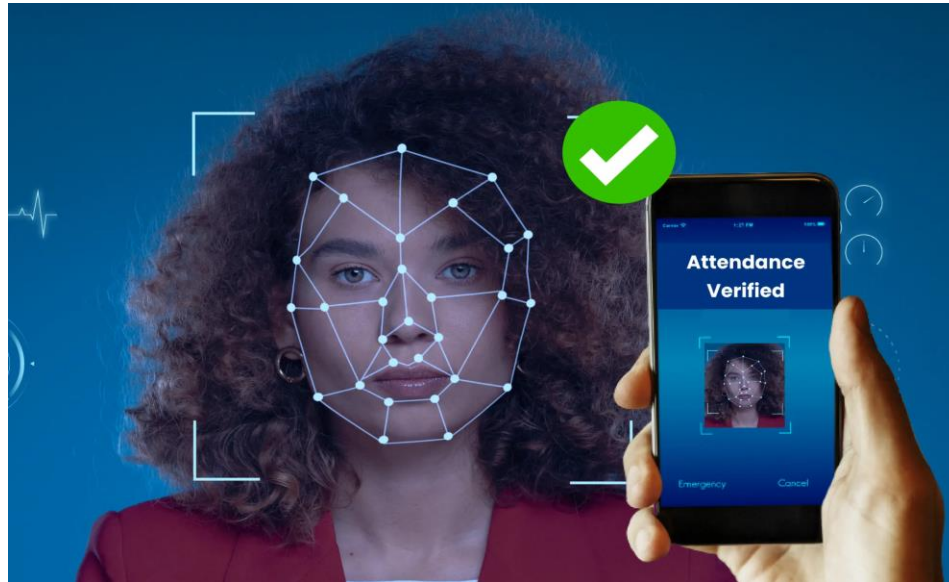
Figure 3 Facial recognition

Facial recognition technology uses artificial intelligence (AI) to identify or verify individuals based on their facial features. The process generally involves several steps:

a) **Face Detection**: The system locates and isolates faces within an image or video stream using algorithms like Haar cascades or deep learning models like Convolutional Neural Networks (CNNs).

b) **Face Alignment**: Detected faces are aligned to correct for variations in angle, scale, and orientation. This step ensures that facial landmarks (e.g., eyes, nose, mouth) are positioned consistently for better recognition.

c) **Feature Extraction**: The aligned face is processed to extract distinctive features using deep learning techniques such as CNNs or other specialized models like FaceNet or VGG-Face. These

features are converted into a numerical representation called an embedding.

d) **Face Matching**: The extracted features are compared with a database of known faces. A similarity score is computed to determine whether there's a match. Various methods like Euclidean distance or cosine similarity measure the closeness of these feature vectors.

e) **Classification and Decision**: Based on the similarity score and a predefined threshold, the system decides whether the face matches an identity in the database.

AI-based facial recognition systems continuously improve their accuracy using vast datasets and advanced deep learning algorithms, learning more about variations in facial features under different conditions (e.g., lighting, expressions, and angles).[2][3][4]

2. **Camera Optimization:** AI adjusts settings for optimal photos, recognizing scenes, faces, and objects.
   AI in smartphone cameras optimizes photography by automatically adjusting settings and enhancing image quality based on scene, face, and object recognition. Here's how it works:

   a) **Scene Recognition**: AI algorithms analyze the scene in real-time to identify elements like landscapes, portraits, night scenes, or food. The system then adjusts settings such as exposure, contrast, and color balance to suit the recognized scene, providing optimized results without manual input.

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[2] Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep Learning*. MIT Press.
[3] Li, S. Z., & Jain, A. K. (2011). *Handbook of Face Recognition*. Springer.
[4] Taigman, Y., Yang, M., Ranzato, M., & Wolf, L. (2014). DeepFace: Closing the gap to human-level performance in face verification. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*.

Figure 4 Scene and Objects Recognition

b) **Face and Object Recognition**: AI detects faces and objects within the frame, ensuring they are in focus and properly exposed. This technology also applies beauty filters, bokeh effects, or object tracking for enhanced photos and videos.

c) **Low-Light Enhancement**: AI reduces noise and brightens images taken in low-light environments by analyzing and processing multiple frames. This computational photography technique produces clearer and more detailed images.

d) **Image Stabilization**: AI compensates for hand movement by predicting and adjusting for motion, resulting in sharper images and smoother videos.

e) **Post-Processing Optimization**: AI algorithms enhance the captured image by adjusting colors, sharpness, and dynamic range. It learns user preferences over time to offer personalized photo enhancements.[5][6][7]

[5] Zhang, Y., Xu, Y., & Liu, H. (2021). *Smartphone Photography: Image Optimization with AI Technologies*. Wiley.
[6] Lim, K., & Tang, M. (2019). AI-powered image enhancement in mobile devices. *Journal of Computational Imaging*, 5(2), 78-89.
[7] Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep Learning*. MIT Press.

3. **Predictive Text and Smart Replies:** AI learns from typing patterns and suggests words or responses to improve communication efficiency.[8]

AI in smartphones enhances communication through **Predictive Text** and **Smart Replies** by analyzing typing patterns and context. AI models like recurrent neural networks (RNNs) and transformer-based architectures (e.g., GPT) learn from users' input history, predicting the next word or suggesting relevant responses based on the conversation's context. This process speeds up typing and offers accurate, context-aware suggestions, improving communication efficiency.[9] [10] [11]

Figure 5 How do phones use AI

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[8] Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep Learning*. MIT Press.
[9] Jurafsky, D., & Martin, J. H. (2023). *Speech and Language Processing*. Pearson
[10] Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep Learning*. MIT Press.
[11] Brown, T. B., et al. (2020). Language models are few-shot learners. *Advances in Neural Information Processing Systems (NeurIPS)*.

Virtual Assistants: Siri, Google Assistant, Alexa

Virtual assistants are one of the most visible applications of AI in daily life. These assistants perform tasks like setting reminders, sending messages, and even controlling smart home devices.

1. **Siri (Apple):** Uses natural language processing (NLP) to understand and respond to user commands.
2. **Google Assistant:** Integrates with Google services for personalized information.
3. **Alexa (Amazon):** Manages smart home ecosystems, enabling voice-controlled lighting, thermostats, and security systems.[12]
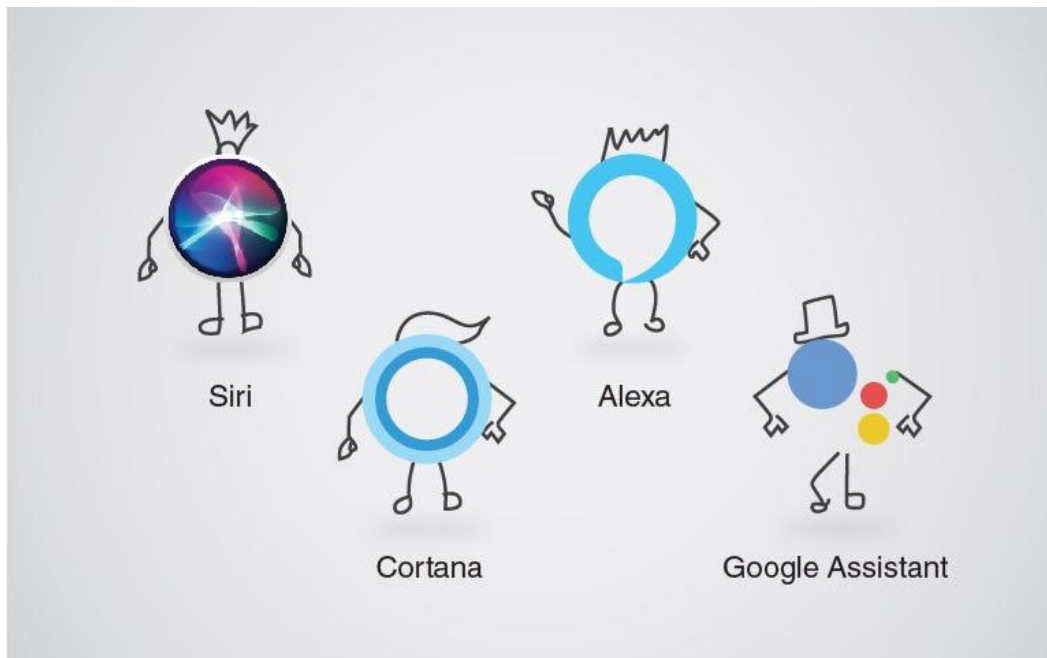
Figure 6 Virtual Assistants in Modern Smartphones

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[12] Gunkel, D. J. (2018). *The Machine Question: Critical Perspectives on AI, Robots, and Ethics*. MIT Press.

Real-World Examples

1. **Navigation & Maps**: AI in Google Maps, Waze and Yandex predicts traffic patterns and suggests optimal routes.
AI in smartphone navigation apps like **Google Maps**, **Waze**, and **Yandex** analyzes real-time traffic data and historical patterns to predict congestion and suggest optimal routes. Machine learning algorithms process information from various sources, such as GPS data, user reports, and road conditions, to provide accurate travel times and efficient navigation options, enhancing the overall user experience.[13]
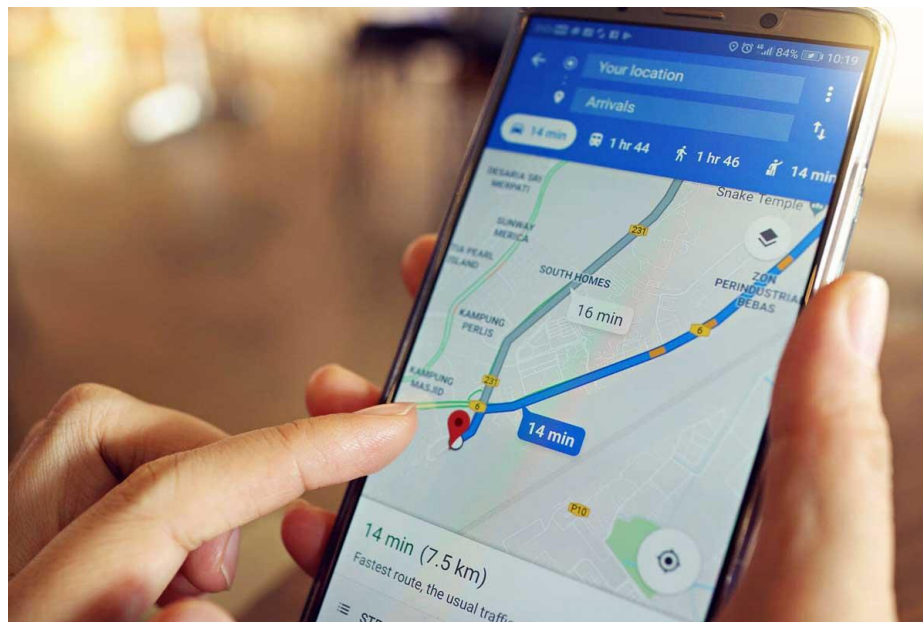
Figure 7 Navigation systems

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[13] Russakovsky, O., et al. (2015). ImageNet Large Scale Visual Recognition Challenge. *International Journal of Computer Vision*, 115(3), 211-252.

2. **Health Monitoring**: AI-powered apps on smartphones track health metrics like heart rate, sleep patterns, and physical activity, promoting healthier lifestyles.

Figure 8 Health monitoring by AI

AI in smartphones enables health monitoring by tracking metrics like heart rate, sleep patterns, and physical activity through AI-powered apps and sensors. These apps analyze data in real-time, providing personalized insights and recommendations to promote healthier lifestyles. Machine learning algorithms identify patterns and offer users tips for improving their well-being. [14] [15]

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[14] Li, X., & Tao, Q. (2021). AI-based health monitoring applications in mobile devices. *Journal of Healthcare Engineering*, 8, 102-118.
[15] Topol, E. (2019). *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*. Basic Books.

3. **Translation Tools**: AI in tools like Google Translate allows for real-time translation, breaking down language barriers.[16]

   AI in smartphone translation tools, like **Google Translate** and **Microsoft Translator**, uses neural machine translation (NMT) models to provide real-time translations. These models understand the context and nuances of language, offering accurate translations for text, speech, and images. AI also enables offline translation and language learning, enhancing accessibility and communication across languages. [17] [18]
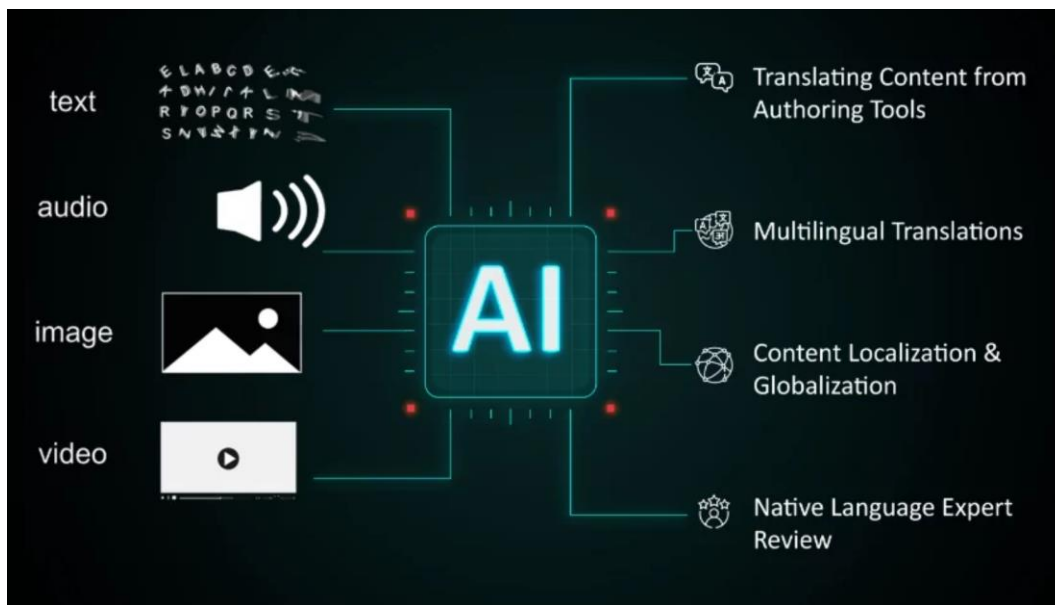
Figure 9 AI in Translation

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[16] Brynjolfsson, E., & McAfee, A. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. W.W. Norton & Company.
[17] Wu, Y., et al. (2016). Google's Neural Machine Translation System: Bridging the Gap between Human and Machine Translation. *arXiv preprint arXiv:1609.08144*.
[18] Jurafsky, D., & Martin, J. H. (2023). *Speech and Language Processing*. Pearson.

Ethical Considerations:

While AI in smartphones and virtual assistants brings convenience, it also raises ethical concerns:

- **Privacy Issues**: Data collection and storage by tech companies can potentially infringe on user privacy.
- **Bias and Fairness**: AI systems may develop biases based on the data they are trained on, affecting their decision-making.
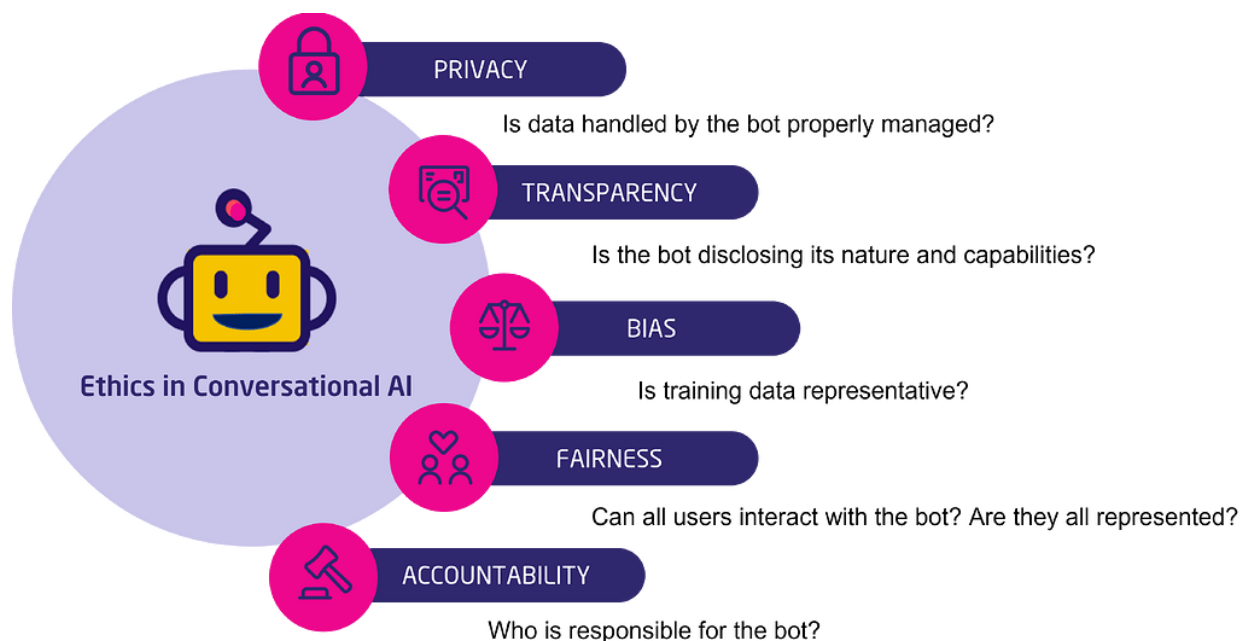- **Dependence on Technology**: Increased reliance on AI tools might impact cognitive skills and independence.[19]

Figure 10 Ethical Considerations in Conversational AI

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[19] Bostrom, N. (2014). *Superintelligence: Paths, Dangers, Strategies*. Oxford University Press.

Q&A Session

- What other AI features do you use daily?
- How do you feel about privacy when using AI-enabled devices?
- Do you trust AI with sensitive information, such as health data?

Conclusion

AI is transforming how we interact with technology, making our lives more convenient and efficient. Smartphones and virtual assistants are just the beginning, with AI continuing to evolve and integrate into more aspects of our lives. Staying informed and understanding the benefits and risks of AI will help us navigate its future.

Still have questions?

Feel free to ask me at yas.mf@ya.ru

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Applications of AI

Assistant Lecturer : Sarah Kadhim Hwaidi

Introduction

Artificial Intelligence (AI) has various applications in today's society. It is becoming essential because it can efficiently solve complex problems in multiple industries, such as Healthcare, entertainment, finance, education, etc. AI is making our daily lives more comfortable and fast.
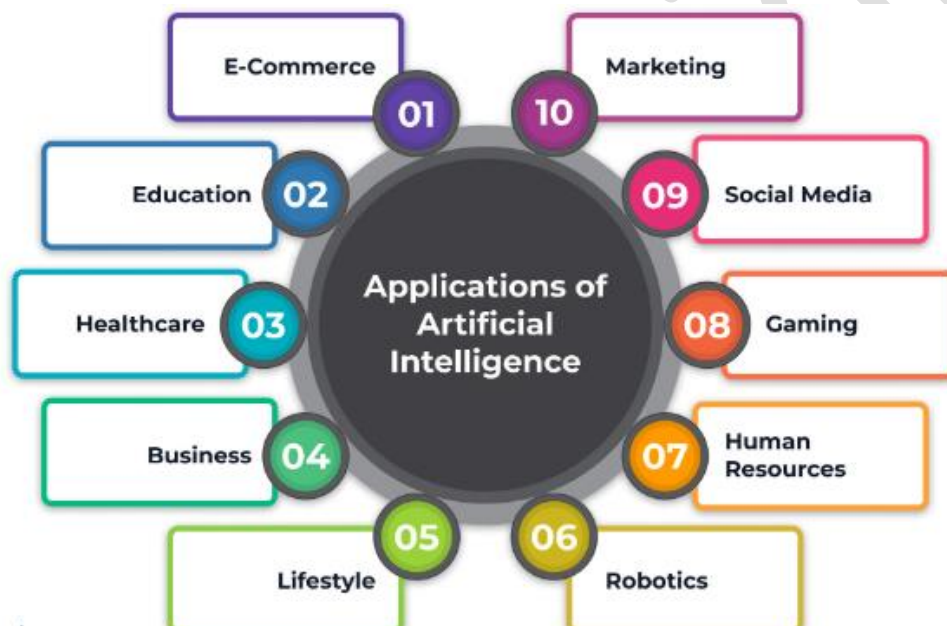
AI in E-commerce:

AI is providing a competitive edge to the e-commerce industry, and it is becoming more demanding in the e-commerce business. AI is helping shoppers discover associated products with recommended sizes, colors, or even brands.

AI in Education :

- Education Content Creation: AI supports educators by creating quizzes, lesson plans, and study materials, freeing up time for student engagement and enhancing content quality.

- Virtual Learning Assistants: AI provides 24/7 support, answering questions and offering explanations to help students overcome learning challenges independently and increase engagement.

AI in Healthcare :

- Early Diagnosis: AI analyzes patient data to predict disease risks, aiding early detection and potential prevention.

- Disease Tracking: Predictive analytics in AI models disease spread, helping with containment efforts.

- Drug Discovery: AI identifies new drug applications and assesses interactions for safety.
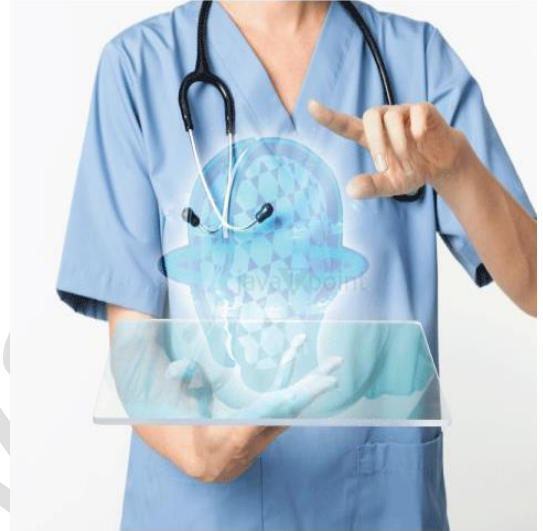
AI in Business

AI is revolutionizing business by offering vast applications, especially in AI analytics. For companies, adopting AI can drive growth and prevent falling behind in a tech-driven market. AI analytics tools, like those from Tableau, provide data-driven insights to help businesses stay competitive and make informed decisions.

AI in Lifestyle :

AI impacts daily life in many ways:

- ❖ Autonomous Vehicles: AI in cars from brands like Tesla and Volvo enables human-like decision-making, enhancing driving safety.

- ❖ Spam Filters: AI-powered filters in email services like Gmail identify and sort spam with over 99% accuracy.

- ❖ Facial Recognition: Used in smartphones and security, AI facial recognition ensures secure access by reliably identifying users.

AI in Robotics :

- ▪ Self-Moving Robots: AI enables robots to navigate independently, allowing tasks like package delivery and exploration without human guidance.

- ▪ Object Recognition and Manipulation: AI helps robots identify and handle objects accurately, useful in settings like warehouses for sorting and packing.

- **Human-Robot Collaboration**: AI allows robots to work alongside humans, enhancing safety and productivity by understanding and supporting human actions.

AI in Human Resources

- **Automated Recruitment**: AI streamlines resume screening and candidate selection, enhancing efficiency and reducing bias in hiring.

- **Employee Onboarding and Training**: AI-powered chatbots provide instant support and personalized training for new hires, improving the onboarding experience.

- **Predictive Analytics**: AI analyzes employee data to forecast trends in performance and engagement, aiding HR in talent management and future planning.

AI in Gaming

❖ Smart NPCs: AI powers non-player characters (NPCs) to act more like real players, adapting to player actions for a more immersive experience.

❖ Game World Creation: AI autonomously builds game worlds, levels, and maps, allowing for larger and more intricate game environments.

❖ Realistic Graphics and Movements: AI enhances graphics and smooth animations, making games look and feel closer to real life and predicting player actions for a seamless experience.

AI in Social Media

- Content Recommendations: AI algorithms tailor content on social media based on user preferences to boost engagement.

- User Data and Advertising: AI collects user data to create targeted ads that are more relevant to individual users.

- User Interaction: Interactions like likes, comments, and shares help train these algorithms to show more preferred content.

Platforms utilizing AI include **Facebook**, **Instagram**, **YouTube**, and **TikTok**, where AI customizes user experiences and improves engagement.

AI in Marketing

- Personalized Experiences: AI analyzes customer data for tailored recommendations, messages, and content, boosting engagement.

- Dynamic Pricing : AI adjusts pricing based on market data and customer behavior to keep businesses competitive.

- Ad Campaign Optimization: AI improves ad performance by refining targeting, bidding, and creatives in real-time to maximize ROI.

These applications enhance efficiency and customer connection in marketing strategies.

Reference :

1. SoluLab. "Top Artificial Intelligence Applications." SoluLab, mailto:SoluLab. "Top Artificial Intelligence Applications." SoluLab, https://www.solulab.com/top-artificial-intelligence-applications/.

2. Patil, N. H., Patel, S. H., & Lawand, S. D. "Research Paper On Artificial Intelligence And Its Applications." *Journal of Advanced Zoology*, vol. 44, no. S-8, 2023, pp. 229-238. Available online at**:** https://jazindia.com.

3. "Application of AI." *Javatpoint*, https://www.javatpoint.com/application-of-ai.

4. "AI Examples.**"** *Tableau*, https://www.tableau.com/data-insights/ai/examples.

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Introduction of AI

Assistant Lecturer : Sarah Kadhim Hwaidi

Contents :

Introduction

Definition of Artificial Intelligence?

One of the most important aspects of AI is that it is a multi-use technology. Like electricity, it can be applied in lots of different ways, to lots of different scenarios. There is no single, universally accepted definition for Artificial Intelligence, but the Oxford English Dictionary defines AI as **"the capacity of computers, or other machines, to exhibit intelligent behavior"**. This means AI systems appear to think, learn, and act like humans and in some cases exceed the capabilities of humans. AI systems can analyse vast amounts of data, solve complex problems, make decisions, and perform creative tasks Some AI

technologies have been around for more than 50 years, but advances in computing power, the availability of enormous quantities of data, and new developments in software algorithms have led to major AI breakthroughs in recent years.
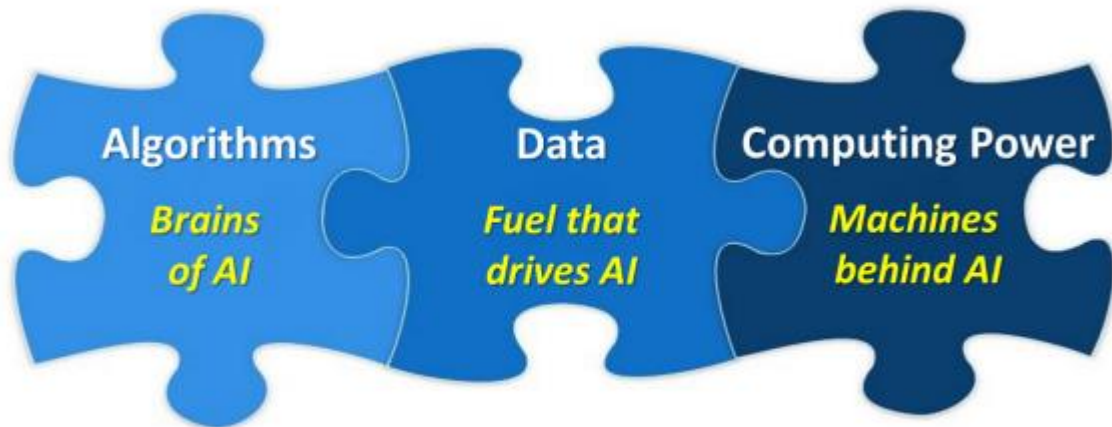
Algorithms tell computers what to do. Data tells computers what to learn. Computing power gives machines the power to learn and make decisions

History of Artificial Intelligence

Maturation of Artificial Intelligence (1943-1952)

➢ Year 1943: The first work which is now recognized as AI was done by
Warren McCulloch and Walter Pits in 1943. They proposed a model of artificial neurons.

➢ Year 1949: Donald Hebb demonstrated an updating rule for modifying the connection strength between neurons. His rule is now called Hebbian learning.

➢ Year 1950: Alan Turing who was an English mathematician and pioneered Machine learning in 1950. Alan Turing publishes "Computing

Machinery and Intelligence" in which he proposed a test. The test can check the machine's ability to exhibit intelligent behavior equivalent to human intelligence, called a Turing test.

The birth of Artificial Intelligence (1952-1956)

➢ Year 1955: An Allen Newell and Herbert A. Simon created the "first artificial intelligence program" Which was named "Logic Theorist". This

program had proved 38 of 52 Mathematics theorems, and find new and more elegant proofs for some theorems.

➢ Year 1956: The word "Artificial Intelligence" was first adopted by American Computer scientist John McCarthy at the Dartmouth Conference. For the first time, AI was coined as an academic field.

At that time high-level computer languages such as FORTRAN, LISP, or COBOL were invented. And the enthusiasm for AI was very high at that time.

The Golden years-Early enthusiasm (1956-1974)

➢ Year 1966: The researchers emphasized developing algorithms that can solve mathematical problems. Joseph Weizenbaum created the first chatbot in 1966, which was named ELIZA.

> Year 1972: The first intelligent humanoid robot was built in Japan which was named as WABOT-1.

The first AI winter (1974-1980)

> The duration between the years 1974 to 1980 was the first AI winter duration. AI winter refers to the time period when computer scientist dealt with a severe shortage of funding from the government for AI research.
> During AI winters, an interest in publicity on artificial intelligence was decreased.

A boom of AI (1980-1987)

> The year 1980: AI came back with "Expert System". Expert systems were programmed that emulate the decision-making ability of a human expert.
> In the Year 1980, the first national conference of the American Association of Artificial Intelligence was held at Stanford University.

The second AI winter (1987-1993)

> The duration between the years 1987 to 1993 was the second AI Winter duration.
> Again Investors and the government stopped in funding AI research due to high cost but not efficient results. The expert system such as XCON was very cost effective.

The emergence of intelligent agents (1993-2011)

- ➢ Year 1997: In the year 1997, IBM Deep Blue beats world chess champion, Gary Kasparov, and became the first computer to beat a world chess champion.
- ➢ Year 2002: for the first time, AI entered the home in the form of Roomba, a vacuum cleaner.
- ➢ Year 2006: AI came in the Business world till the year 2006. Companies like Facebook, Twitter, and Netflix also started using AI.

Deep learning, big data, and artificial general intelligence (2011-present)

- ➢ Year 2011: In the year 2011, IBM's Watson won Jeopardy, a quiz show, where it had to solve complex questions as well as riddles. Watson had proved that they could understand natural language and could solve tricky questions quickly.
- ➢ Year 2012: Google has launched an Android app feature "Google Now", which was able to provide information to the user as a prediction.
- ➢ Year 2014: In the year 2014, Chatbot "Eugene Goostman" won a competition in the infamous "Turing test."
- ➢ Year 2018: The "Project Debater" from IBM debated on complex topics with two master debaters and also performed extremely well.

➢ Google has demonstrated an AI program "Duplex" which was a virtual assistant and that had taken a hairdresser appointment on call, and the lady on the other side didn't notice that she was talking with the machine. Now AI has developed to a remarkable level. The concepts of Deep learning, big data, and data science are now trending like a boom. Nowadays companies like Google, Facebook, IBM, and Amazon are working with AI and creating amazing devices. The future of Artificial Intelligence is inspiring and will come with high intelligence.

AI Techniques

Top 4 Techniques of Artificial Intelligence

Machine Learning

NLP

Automation & Robotics

Machine Vision
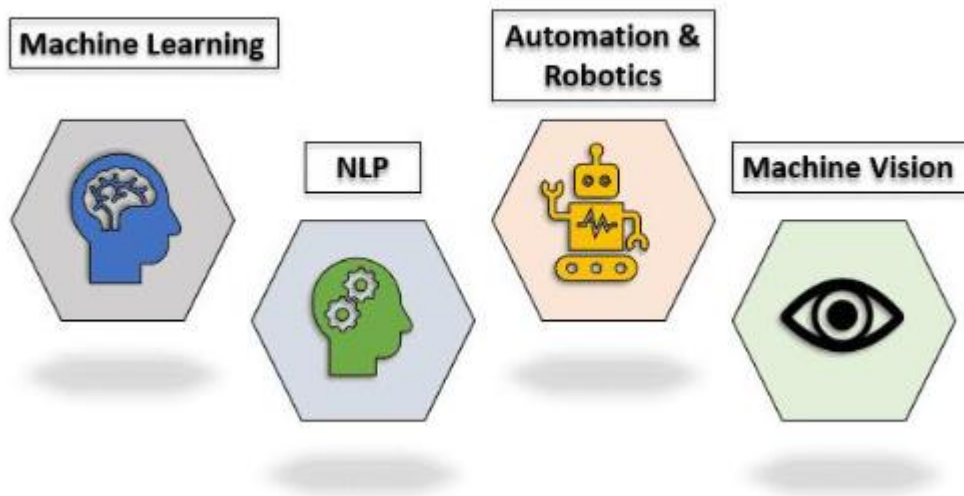
Artificial intelligence techniques refer to a set of methods and algorithms used to develop intelligent systems that can perform tasks that require human-like intelligence. Among the most commonly used methods are:

- Machine Learning.
- Natural Language Processing.
- Machine Vision.
- Robotics.

Machine learning
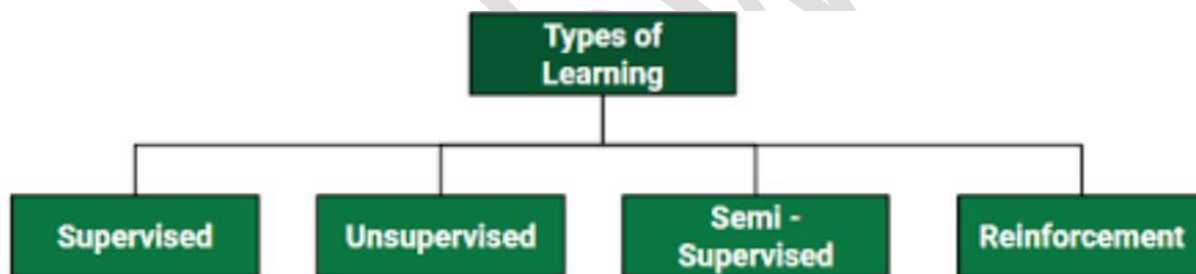
1. **Unsupervised machine learning** – AI systems analyze unlabeled data, where no pre-defined outcomes are provided. The goal is to uncover structures or patterns within the data without any prior knowledge. For example, they can aggregate similar customer behavior data to identify customer segments for targeted marketing strategies.
2. **Supervised learning** – A combination of an input dataset and an intended output is inferred from the training data. AI systems learn from a labeled dataset, where each data point is associated with a

known outcome. For example, this allows spam filters to distinguish spam from legitimate emails based on learned patterns.

3. **Semi-supervised learning** - It is a method that uses a small amount of labeled data and a large amount of unlabeled data to train a model. The goal of semi-supervised learning is to learn a function that can accurately predict the output variable based on the input variables, similar to supervised learning. However, unlike supervised learning, the algorithm is trained on a dataset that contains both labeled and unlabeled data.

4. **Reinforcement Learning** – In reinforcement learning, data is collected from machine learning systems that use trial and error to learn from the results and determine what action to take next. After each action, the algorithm receives feedback that helps it determine whether the choice it made was correct, neutral, or incorrect. It takes actions with the goal of maximizing rewards, or in other words, it learns by doing in order to achieve the best outcome.

Natural Language Processing
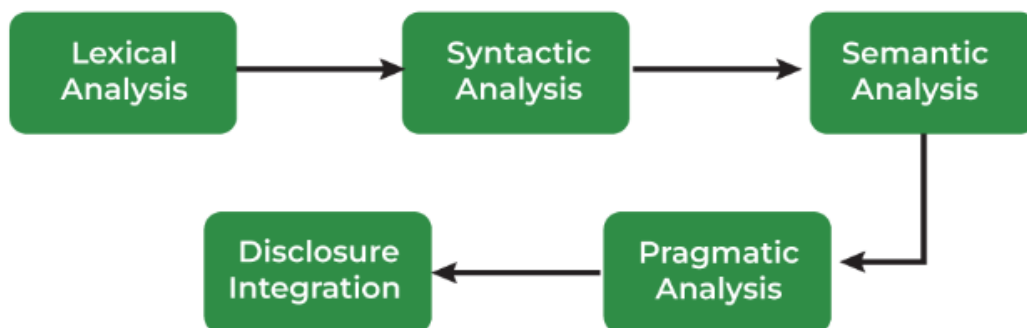
1. **Lexical integration** – Lexical analysis is the process of converting a string of characters into a string of symbols. Lexicographers are usually combined with parsers, which together analyze grammar in programming languages, web pages, etc.

2. **Syntactic Integration** – Syntactic analysis is the process of analyzing a string of symbols, whether in natural language, computer languages, or data structures, according to the rules of formal grammar.

3. **Semantic Integration** – Semantic analysis attempts to understand the meaning of human language.

4. **Pragmatic Integration** – Pragmatic analysis is part of the process of extracting information from text. It focuses on taking an organized set of texts and finding out the actual meaning of the text. It also focuses on the meaning of words in time and context.

5. **Disclosure Integration** - Discourse analysis is used to uncover the motivation behind a text and is useful for studying the underlying meaning of a spoken or written text as it takes into account its social and historical contexts.

Machine Vision

Computer vision technology gives machines the ability to interpret visual information from the world. It has revolutionized industries such as healthcare, automotive, and robotics, enabling tasks such as facial recognition, object detection, and autonomous driving. How well it can distinguish between objects is a key component of computer vision technology.
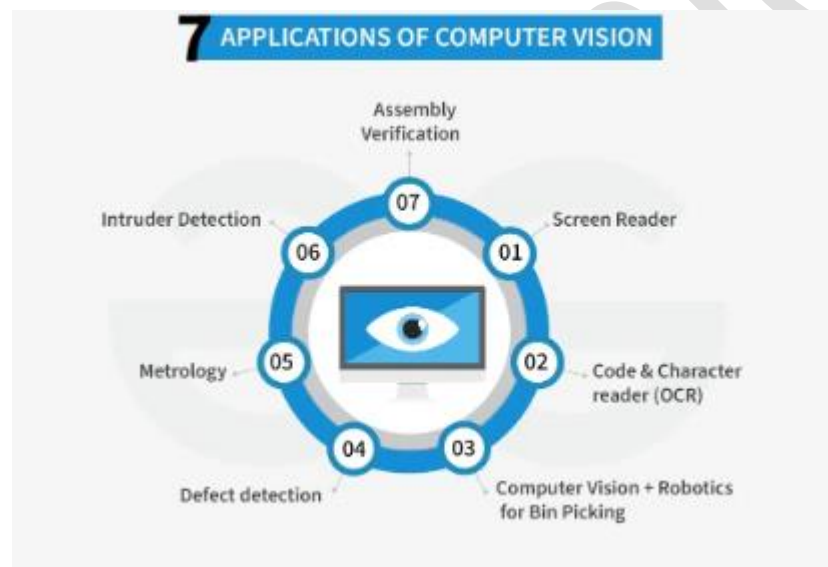
Robotics and Automation

Automation aims to enable machines to perform boring and repetitive jobs, increasing productivity and delivering more effective, efficient and affordable results.

Challenges and Ethical Considerations

Here are common values associated with AI ethics and responsible AI:

Explainability and interpretability

As AI becomes more advanced, humans are challenged to comprehend and retrace how the algorithm came to a result. Explainable AI is a set of processes and methods that enables human users to interpret, comprehend and trust the results and output created by algorithms.

Fairness and inclusion

To encourage fairness, practitioners can try to minimize algorithmic bias across data collection and model design, and to build more diverse and inclusive teams.

Robustness and security

Robust AI effectively handles exceptional conditions, such as abnormalities in input or malicious attacks, without causing unintentional harm.

Accountability and transparency

users should be able to see how an AI service works, evaluate its functionality, and comprehend its strengths and limitations. Increased transparency provides information for AI consumers to better understand how the AI model or service was created.

Privacy and Compliance

It is crucial to be able to protect AI models that might contain personal information, control what data goes into the model in the first place, and build adaptable systems that can adjust to changes in regulation and attitudes around AI ethics.

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Lecture 2

E-commerce and electronic banking services

By: Assistant Lecturer Doaa Talib Zaidan

- Contents :

- E-commerce Concept
- Types of e-commerce
- Electronic Banking Services
- Online Banking
- ATM Services
- Undebit Card Services
- Phone Banking
- SMS Banking
- Electronic Airlines Services
- Mobile Banking

Introduction to E-commerce Concept

1. E-commerce: It is the process of buying and selling goods and services or exchanging commercial information using the Internet.
- The importance of e-commerce: How it has revolutionized the way business is done by providing greater access to global markets and reducing operating costs.

Types of e-commerce:

- B2B business-to-business
- B2C business-to-consumer
- C2C from consumer to consumer
- C2B consumer to business
- C2A from consumer to management
- B2A Business Administration

There are 6 basic types of e-commerce:

1. Business - to- Business (B2B)

Business-to-Business (B2B) e-commerce encompasses all electronic transactions of goods or services conducted between companies. Producers and traditional commerce wholesalers typically operate with this type of electronic commerce.

2. Business- to - Consumer (B2C)

The Business-to-Consumer type of e-commerce is distinguished by the establishment of electronic business relationships between businesses and final consumers. It corresponds to the retail section of e-commerce, where traditional retail trade normally operates.

3. Consumer-to-Consumer (C2C)

Consumer-to-Consumer (C2C) type e-commerce encompasses all electronic transactions of goods or services conducted between consumers. Generally, these transactions are conducted through a third party, which provides the online platform where the transactions are actually carried out.

4. Consumer-to-Business (C2B)

In C2B there is a complete reversal of the traditional sense of exchanging goods. This type of e-commerce is very common in crowdsourcing based projects. A large number of individuals make their services or products available for purchase for companies seeking precisely these types of services or products.

5. Business-to-Administration (B2A)

This part of e-commerce encompasses all transactions conducted online between companies and public administration. This is an area that involves a large amount and a variety of services, particularly in areas such as fiscal, social security, employment, legal documents and registers, etc. These types of services have increased considerably in recent years with investments made in e-government.

6. Consumer-to-Administration (C2A)

The Consumer-to-Administration model encompasses all electronic transactions conducted between individuals and public administration.

Examples of applications include:

- Education – disseminating information, distance learning, etc.
- Social Security – through the distribution of information, making payments, etc.
- Taxes – filing tax returns, payments, etc.
- Health – appointments, information about illnesses, payment of health services, etc.

Both models involving Public Administration (B2A and C2A) are strongly associated to the idea of efficiency and easy usability of the services provided to citizens by the government, with the support of information and communication technologies.

2. Electronic Banking Services

•The concept of electronic banking services: a group of financial services provided by banks via digital media to facilitate access to bank accounts and conduct banking operations.

3. Online Banking

•Definition of online banking: It is the use of the Internet to access banking services and conduct transactions from anywhere and at any time.

•Advantages: ease, convenience, speed of implementation, and accessibility 24/7.

•Examples of operations: money transfer, bill payment, balance inquiry.

4. Banking via ATM Services

Definition of automated teller machines (ATM): Banking devices that allow customers to perform basic banking operations such as withdrawals, deposits, and balance inquiries without the need to visit the branch.

•The importance of ATMs: providing service around the clock and reducing the burden on banking branches.

5. Undebit Card Services

•Definition of non-debit cards: includes prepaid cards and credit cards that do not withdraw directly from the customer's balance.

•The difference between non-debit cards and direct debit cards: how each type works and when it is best to use it.

6. Phone Banking

•Definition of telephone banking: the ability to conduct banking operations using the telephone by contacting customer service or using an automated response.

•Benefits: Fast and easy access to basic operations such as balance inquiries or money transfers.

7. SMS Banking

•Definition of text message banking: The use of text messages to send and receive banking information or to carry out simple operations.

•Examples of uses: Balance alerts, transaction notifications, account inquiries.

8. Electronic Airlines Services)

•The concept of aviation electronic services: using technology to purchase and book airline tickets and manage travel reservations via the Internet.

•Advantages: saving time and effort, access to promotional offers, and the ability to change reservations easily.

9. Mobile Banking

Mobile Banking: Applications and services that allow users to conduct their banking transactions via mobile devices such as smartphones and tablets.

•Main functions: transfer money, pay bills, view accounts, and manage personal finances. The importance of security: protecting banking data and emphasizing the use of encryption and complex passwords.

Comparison between e-commerce and traditional commerce

•E-commerce:

•It takes place entirely online and includes digital buying and selling.

•Provides 24/7 global access.

•Requires lower operating costs because there is no need for a physical location.

•It enjoys fast implementation and electronic handling of transactions.

Traditional trade:

•It takes place in physical locations such as stores and markets.

•It relies on personal contact with customers and face-to-face negotiations.

•Needs higher operating costs due to rent and logistical expenses.

•Requires longer time to complete transactions due to traditional procedures.
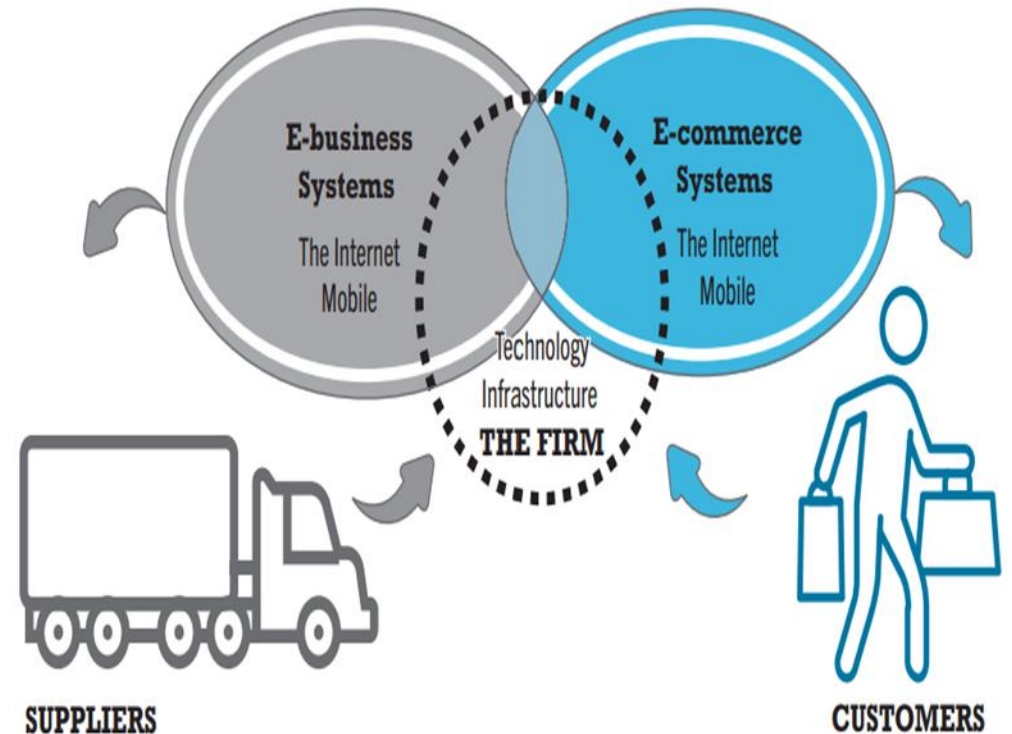
Benefits of E-commerce

Benefits of E-commerce to Organizations

1. **International marketplace**

What used to be a single physical marketplace located in a geographical area has now become a borderless marketplace including national and international markets. By becoming e-commerce enabled, businesses now have access to people all around the world.

2. **Operational cost saving**

The cost of creating, processing, distributing, storing and retrieving paper-based information has decreased.

3. **Mass customization**

E-commerce has revolutionized the way consumers buy products and services. Now customers can configure a product according to their specifications within minutes on-line via the website.

4. **No time constraints**

Businesses can be contacted by at any time.

Benefits of E-commerce

Benefits of E-commerce to Consumers

1. **24/7 access**

Enables customers to shop or conduct other transactions 24 hours a day, all year round from almost any location.

2. **More choices**

Customers not only have a whole range of products that they can choose from and customize, but also an international selection of suppliers.

3. **Price comparisons**

Customers can 'shop' around the world and conduct comparisons directly by visiting different sites.

4. **Improved delivery processes**

This can range from the immediate delivery of digitized or electronic goods such as software or audio-visual files by downloading via the Internet, to the on-line tracking of the progress of packages being delivered.

5. **An environment of competition**

Where substantial discounts can be found or value added, there are different retailers for customers.

Disadvantages of e-commerce

The main disadvantages associated with e-commerce are the following:

- Strong dependence on information and communication technologies (ICT);
- Lack of legislation that adequately regulates the new e-commerce activities, both nationally and internationally;
- Market culture is averse to electronic commerce (customers cannot touch or try the products);
- The users' loss of privacy, the loss of regions' and countries' cultural and economic identity;
- Insecurity in the conduct of online business transactions.

10. Conclusion and conclusions

The future of e-commerce and e-banking: How are these technologies expected to develop in the future.

• The impact of technological developments on these fields: such as artificial intelligence, the Internet of Things, and blockchain technology.

Benefits of using artificial intelligence in e-commerce:

Increase sales: AI can help companies increase sales by providing personalized product recommendations, improving customer service, and reducing fraud.

Improve customer satisfaction: AI can help businesses improve customer satisfaction by providing a more personalized shopping experience and 24/7 customer support.

Streamlined operations: AI can help companies streamline operations by automating tasks such as fraud detection and optimizing logistics.

If you work in e-commerce, there are a number of ways you can start using AI:

Invest in AI-powered tools: There are a number of AI-powered tools that can help you with tasks like product recommendations, customer service, and fraud detection.

Hire AI experts: If you don't have the resources to invest in AI-powered tools, you can hire AI experts to help you implement AI solutions.

Partnering with AI companies: There are a number of AI companies that offer e-commerce solutions. You can partner with one of these companies to start using AI.

Artificial Intelligence is a powerful technology that has the potential to transform the e-commerce industry. If you are in the e-commerce business, you should be thinking about how you can start using AI to improve your business.

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Lecture 7

AI and Society

(How AI affects social, AI and international relations, AI and the future of humanity)

By

Doaa Talib Zaidan

Contents:

1.AI and Society

2. AI and International Relations

3. AI and the Future of Humanity

AI is transforming society in multiple ways, influencing everything from daily life to international relations and the future of humanity. Here's a breakdown of these areas:

1. AI and Society

- **Economic Impact:** AI is automating tasks across industries, leading to increased productivity but also concerns over job displacement. It has the potential to create new industries and opportunities, while also exacerbating inequality if not managed well.

- **Social Structures:** AI is changing how people interact with technology and with each other. From personalized recommendations on social media to AI-driven health diagnostics, AI is embedded in everyday life. It raises concerns about privacy, surveillance, and data ownership.

- **Ethical Concerns:** AI has sparked debates on bias, discrimination, and accountability. If AI systems inherit biases from their training data, they can perpetuate and even amplify these biases in decision-making processes, affecting justice systems, hiring, and healthcare.
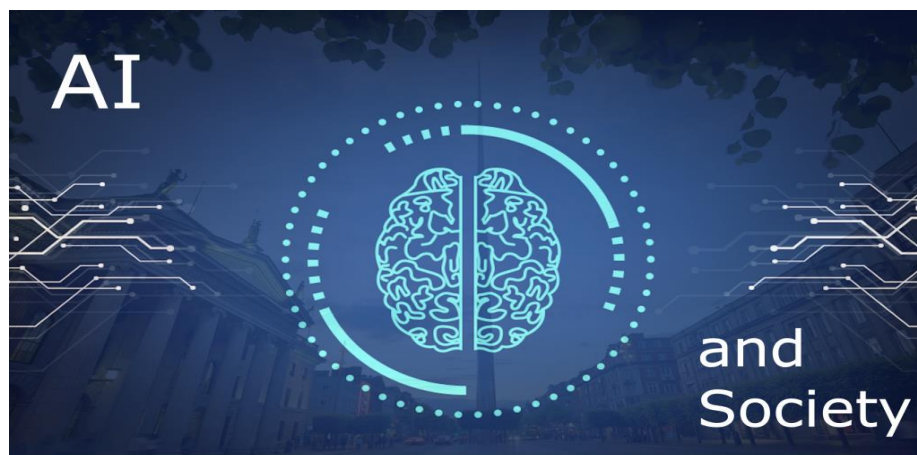
The Impact of AI: How Artificial Intelligence is Transforming Society

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are designed to think and work like humans. AI has the ability to learn from experience, make decisions, and perform tasks that typically require human intelligence.

The Advantages of AI

- Increased efficiency and productivity

- Improved accuracy and decision making

- Enhanced customer experience

- The creation of new job opportunities

The study of the impact of AI on society is a rich research topic, as it has profound impacts on various aspects of daily and social life. We can approach AI as a tool for positive social transformation from a number of perspectives, including health, education, work, and social justice. Specific cases can be studied that have demonstrated patterns of positive change using AI; I will present some examples here.

1. Healthcare

Healthcare is one of the areas that has seen the most positive impact thanks to AI. For example, deep learning models are now able to analyze medical images (such as X-rays and MRIs) with high accuracy, contributing to the early diagnosis of serious diseases such as cancer and heart disease. "Virtual medical assistants" can be considered a case study, providing proactive solutions and accurate diagnoses, especially in areas with a shortage of doctors, which enhances access to healthcare and improves patient outcomes.

2. Personalized education

In the education sector, AI algorithms are used to create personalized learning plans for each student, based on their academic level and strengths and weaknesses. Examples of these applications include smart e-learning platforms such as Coursera, EdX, and others, which use AI to analyze student interactions and provide guidance suggestions, enhancing the educational experience and improving academic success rates. These tools provide equal opportunity education for students around the world, helping to reduce the knowledge gap.

3. Recruitment and inclusion in the labor market

By leveraging AI in recruitment, companies are able to avoid unfair bias and achieve greater inclusion. Many companies use AI algorithms to screen job applications and identify the most suitable candidates based on skills and competencies alone, rather than relying on personal considerations. An example of this is the use of AI to screen resumes without revealing details about candidates, which supports diversity and inclusion in the labor market.

4. Smart environmental solutions

In the field of environmental protection, AI is used to monitor environmental phenomena and predict climate change. A clear case study is Google's Project Sunroof, which helps individuals and communities identify the best places to install solar panels, with the aim of reducing non-renewable energy consumption and promoting sustainability. These technologies support communities in addressing environmental challenges in more efficient and effective ways.

5. Improving social justice and protecting human rights

AI also contributes to advancing social justice, as it is used in human rights abuse analysis and social data analysis to understand challenges and needs. For example, the Human Rights Data Analysis Group project uses AI to analyze human rights data and identify patterns in abuses, supporting stakeholders in making data-driven decisions.

Conclusion:

AI has the potential to catalyze positive social change across multiple sectors, making society more inclusive and progressive.

2. AI and International Relations

- Geopolitical Competition: AI is becoming a core area of competition between major powers, such as the U.S. and China. Both nations are investing heavily in AI for economic growth and military capabilities, potentially reshaping global power dynamics.

- Cybersecurity and Warfare: AI's role in cybersecurity and military applications is growing. AI can improve defense mechanisms against cyber threats, but it also raises the specter of autonomous weapons and the risks of accidental escalation in conflicts.

- Diplomacy and Regulation: AI challenges international cooperation on creating frameworks and regulations to ensure its ethical use. Issues like AI governance, ethical guidelines, and cross-border data flows are now central to diplomatic negotiations.

3. AI and the Future of Humanity

• Existential Risk: Some researchers, such as Nick Bostrom and Elon Musk, have warned about the long-term risks AI could pose to humanity. The fear is that advanced AI, if misaligned with human values or interests, could act in ways harmful to humans or even surpass human control.

• Transhumanism and Human Enhancement: AI could enhance human capabilities, potentially allowing for advances in brain-machine interfaces, medical AI, and life extension. This raises philosophical questions about what it means to be human and how society should handle these transformations.

• Global Cooperation: As AI advances, humanity may need global cooperation to address its challenges. This includes creating global AI ethics standards and frameworks that can regulate its impact, promoting fairness and avoiding misuse in areas such as warfare or surveillance.
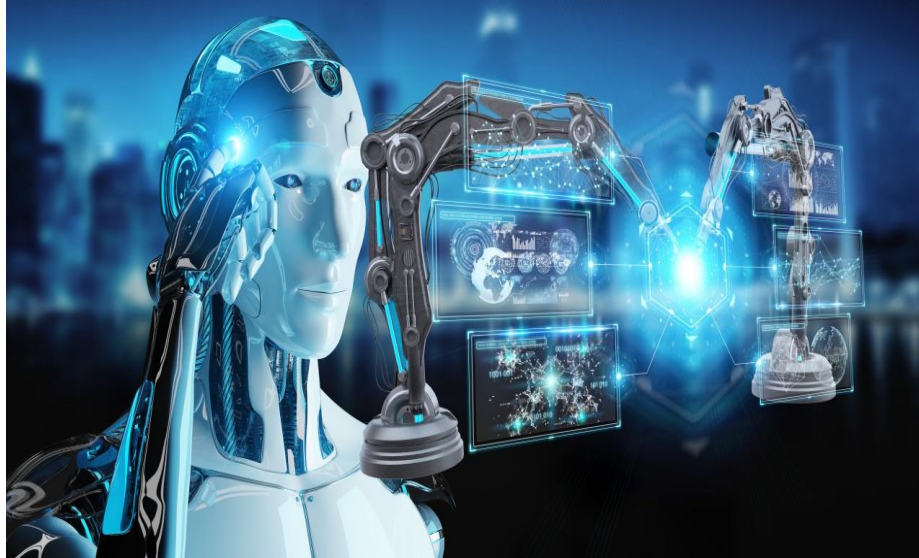
AI's potential to shape society and the future of humanity presents both immense opportunities and significant challenges. The way we handle AI governance and ethical considerations will likely determine the nature of its long-term impact.

Artificial Intelligence (AI) has profound and growing impacts on society, as it is used in many fields such as medicine, industry, education, and the economy, contributing to improving efficiency and decision-making. However, this technology also has social and economic impacts that may be complex, requiring a careful understanding of their dimensions.

The impact of AI on humanity

1. Economy and labor market: AI improves efficiency in many industries, but it may also lead to the replacement of certain jobs with automation, raising issues related to unemployment, training, and rehabilitation. For example, the use of robots in factories could lead to many workers losing their jobs, forcing countries and societies to find new ways to support these individuals.

2. Education and training: AI is used to improve the quality of education, by personalizing educational content and developing analytical tools that help understand student performance and provide personalized support. However, the adoption of technology in education requires a balance to ensure that machines do not overpower the role of teachers and the human side of education.

3. Health and medical care: AI contributes to improving medical diagnosis and developing medicines. For example, there are AI-based systems that can analyze medical images with high efficiency, helping doctors detect diseases early. However, there are challenges related to medical ethics, such as privacy and the possibility of over-reliance on machines.

4. Ethical and privacy issues: As AI spreads, concerns about privacy violations are increasing, as big data is used to improve the performance of models. In addition, there are concerns about the use of AI to monitor individuals and analyze their behavior, which could limit individual freedoms and strengthen central authority.

5. Social interaction: AI can also affect human relationships, as robots and smart applications spread that provide social and personal services, such as talking to people or providing emotional support. This could lead to changes in how individuals interact with each other and provide social support.

The future of artificial intelligence and its impact on humans

In the future, AI is expected to continue to evolve and become more intelligent and independent, raising many questions about the future of humanity. Some future axes of impact of AI include:

* The development of artificial general intelligence (AGI): If AGI is achieved, which can outperform humans in a wide range of tasks, this could pose unprecedented challenges related to control and regulation, and how to avoid misuse or loss of control.

* Impact on human values: AI is expected to redefine many human and ethical values, including responsibility, solidarity, and privacy, as new questions will be raised about the decisions made by machines and the overlap between them and human decisions.

* Integration between humans and machines: Integration between humans and machines may evolve to include areas such as medicine and the implantation of smart devices in the human body. These technologies can enhance human capabilities, but they also raise issues related to human identity, and how to define the boundaries between what is human and what is artificial.

In short, AI is expected to continue to shape human lives in profound ways, requiring a comprehensive response that takes into account economic, social, and ethical dimensions, to ensure that this technology remains a service to humanity and its well-being.

In recent years, artificial intelligence (AI) has emerged as a transformative force across various sectors, and the realm of diplomacy and international relations is no exception. As nations grapple with increasingly complex global challenges, from climate change to cybersecurity threats, AI presents both opportunities and risks in the conduct of foreign affairs. This article explores the multifaceted impact of AI on diplomacy and international relations, examining its advantages, disadvantages, challenges, and potential future developments.

Advantages of AI in Diplomacy	Disadvantages and Risks	Challenges in Implementing AI in Diplomacy
Enhanced Data Analysis and Decision Support	Reduced Human Judgment and Intuition	Technological Infrastructure and Digital Divide
Predictive Analytics and Scenario Planning	Potential for Bias and Manipulation	Data Privacy and Sovereignty Concerns
Language Translation and Cultural Understanding	Cybersecurity Vulnerabilities	Ethical Considerations and Regulation
Automation of Routine Tasks	Lack of Transparency and Accountability	Training and Adaptation of Diplomatic Corps
Enhanced Crisis Management	Potential for Escalation and Misunderstanding	Interoperability and Standardization

Advantages of AI in Diplomacy

1. Enhanced Data Analysis and Decision Support

2. Predictive Analytics and Scenario Planning

3. Language Translation and Cultural Understanding

4. Automation of Routine Tasks

5. Enhanced Crisis Management

Disadvantages and Risks

1. Reduced Human Judgment and Intuition

2. Potential for Bias and Manipulation
3.   Cybersecurity Vulnerabilities
4. Lack of Transparency and Accountability
5. Potential for Escalation and Misunderstanding

Challenges in Implementing AI in Diplomacy

1. Technological Infrastructure and Digital Divide
2. Data Privacy and Sovereignty Concerns
3. Ethical Considerations and Regulation
4. Training and Adaptation of Diplomatic Corps
5. Interoperability and Standardization

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Level 2

Lecture 8

" Ethical Challenges In AI "

By: Nawras Akeed Rejab

Contents :

Ethical Challenges in AI :

AI ethics are the texts and legislations that enable us to know what is right and what is wrong when dealing with this technology. First and foremost, there has been interest in many important elements that help in the work of these legislations, such as the governance of data feeding smart systems and determining its ownership, classification, privacy, access and use, as well as the protection and security of this data. There is another important element in the field of AI ethics, which is the need for the data used to feed smart machines to be of high quality and can be trusted and relied upon .
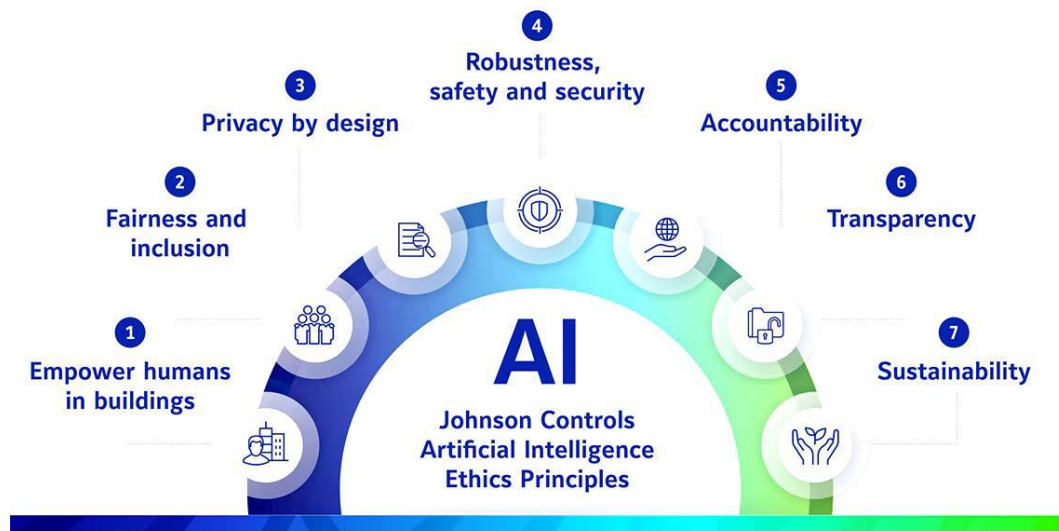
The most prominent of these challenges are :

1- The cost of innovation in this field.

2- The lack of complete trust in artificial intelligence by many.

3- Lack of data quality.

4- The disappearance of some jobs.

5- Harm to the physical safety of humans sometimes when dealing with robots.

6- Lack of privacy, especially when using data in health, security, and other fields.

7- The sudden emergence of artificial intelligence and the need to adopt it quickly.

8- Related security challenges.

9- Lack of transparency.

10- Limiting human communication, especially in the health field.

11- Negative impact on the environment.

12- Human loss of decision-making.
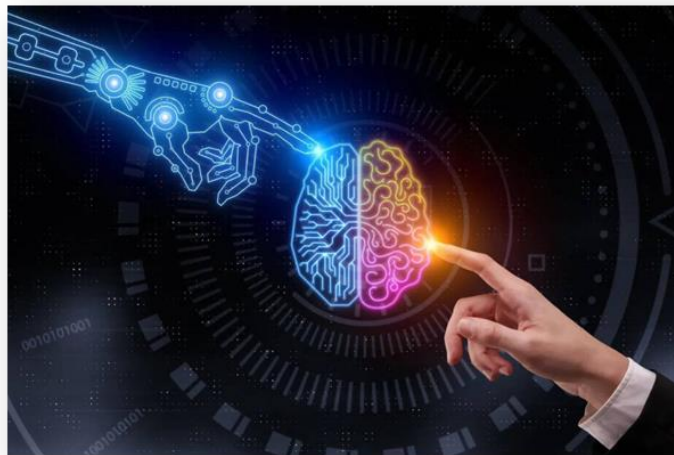
Al Ethics :

It is a set of values, principles and methods to guide ethical behavior in the development and use of artificial intelligence technologies. It is also part of the ethics of technology for robots and other artificially intelligent beings. It can be divided into :

1-Robotics ethics, which concerns the ethical behavior of humans when designing, building, using and treating artificially intelligent beings .
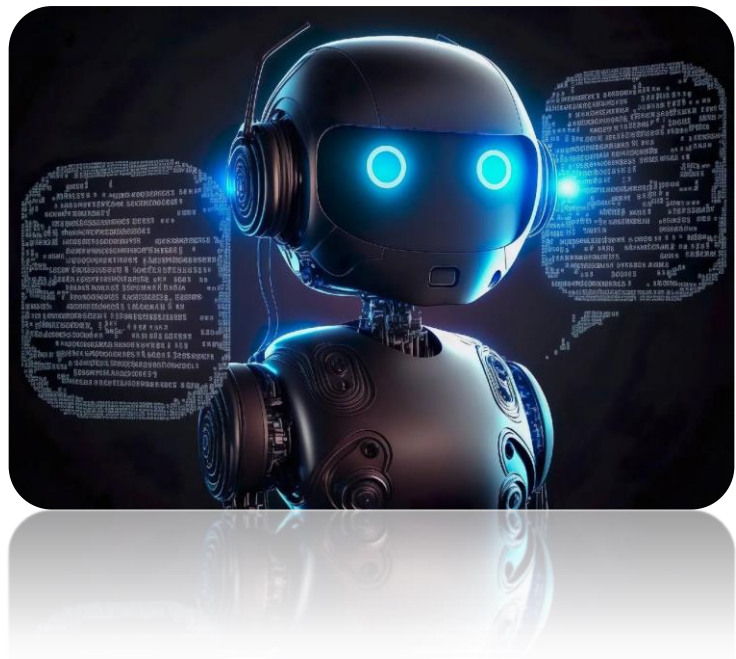
2- Machine ethics, which concerns the ethical behavior of artificially intelligent agents.

Privacy And Surveillance :

Artificial intelligence is used in smartphones, self-driving cars, and smart home appliances, and despite the great benefits it offers, artificial intelligence carries with it significant risks to privacy and security in the digital age .

Individuals are now more vulnerable to hacks and violations as companies collect information about individuals, including their locations, shopping habits, internet usage, and even their social interactions. All of this information can be used to improve the user experience, but it also opens the door to a wide range of privacy violations if this data falls into the wrong hands. Individuals' behavior can be tracked and monitored via smart devices and cameras linked to artificial intelligence (surveillance cameras equipped with facial recognition algorithms).
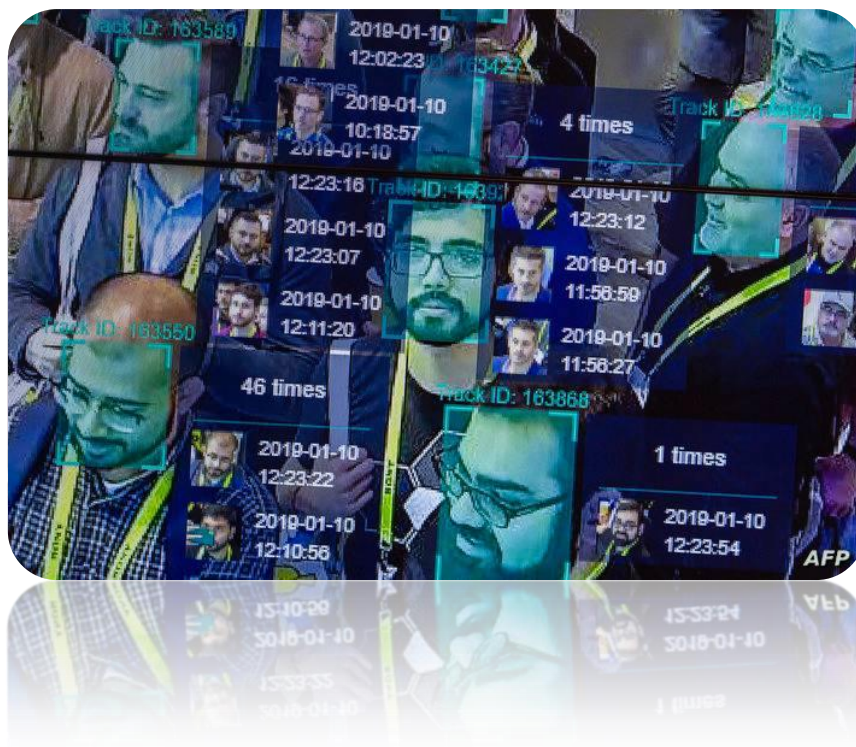
⊠ Common privacy issues in AI:

1. Data Collection and Consent:

With the widespread use of AI systems like Chat GPT, data collection has become more comprehensive than ever before. We face a major challenge in ensuring that users consent to data collection in a thoughtful and authentic manner.

The misuse of data collection can be divided into three main issues:

1- Data continuity.

2- Data reuse.

3- Data spillage.

2. Bias and Discrimination in AI:

AI algorithms, based on the data they are trained on, can inadvertently perpetuate existing biases, leading to discrimination. This is of particular concern in applications such as hiring, lending, and law enforcement.

3. Surveillance and Monitoring :

The use of AI in surveillance, such as facial recognition systems, raises serious privacy concerns.

4. Transparency and oversight issues :

There is a growing need for transparency in how AI systems, including Chat GPT, operate and use data.

5. Economic inequality and access to privacy :

There is a growing gap in access to privacy, with individuals with less resources likely to have less ability to protect their data. Economic inequality impacts the affordability of privacy, making it a luxury for some, while others are more vulnerable to privacy risks.

6. Security risks and data breaches :

The extensive use of AI technologies has increased the risk of security breaches. AI tools have led to unintended private leaks in private organizations.
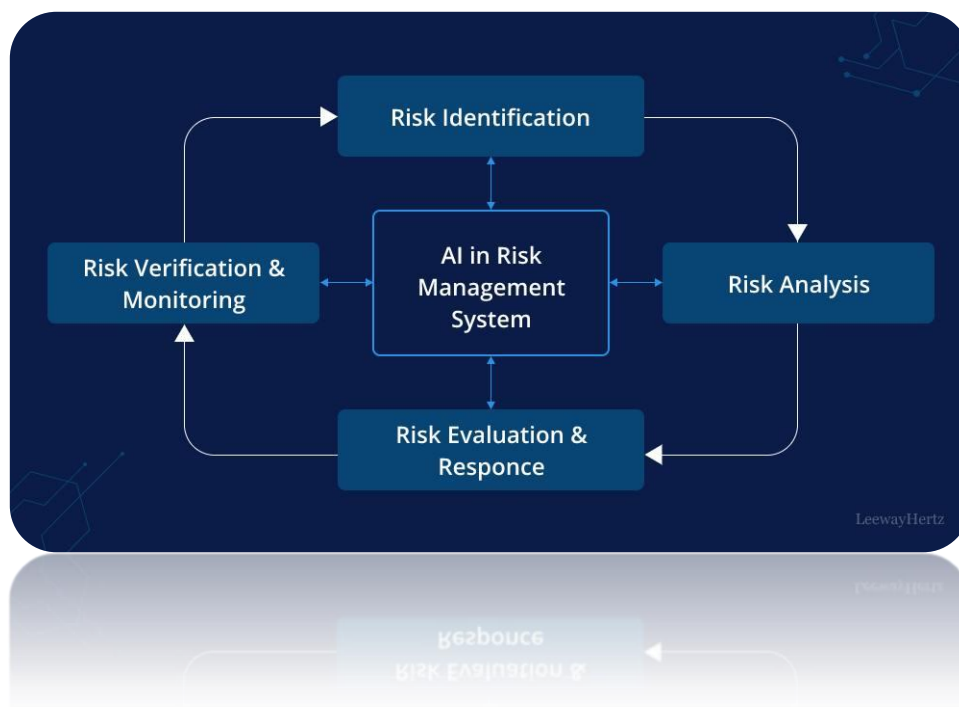
Several emerging technologies and methodologies offer
potential solutions to privacy challenges in AI:

1. Federated learning: This approach allows AI systems to
   learn from decentralized data sources without the need to
   move the data, reducing the risk of privacy breaches.

2. Differential privacy: This technique adds "noise" to data
   sets, making it difficult to identify individuals within the
   data, thereby protecting personal information.

3. Homomorphic encryption: This form of encryption allows
   AI algorithms to process encrypted data, ensuring data
   privacy even during analysis.

4. Block chain technology to protect data privacy: Leveraging
   block chain technology can enhance data security and
   transparency, providing a tamper-resistant record of data
   transactions.

The Impact Of AI On The Job Market :

Artificial intelligence may affect the labor market and the continuity of many different jobs and tasks, as routine and mechanical jobs are replaced by advanced and modern technological methods that enhance artificial intelligence skills and mental and intellectual development. Through the skills it possesses, many problems can be solved in innovative and creative ways.

What is the impact of artificial intelligence on jobs?

Artificial intelligence is capable of creating new job opportunities with more advanced capabilities, as it provides:

• New fields: New job opportunities in many different fields such as developing and maintaining smart systems, designing algorithms, and using robots in analyzing big data.

• Training and development: We notice this impact on employee behavior by providing them with various training courses that help them keep pace with any changes in the technical field.

How does AI impact employees at work?

• Create new job opportunities.

• Boost productivity and efficiency.

• Enhance employee skills and empower their qualifications.

• Enhance access to candidate data and information.

• Promote innovation and entrepreneurship in the workplace.

• Facilitate the process of finding qualified talent.

• Improve the match of candidate qualifications with job requirements.

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2. Bunn, Jenny (Apr 13, 2020). "Working in contexts for which transparency is important: A recordkeeping view of explainable artificial intelligence (XAI). Retrieved 2024-10-22.
3. Anderson, Michael; Anderson, Susan Leigh, editors (July 2011). Machine Ethics. Cambridge University Press.

Computer Troubleshooting

Lecture 3

by

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Computer Troubleshooting

is the process of figuring out how to solve a computer problem. Even

with the most updated software and hardware, occasionally

computers can malfunction.

planning to solve a problem

- 1. must figure out which part of the system is malfunctioning.
- 2. need to check each component of the computer, unless it is obvious
- where the problem is coming from.
- 3. Isolating the problem will help you solve the problem quickly.
- 4. Knowing how to solve these problems with a shortcut perhaps using only
- a few keys on the keyboard can save time and effort.
- 5. Backing up your important computer files to another source will ensure that if your problem cannot be corrected, you will still have a safe copy of your information

Step-by-Step Troubleshooting Process

Implement solutions

5

Test and isolate

4

Identify potential causes

3

Gather information

2

Define the problem

1
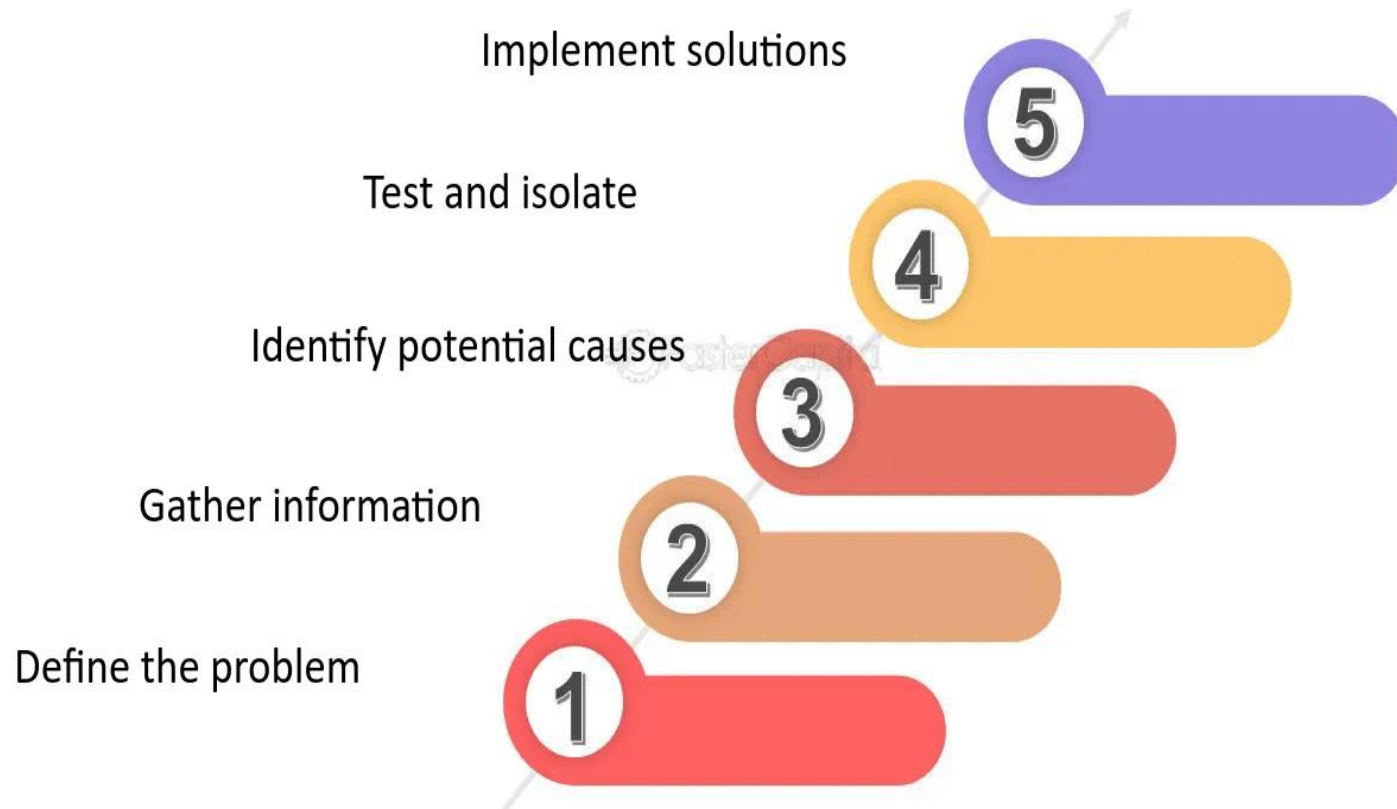
basic troubleshooting techniques

- we'll show you some simple things to try when troubleshooting, as well as how to solve common problems you may encounter.

- **Write down your steps**: Once you start troubleshooting, you may want to **write down** each step you take. This way, you'll be able to remember exactly what you've done and can avoid repeating the same mistakes. If you end up asking other people for help, it will be much easier if they know exactly what you've tried already.

- **Take notes about error messages**: If your computer gives you an **error message**, be sure to write down as much information as possible. You may be able to use this information later to find out if other people are having the same error.

- **Always check the cables**: If you're having trouble with a specific piece of computer **hardware**, such as your monitor or keyboard, an easy first step is to check all related cables to make sure they're properly connected.
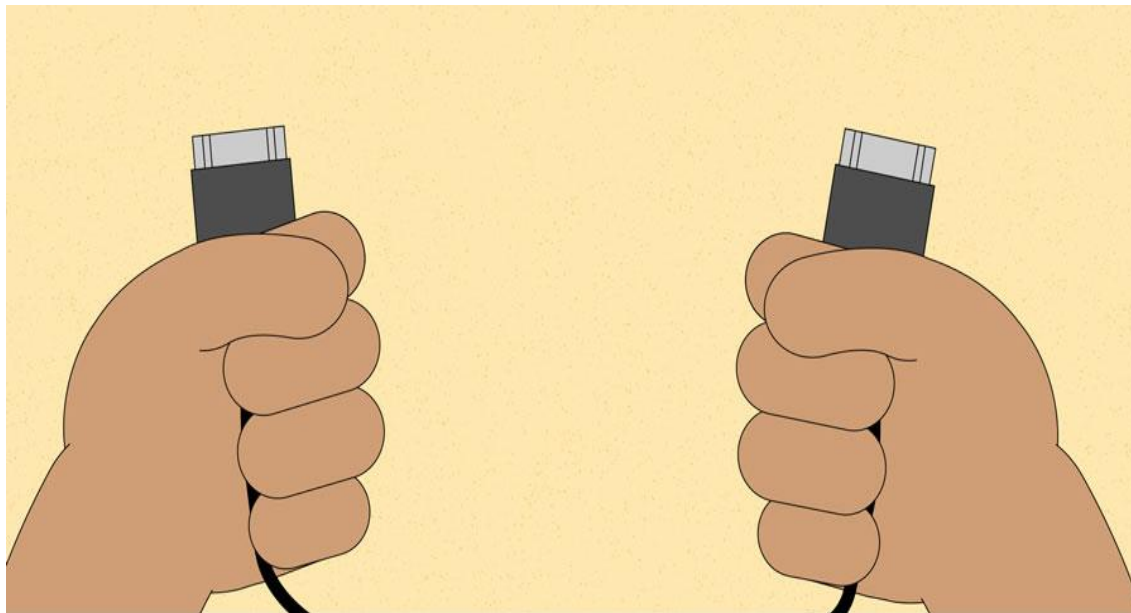
- **Restart the computer**: When all else fails, **restarting the computer** is a good thing to try. This can solve a lot of basic issues you may experience with your computer.

Common Technology Issues

1. The printer is not working.

2. The computer is frozen.

3. A program is not responding.

4. The keyboard is not working.

5. New hardware or software is working incorrectly.

6. The mouse is not working.

7. The computer is slow.

Simple solutions to common problems

Most of the time, problems can be fixed using simple troubleshooting techniques, like **closing** and **reopening** the program. It's important to try these simple solutions before resorting to more extreme measures. If the problem still isn't fixed, you can try other troubleshooting techniques.

Problem: Power button will not start computer

- **Solution 1**: If your computer **does not start**, begin by checking the power cord to confirm that it is plugged securely into the back of the computer case and the power outlet.

- **Solution 2**: If it is plugged into an outlet, make sure it is a **working outlet**. To check your outlet, you can plug in another **electrical device**, such as a lamp**.**

- **Solution 3**: If the computer is plugged in to a **surge protector**, verify that it is turned on. You may have to **reset** the surge protector by turning it off and then back on. You can also plug a lamp or other device into the surge protector to verify that it's working correctly.
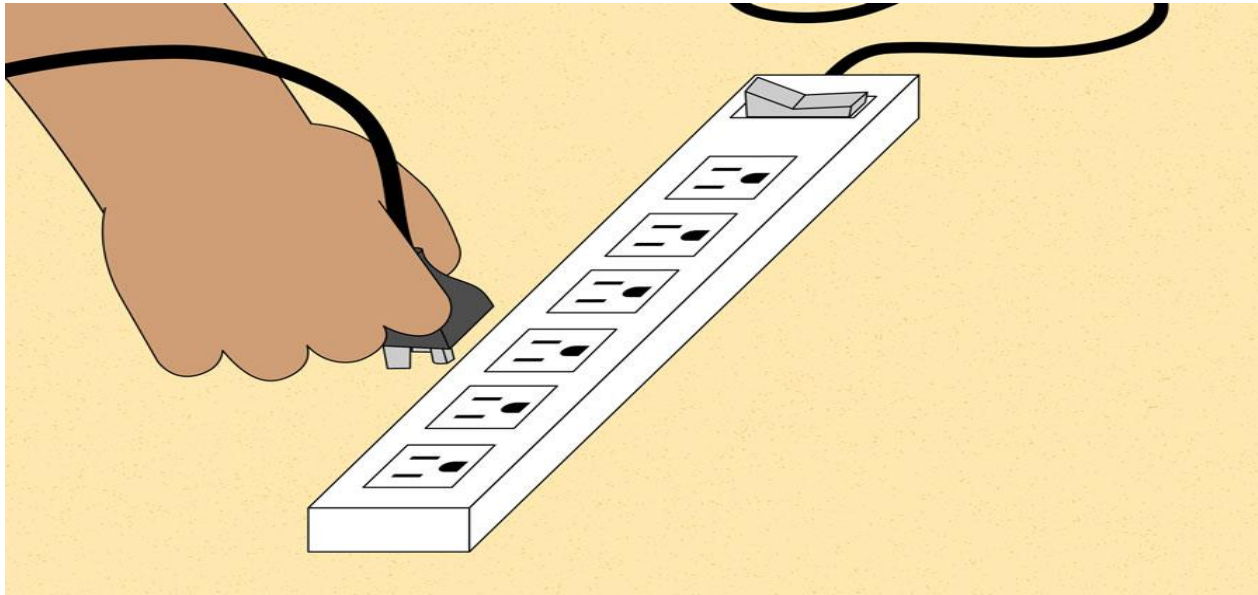
- **Solution 4**: If you are using a **laptop**, the **battery** may not be charged. Plug the **AC adapter** into the wall, then try to turn on the laptop. If it still doesn't start up, you may need to wait a few minutes and try again.
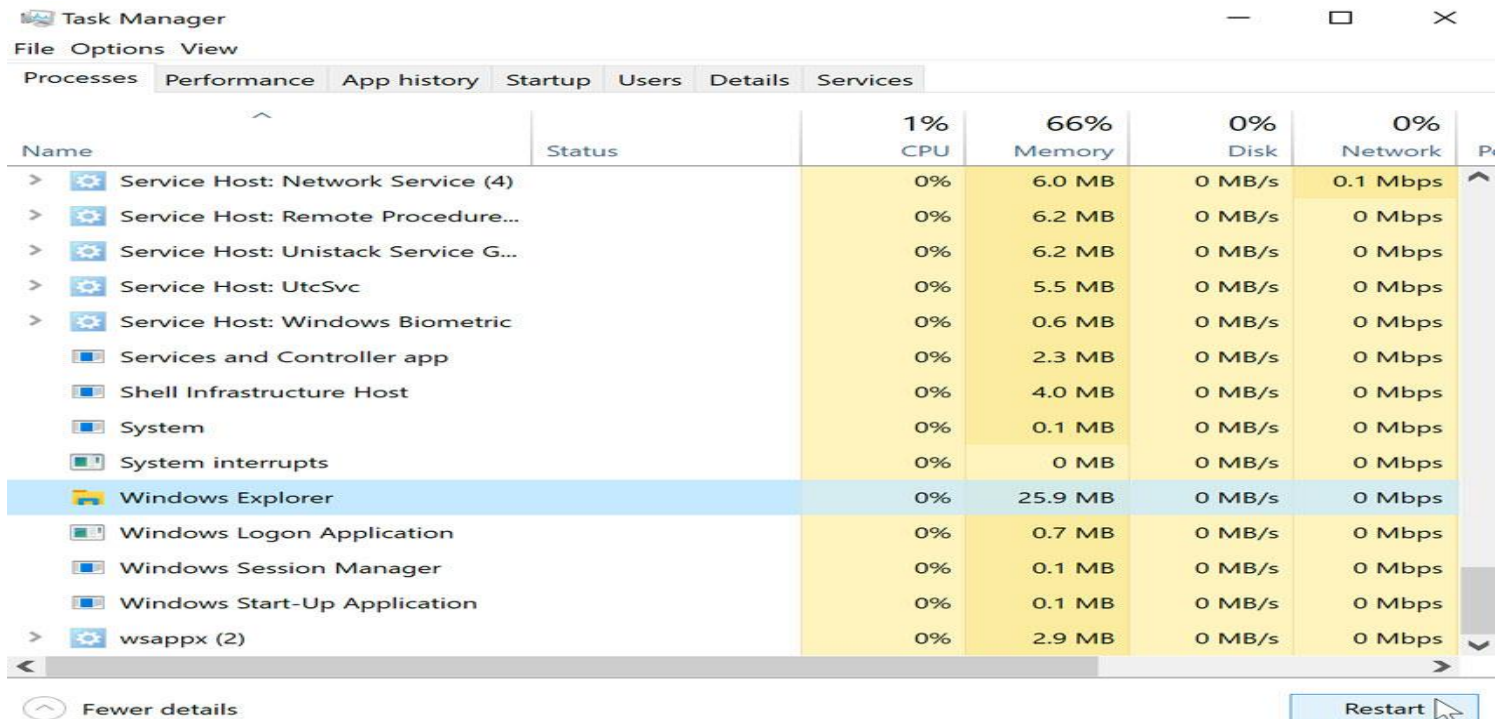
Problem: An application is running slowly

- **Solution 1**: Close and reopen the application.
- **Solution 2**: Update the application. To do this, click the **Help** menu and look for an option to check for **Updates**. If you don't find this option, another idea is to run an online search for application updates.
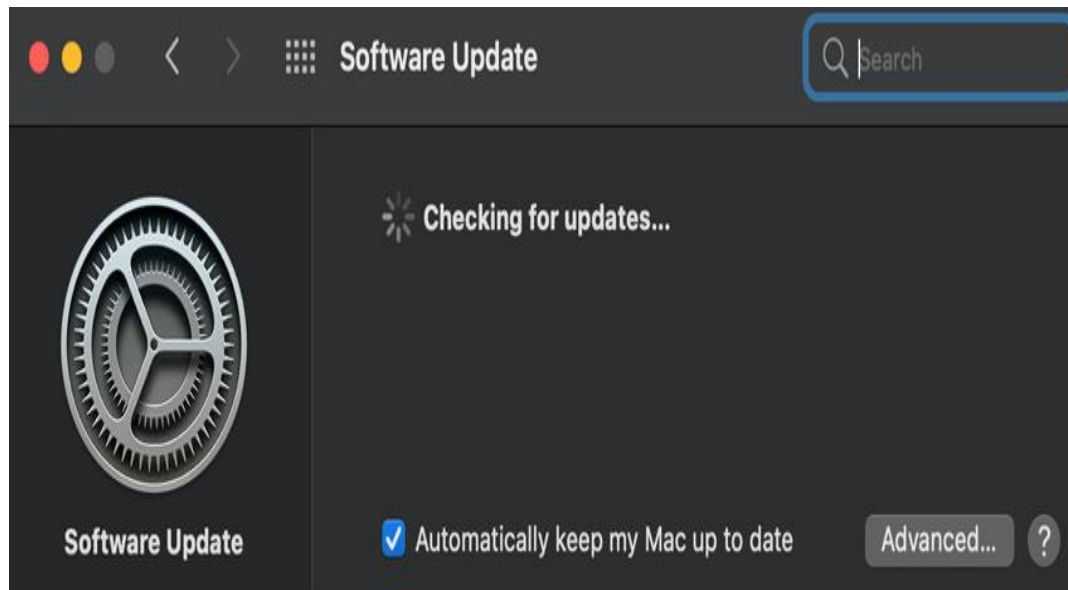
Problem: An application is frozen

- **Solution 1 (Windows only)**: Restart Windows Explorer. To do this, press and hold **Ctrl+Alt+Delete** on your keyboard to open the **Task Manager**. Next, locate and select **Windows Explorer** from the **Processes** tab and click **Restart**. You may need to click **More Details** at the bottom of the window to see the Processes tab.

- **Solution 2 (Mac only):** Restart Finder. To do this, press and hold **Command+Option+Esc** on your keyboard to open the **Force Quit Applications** dialog box. Next, locate and select **Finder**, then click **Relaunch**.
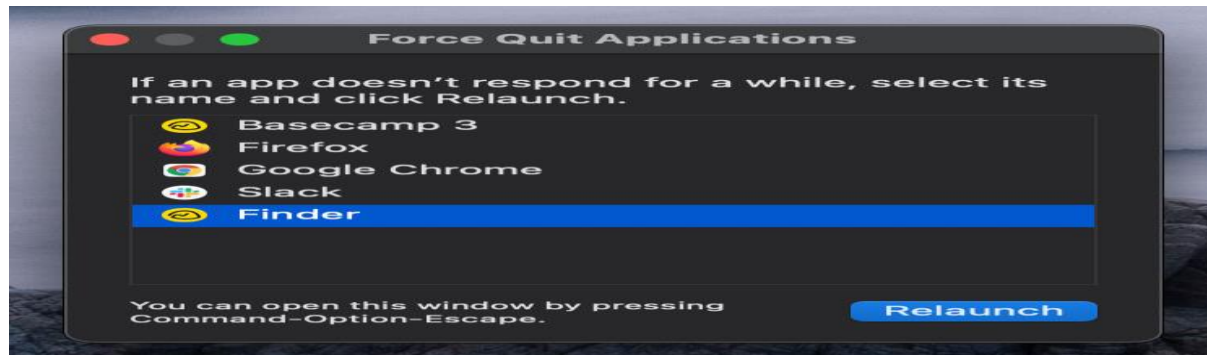
- **Solution 3**: Press and hold the Power button. The Power button is usually located on the front or side of the computer, typically indicated by the **power symbol**. Press and hold the Power button for **5 to 10 seconds** to force the computer to shut down.

- **Solution 4**: If the computer still won't shut down, you can **unplug the power cable** from the electrical outlet. If you're using a laptop, you may be able to remove the battery to force the computer to turn off. **Note**: This solution should be your **last resort** after trying the other suggestions above.

Problem: All programs on the computer run slowly

- **Solution 1**: Run a **virus scanner**. You may have **malware** running in the background that is slowing things down.

- **Solution 2**: Your computer may be running out of hard drive space. Try **deleting** any files or programs you don't need.

- **Solution 3**: If you're using a **PC**, you can run **Disk Defragmenter**. To learn more about **Disk Defragmenter**, check out our lesson on **Protecting Your Computer**.

Problem: The mouse or keyboard has stopped working

- **Solution 1**: If you're using a **wired** mouse or keyboard, make sure it's correctly plugged into the computer.

- **Solution 2**: If you're using a **wireless** mouse or keyboard, make sure it's turned on and that its batteries are charged.
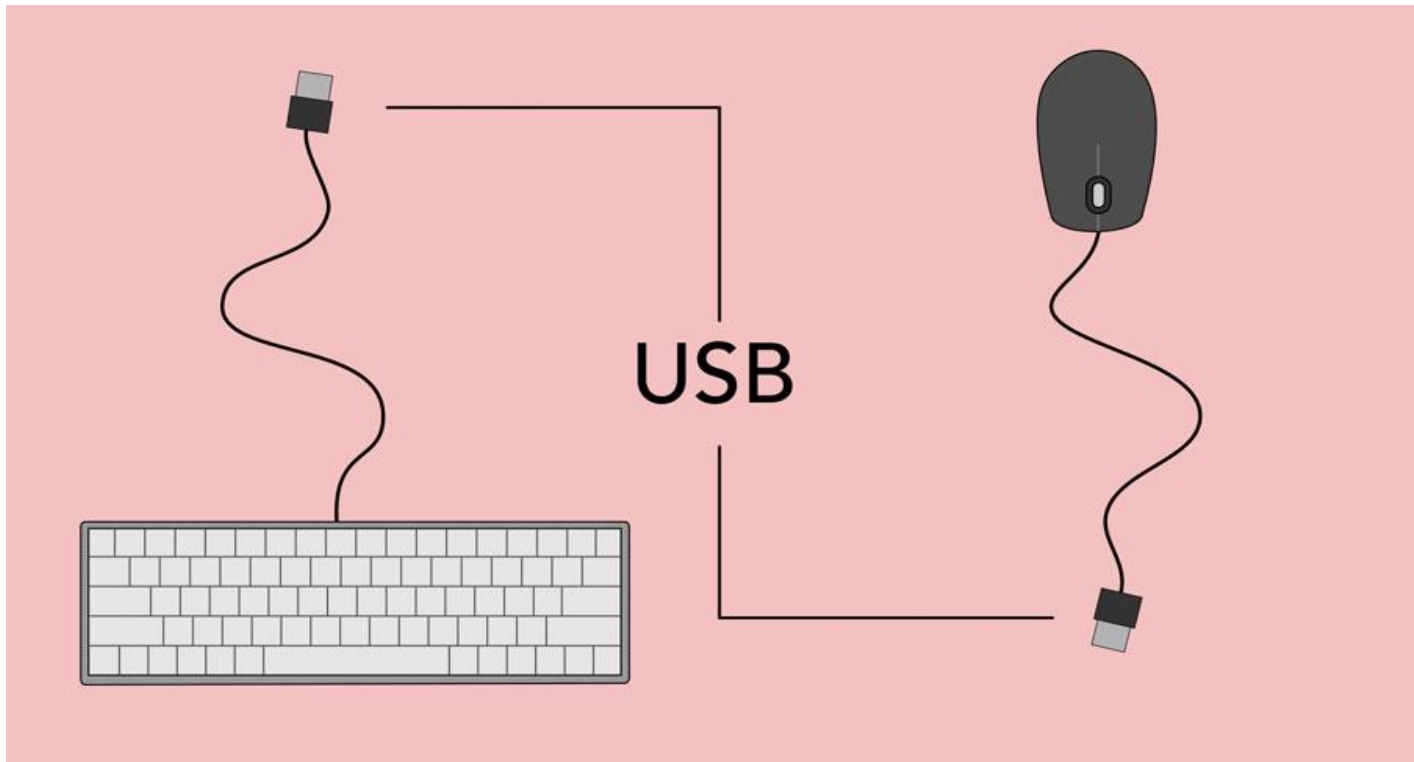
Problem: The sound isn't working

- **Solution 1**: Check the volume level. Click the audio button in the top-right or bottom-right corner of the screen to make sure the sound is turned on and that the volume is up.

- **Solution 2**: Check the audio player controls. Many audio and video players will have their own separate audio controls. Make sure the sound is turned on and that the volume is turned up in the player.

- **Solution 3**: Check the cables. Make sure external speakers are plugged in, turned on, and connected to the correct audio port or a USB port. If your computer has **color-coded** ports, the audio output port will usually be **green**.

- **Solution 4**: Connect headphones to the computer to find out if you can hear sound through the headphones.
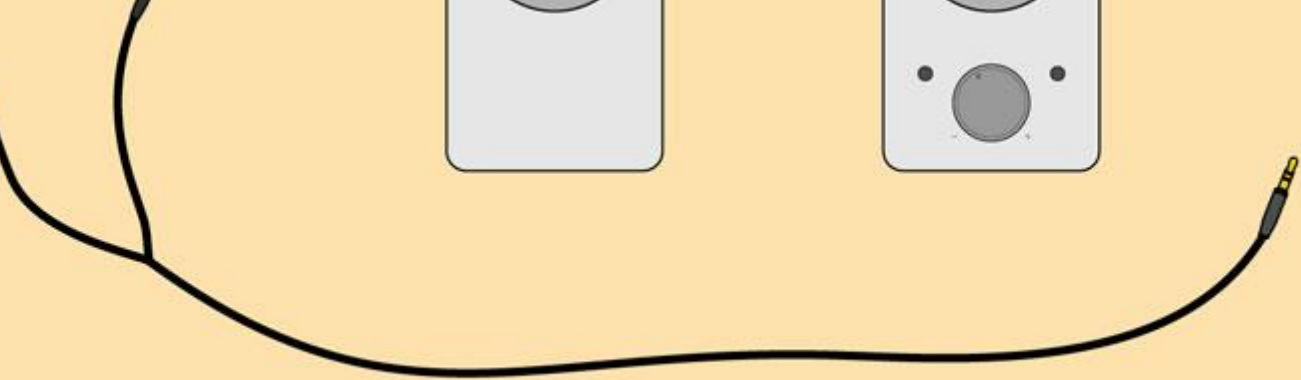
Problem: The screen is blank

- **Solution 1**: The computer may be in **Sleep** mode. Click the mouse or press any key on the keyboard to wake it.

- **Solution 2**: Make sure the monitor is **plugged in** and **turned on**.

- **Solution 3**: Make sure the computer is **plugged in** and **turned on**.

- **Solution 4**: If you're using a desktop, make sure the monitor cable is properly connected to the computer tower and the monitor.

Problem : The printer is not working

- First, you check the printer to see that it's turned on and plugged in to the **surge protector**. It is, so that's not the issue. Next, you check to make sure the printer's **ink cartridge** still has ink and that there is paper loaded in the **paper tray**. Things look good in both cases, so you know the issue has nothing to do with ink or paper.

- Now you want to make sure the printer and computer are **communicating correctly**. If you recently downloaded an **update to your operating system**, it might interfere with the printer. But you know there haven't been any recent updates and the printer was working yesterday, so you'll have to look elsewhere.

- You check the printer's **USB cord** and find that it's not plugged in. You must have unplugged it accidentally when you plugged something else into the computer earlier. Once you plug in the USB cord, the printer starts working again. It looks like this printer issue is solved!

- This is just one example of an issue you might encounter while using a computer. In the rest of this lesson, we'll talk about other common computer problems and some ways to solve them.