

# Emerging Technologies Lecture 5 Notes

Posted in 9 Computer Science



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## Definition [Emerging Technologies]

Same as we did in lecture 1.

# Implications of AI and IoT

## 1. Risks and Challenges

### Data Privacy

AI and IoT devices collect large amounts of data. Personal and sensitive information can be misused or accessed by unauthorized users.

**Example:** Smart home devices recording daily routines could leak personal info if hacked.

### Algorithmic Bias

AI systems learn from data. If the data contains bias, the AI may produce unfair or incorrect decisions.

**Example:** A loan system may approve loans for people who should not get them and reject loans for people who actually deserve them due to biased data.

## 2. Policy and Regulatory Measures

Governments and organizations implement rules and standards to reduce risks:

- **Data Protection Laws:** Protect personal information. *Example:* GDPR in Europe ensures secure handling of data.
- **Ethical Guidelines:** Ensure fairness, transparency, and accountability in AI systems. *Example:* Designing an AI system that does not favor any group and makes decisions based on clear and unbiased rules.
- **Bias Mitigation Standards:** Identify and reduce biases in AI training and predictions. *Example:* Training AI with data from different groups to ensure fair and balanced decisions.
- **Security Standards:** Protect IoT devices through updates, encryption, and secure authentication. *Example:* Using strong passwords and encrypted communication for smart home devices.

## 3. Societal Impact and Adaptation

### Daily Life

AI and IoT make everyday life easier, safer, and more efficient:

- Smart thermostats automatically adjust home temperature for comfort and energy saving
- Wearable devices track health data and send alerts in case of emergencies
- Smart security systems allow users to monitor and control their homes remotely
- Smart assistants help with daily tasks using voice commands

### Work Environments

AI and IoT improve productivity by automating tasks and helping in better decision-making:

- IoT sensors in factories monitor machines and help prevent breakdowns
- AI systems analyze data to improve work processes and use resources efficiently
- Automation reduces manual work so employees can focus on important tasks

### Society at Large

Emerging technologies help solve big problems:

- Smart cities use IoT to reduce traffic congestion, manage energy consumption, and improve public services.
- Healthcare systems leverage AI for predictive diagnostics and treatment optimization.
- IoT in agriculture increases crop yields and resource efficiency through precision farming.

## Multiple Choice Questions (MCQs) on AI and IoT Implications

### 1. What is a major risk of AI and IoT devices?

- a. Faster internet speed
- b. Data privacy issues
- c. Better gaming experience
- d. Less storage usage

**Answer: b. Data privacy issues**

### 2. What can happen if IoT devices are hacked?

- a. They become faster
- b. Personal data may be leaked
- c. Internet becomes free
- d. Devices stop using electricity

**Answer: b. Personal data may be leaked**

### 3. What is algorithmic bias?

- a. Faster computing
- b. Fair decision making
- c. Unfair or incorrect AI decisions due to biased data
- d. Internet speed problem

**Answer: c. Unfair or incorrect AI decisions due to biased data**

### 4. What is an example of algorithmic bias?

- a. Smart lighting system
- b. Loan system unfairly approving or rejecting applications
- c. Weather forecasting
- d. Mobile charging