

ST. ANNE'S COLLEGE OF ENGINEERING AND TECHNOLOGY

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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CCS345-ETHICS AND AI

III Year / VI Semester

Question Bank

UNIT – I To 5

UNIT-1

PART-A

1. What is AI – and what is intelligence?

'Artificial Intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications). Definition is that intelligent behaviour is 'doing the right thing at the right time'.

2. State three common features of AI:

Three common features of AI:

- (1) 'a property that an individual agent has as it interacts with its environment or environments',
- (2) 'related to the agent's ability to succeed or profit with respect to some goal or objective',
- (3) 'depends on how able that agent is to adapt to different objectives and environments.'

3. List out the Applications of AI

1. physical **robot** its environment is the real world, which can be a human environment (for social robots),
2. a city street (for an autonomous vehicle),
3. a care home or hospital (for a care or assisted living robot), or a workplace (for a workmate robot).

4. Define machine learning and its types.

Machine learning is the term used for AIs which are capable of learning or, in the case of robots, adapting to their environment.

Two categories

1. Supervised : Supervised learning systems generally make use of **Artificial Neural Networks (ANNs)**, which are trained by presenting the ANN with inputs (for instance, images of animals) each of which is tagged (by humans) with an output (i.e. giraffe, lion, gorilla). This set of inputs and matched outputs is called a training data set. After training, an ANN should be able to identify which animal is in an image it is presented with (i.e. a lion), even though that particular image with a lion wasn't present in the training data set.
2. Unsupervised learning: unsupervised learning has no training data; instead, the AI (or robot) must figure out on its own how to solve a particular task (i.e. how to navigate successfully out of a maze), generally by trial and error.

Deep learning simply refers to (typically) supervised machine learning systems with large (i.e. many-layered) ANNs and large training data sets.

5. Define Morality

Morality in AI: Morality is about knowing what's right and wrong. In AI, it means thinking

about whether it's okay to create machines that can make decisions on their own. We need to make sure these machines don't harm people, treat everyone fairly, and follow the rules we set for them.

6. What is meant by ethics?

Ethics are moral principles that govern a person's behaviour or the conduct of an activity. AI ethics is a system of moral principles and techniques intended to inform the development and responsible use of artificial intelligence technology

7. How does AI impact trust in various context?

AI impacts trust in various contexts by requiring users to calibrate their expectations with AI capabilities, fostering trust through transparency and explainability, and potentially undermining trust if AI systems lack accountability or exhibit bias.

8. What are the 3 main types of environmental issues?

- ☑ Use of natural resources
- ☑ Pollution and waste
- ☑ Energy concerns

9. State Tort law

Tort law covers situations where one person's behaviour causes injury, suffering, unfair loss, or harm to another person. This is a broad category of law that can include many different types of personal injury claims.

Tort laws serve two basic, general purposes:

- 1) to compensate the victim for any losses caused by the defendant's violations;
- 2) to deter the defendant from repeating the violation in the future.

10. State the 3 scenarios of based on Impact on legal system.

1. Perpetrator-via-another
2. Natural-probable-consequence.
3. Direct liability.

11. What is a major challenge of AI Related to ethics and societal impact?

A major challenge of AI related to ethics and societal impact is bias and discrimination. AI systems can unintentionally reflect or amplify existing social biases present in the data they are trained on, leading to unfair treatment of individuals or groups.

12. What is the principle of AI?

The principle of AI is to create machines or systems that can mimic human intelligence, including learning, reasoning, problem-solving, perception, and language understanding, to perform tasks that typically require human intelligence.

13. Different supervised and unsupervised learning.

Supervised learning systems	Unsupervised learning
Supervised learning systems generally make use of Artificial Neural Networks (ANNs), - Trained by presenting the ANN with inputs (for instance, images of animals) each of which is tagged (by humans) with an output (i.e. giraffe, lion, gorilla). - <u>This set of inputs and matched outputs is called a training data set.</u>	Unsupervised learning has <u>no training data</u>; -The AI (or robot) must figure out on its own how to solve a particular task -Generally by trial and error.

14. Define deep learning.

Deep learning is a subset of machine learning that uses artificial neural networks with multiple layers to automatically learn and extract features from large amounts of data. It is especially effective for tasks like image recognition, natural language processing, and speech recognition.

15. State Kant's principle

Kant's principle, based on the philosophy of Immanuel Kant, is often referred to as the "Categorical Imperative." A key version of it states:

"Act only according to that maxim whereby you can at the same time will that it should become a universal law."

16. List out impact of AI in society

Improved Healthcare – AI assists in diagnosis, personalized treatment, and drug discovery.

Enhanced Education – Adaptive learning platforms and virtual tutors personalize education.

Automation of Jobs – Increases efficiency but may lead to job displacement.

Smart Cities – AI helps in traffic management, energy use, and public safety.

Data Privacy Concerns – Collection and analysis of personal data raise privacy issues.

Bias and Discrimination – AI can reflect societal biases, leading to unfair decisions.

Economic Growth – AI drives innovation and productivity, boosting economic development.

Security and Surveillance – Improved monitoring but raises ethical and privacy questions.

Environmental Impact – AI helps in climate modeling and resource optimization.

Social Interaction – Virtual assistants and AI-driven social platforms change communication.

In simple terms, it means you should act in a way that you would want everyone else to act in a similar situation — promoting universal moral rules.

17. List out impact of AI in human psychology

Reduced Human Interaction – Overreliance on AI (e.g., virtual assistants) may decrease face-to-face communication and social skills.

Mental Health Concerns – Social media algorithms driven by AI can contribute to anxiety, depression, and low self-esteem.

Job Insecurity and Stress – Fear of job loss due to automation can lead to stress and anxiety.

Trust Issues – Difficulty in understanding AI decisions can lead to mistrust or overtrust in AI systems.

Behavioral Manipulation – AI-driven ads and content curation can influence behavior and decision-making subconsciously.

Dependency – Heavy reliance on AI tools may reduce critical thinking and problem-solving skills.

Improved Mental Health Support – AI chatbots and therapy apps can provide accessible mental health support and reduce stigma.

Cognitive Overload – The constant flow of AI-curated information may overwhelm users, affecting concentration and mental clarity.

18. Define Algorithmic trading.

Algorithmic trading is the use of computer programs and algorithms to execute financial trades automatically based on predefined criteria such as price, timing, and volume. It aims to execute orders faster and more efficiently than human traders, often taking advantage of small market fluctuations.

19. List out the impacts of AI on the environment and the planet

Climate Change Modeling – AI helps predict climate patterns and assess the impact of global warming. Energy Efficiency – AI optimizes energy use in buildings, factories, and smart grids to reduce waste.

Wildlife Conservation – AI supports monitoring and protecting endangered species through image and sound recognition.

Pollution Control – AI detects and monitors air, water, and soil pollution for quicker response.

Disaster Management – AI predicts natural disasters like floods, earthquakes, and wildfires, aiding in early warning and response.

20. List out the impacts of AI on the trust.

Trust in Automation – AI can increase trust when it performs tasks accurately and efficiently.

Loss of Human Trust – Lack of transparency in AI decision-making can reduce trust in systems. Overtrust in AI – People may rely too heavily on AI, even when it's wrong or biased.

Erosion of Social Trust – Deepfakes and misinformation generated by AI can damage public trust.

Part B&C

- 1) Explain how the influence effect on Human Psychology?
- 2) Compare and contrast the ethical consideration of AI in developed & developing countries?
- 3) Explain how the environment and planet are impacted.
- 4) Explain how the legal systems handles ethical challenges posed by AI?
- 5) Impact of AI society, including both positive and negative aspects.
- 6) How does AI impact in various context, such as healthcare, finance and social media?

UNIT II ETHICAL INITIATIVES IN AI PART A

1. What are ethical issues and concerns?

AI should be researched, developed, designed, deployed, monitored, and used in an ethical manner – but each has different areas of priority. This section will include analysis and grouping of the initiatives above, by type of issues they aim to address, and then outline some of the proposed approaches and solutions to protect from harms.

2. State some international initiatives

Other key international developments: current and historical				
The Montréal Declaration	Canada	The socially responsible development of AI, bringing together 400 participants across all sectors of society to identify the ethical and moral challenges in the short and long term. Key values: well-being, autonomy, justice, privacy, knowledge, democracy, and accountability.	'Top 10 Principles for Ethical AI'	Université de Montréal with the support of the Fonds de recherche en santé du Québec and the Palais des congrès de Montréal.
The UNI Global Union	Switzerland	Worker disruption and transparency in the application of AI, robotics, and data and machine learning in the workplace. Safeguarding workers' interests and maintaining human control and a healthy power balance.		unknown
The European Robotics Research Network (EUROCN)	Europe (Coordinator based in Sweden)	Research co-ordination, education and training, publishing and meetings, industrial links and international links in robotics.	'Roboethics Roadmap'	European Commission (2000-2004)
The European Robotics Platform (EUROP)	Europe	Bringing European robotics and AI community together. Industry-driven, focus on competitiveness and innovation.		European Commission

3. How the robot is used in healthcare?

AI robots are revolutionizing healthcare by assisting in surgery, rehabilitation, patient monitoring, and logistics, enhancing precision, efficiency, and patient care.

Here's a more detailed look at their uses:

Surgical Procedures:

Robotic-assisted surgery:

Systems like the da Vinci Surgical System allow surgeons to perform complex surgeries with enhanced dexterity and control, improving precision, reducing recovery times, and minimizing complications.

Minimally invasive procedures:

Robots enable surgeons to perform delicate procedures with minimal invasiveness, reducing the risk of complications and promoting faster recovery times.

AI-powered robots:

AI-powered robots can analyze data in real-time, provide detailed images, suggest surgical approaches, and execute incisions with sub-millimeter accuracy.

Automated tasks:

AI models are being used to automate surgical tasks and enhance intraoperative safety, such as suturing and tissue dissection.

Rehabilitation Therapies:

Robotic exoskeletons and therapy robots:

These assist patients in regaining mobility and strength, facilitating more consistent and effective therapy sessions for conditions like stroke, spinal cord injuries, and other mobility impairments.

Monitoring patient form:

Robots can monitor a patient's form as they perform exercises, measure degrees of motion, and track progress.

4. List out the benefits of Autonomous vehicles.

Autonomous vehicles offer numerous benefits, including enhanced safety, reduced traffic congestion, increased accessibility for those with mobility limitations, and improved efficiency, ultimately leading to a more sustainable and convenient transportation system.

5. How AI affecting warfare?

AI is profoundly impacting warfare, enabling faster decision-making, enhanced precision in targeting, and potentially leading to autonomous weapons systems, while also raising ethical and strategic concerns about the militarization of AI

6. What is the example of real time application of AI ethics?

A real-time application of AI ethics could be a system that monitors and flags potential biases in AI-powered recruitment tools, ensuring that hiring decisions are fair and unbiased, or a system that ensures patient data privacy in AI-driven healthcare applications.

7. Why are autonomous weapons unethical?

Autonomous weapons are considered unethical primarily because they lack human judgment and accountability, potentially leading to unintended consequences, violations of the laws of war, and a diminished sense of human dignity.

8. State some of the key ethical concerns include:

Human Rights Violations – Issues such as child labor, human trafficking, political oppression, and restrictions on freedom of speech and expression.

Climate Change and Environmental Degradation – Industrial pollution, deforestation, carbon emissions, and exploitation of natural resources without sustainable practices.

Economic Inequality – The widening gap between wealthy and poor nations, unfair trade policies, and exploitation of workers in developing countries by multinational corporations.

Global Health Inequities – Limited access to healthcare, unethical drug trials in poorer nations, and unequal vaccine distribution.

9. Define weaponization.

The weaponization of AI is one of the biggest threats facing the international community. Weaponized AI technologies do not face the same barriers as human soldiers, allowing them to traverse all kinds of terrain and be utilized in all areas of typical warfare.

10. Give the 6 level of autonomous vehicles

0	No automation	An automated system may issue warnings and/or momentarily intervene in driving, but has no sustained vehicle control.
1	Hands on	The driver and automated system share control of the vehicle. For example, the automated system may control engine power to maintain a set speed (e.g. Cruise Control), engine and brake power to maintain and vary speed (e.g. Adaptive Cruise Control), or steering (e.g. Parking Assistance). The driver must be ready to retake full control at any time.
2	Hands off	The automated system takes full control of the vehicle (including accelerating, braking, and steering). However, the driver must monitor the driving and be prepared to intervene immediately at any time.
3	Eyes off	The driver can safely turn their attention away from the driving tasks (e.g. to text or watch a film) as the vehicle will handle any situations that call for an immediate response. However, the driver must still be prepared to intervene, if called upon by the AV to do so, within a timeframe specified by the AV manufacturer.
4	Minds off	As level 3, but no driver attention is ever required for safety, meaning the driver can safely go to sleep or leave the driver's seat.
5	Steering wheel optional	No human intervention is required at all. An example of a level 5 AV would be a robotic taxi.

11) Define international ethical initiatives in AI

International ethical initiatives in AI are collaborative efforts by governments, organizations, and experts worldwide to establish guidelines, principles, and frameworks that promote the responsible, fair, and transparent development and use of artificial intelligence. These initiatives aim to address ethical concerns like privacy, bias, accountability, and human rights to ensure AI benefits all of humanity.

12) What is the example of real time application of AI ethics?

A real-time example of AI ethics in practice is content moderation on social media platforms. AI algorithms automatically detect and remove harmful or inappropriate content while aiming to respect freedom of speech and avoid unfair censorship, balancing ethical concerns like fairness, privacy, and transparency.

13) What are ethical concerns in healthcare rob

Ethical concerns in healthcare robots include:

Privacy – Ensuring patient data collected by robots is kept confidential and secure.

Safety – Guaranteeing that robots operate safely without causing harm to patients.

Autonomy – Respecting patients' rights to make decisions without undue influence from robots.

Accountability – Determining who is responsible if a robot makes a mistake or causes harm.

Bias – Avoiding discrimination in robot interactions based on age, gender, or ethnicity.

Emotional Impact – Addressing the psychological effects of patients interacting with robots instead of humans.

14) List out the ethical harms and concerns

Bias and Discrimination – AI may reinforce social, racial, or gender biases present in training data.

Privacy Violation – Unauthorized collection, use, or misuse of personal data.

Lack of Transparency – AI decisions may be opaque, making it hard to understand or challenge outcomes.

Accountability Issues – Difficulty in identifying who is responsible when AI causes harm or makes errors.

Job Displacement – Automation may lead to unemployment or loss of livelihood for certain workers.

Manipulation and Misinformation – Use of AI in generating fake news, deepfakes, or targeted

15) What are the list of health care robot?

Surgical Robots – Assist surgeons in performing precise and minimally invasive surgeries (e.g., da Vinci Surgical System).

Rehabilitation Robots – Help patients recover physical functions through guided exercises (e.g., Lokomat for gait training).

Robotic Prosthetics – AI-powered artificial limbs that mimic natural movement.

Exoskeletons – Wearable robotic suits that aid mobility for disabled or injured patients (e.g., ReWalk).

Telepresence Robots – Allow doctors to remotely interact with patients (e.g., VGo, RP-Vita).

16) Define autonomous vehicles

Autonomous vehicles, also known as self-driving cars, are vehicles equipped with sensors, cameras, artificial intelligence (AI), and control systems that enable them to navigate and operate without human intervention. They can perceive their environment, make driving decisions, and control movement, aiming to improve road safety, efficiency, and convenience.

17) Define health care robots

Healthcare robots are robotic systems designed to assist in medical and healthcare tasks, such as surgery, rehabilitation, patient care, diagnostics, and hospital logistics. These robots use technologies like artificial intelligence, sensors, and automation to improve the quality, efficiency, and safety of healthcare services for both patients and medical professionals.

18) What is the concept of weaponization?

Weaponization is the process of developing or modifying tools, technologies, or systems to be used as weapons in conflict or warfare. In the context of AI, weaponization refers to using artificial intelligence in military applications, such as autonomous drones, surveillance systems, or cyberweapons, which can raise serious ethical, legal, and security concerns.

19) What is the example of weaponization of AI?

An example of the weaponization of AI is the use of autonomous combat drones, such as AI-powered drones that can identify, track, and attack targets without direct human control. These systems use machine learning, computer vision, and decision-making algorithms to operate in combat zones, raising concerns about accountability, civilian safety, and the ethics of lethal autonomous weapons.

20) List out the uses of AI in national security

Surveillance and Monitoring – AI analyzes video and audio feeds to detect threats and unusual activities.

Cybersecurity – AI identifies and responds to cyber threats in real-time by detecting malware, intrusions, and anomalies.

Autonomous Weapons – AI powers drones, robots, and other systems for surveillance, targeting, and combat operations.

Border Security – AI assists in monitoring borders using facial recognition, motion detection, and predictive analytics.

Threat Detection – AI predicts and assesses potential terrorist activities or security threats using data analysis.

Part B&C

- 1) Analyze a case study on the ethical challenges of autonomous vehicle
- 2) Assess the ethical concerns in the deployment of AI in healthcare, considering both benefits and risks.
- 3) How do the ethical implications of AI manifest in the context of warfare and weaponization?
- 4) Analyze Effectiveness of international ethical initiatives in addressing the challenges of AI.
- 5) Analyze a case study on the ethical challenges of weapons

UNIT III AI STANDARDS AND REGULATION

PART A

1) What is concept of operation?

Concept of Operation (CONOPS) in AI refers to a high-level description of how an AI system will be used to achieve specific goals within a real-world context. It outlines the operational goals, user interactions, system behavior, and roles of both humans and AI, helping stakeholders understand how the AI system will function in practice.

2) List out the activities and tasks Model process for Addressing Ethical concerns during system design.

Identify Ethical Concerns

Analyze potential risks (e.g., bias, privacy, misuse). Engage stakeholders to gather ethical viewpoints.

Define Ethical Requirements

Translate ethical concerns into clear, actionable system requirements. Ensure compliance with laws and ethical guidelines.

Design for Ethics

Integrate fairness, transparency, accountability, and privacy into system design. Include mechanisms for user consent and data protection.

Implement Ethical Safeguards

Apply technical solutions like bias mitigation algorithms, explainability features, and access controls.

Use secure data handling practices. Conduct

Ethical Impact Assessment

Assess short- and long-term effects of the system on individuals and society. Use ethical auditing tools or expert reviews.

Test and Validate

Test the system for unintended bias, reliability, and user safety. Collect feedback from diverse user groups.

Deploy with Oversight

Monitor real-world use for ethical risks.

Establish procedures for reporting and correcting ethical issues. Continuous

Improvement

Update the system based on new ethical insights, user feedback, and legal changes. Maintain transparency and accountability through regular audits and reviews.

3) Define the scope of Transparency of Autonomous systems?

The scope of transparency of autonomous systems refers to the extent to which these systems are designed to provide clear, understandable information about their operations, decisions, and underlying processes to users and stakeholders. It includes:

How and why the system makes specific decisions (decision-making logic). Access to data sources and algorithms used by the system.

Visibility into system limitations and uncertainties.

Clear communication of the system's goals, actions, and potential risks. Mechanisms for users to question, interpret, or override decisions when necessary.

4) What are the ethical issues considered during the engineering design process?

Ethical issues considered during the engineering design process include: Safety

– Ensuring the design does not cause harm to users or the environment. Privacy –

Protecting user data and maintaining confidentiality.

Fairness and Non-Discrimination – Avoiding bias that could lead to unfair treatment of individuals or groups.

Transparency – Making system functions and decisions understandable to users. Accountability

– Defining who is responsible for the system's actions and failures. Sustainability – Considering environmental impact and resource use.

Informed Consent – Ensuring users understand how the system works and agree to its use. Accessibility –

Designing for inclusivity so all users can benefit from the technology.

Security – Protecting the system from malicious attacks and unauthorized access.

Human Autonomy – Respecting users' ability to make their own decisions without undue influence from the system.

5) Explain scope of Data privacy process?

Data Collection: Ensuring only necessary data is collected with user consent and transparency about purpose.

Data Storage: Securely storing data to prevent unauthorized access or breaches.

Data Usage: Using data only for stated purposes and avoiding misuse or secondary use without consent.

Data Sharing: Controlling how data is shared with third parties, ensuring they comply with privacy standards.

Data Retention and Deletion: Keeping data only as long as needed and properly deleting it afterward.

User Rights: Enabling individuals to access, correct, or delete their data and control its use.

Compliance: Adhering to legal and regulatory requirements related to data protection (e.g., GDPR).

Monitoring and Auditing: Regularly checking privacy practices and responding to breaches or violations.

6) Define Regulatory compliance

Regulatory compliance is the process of ensuring that a system, organization, or product adheres to all applicable laws, regulations, standards, and guidelines set by government bodies or industry authorities. In the context of AI and technology, it involves designing and operating systems in ways that meet legal requirements related to safety, privacy, fairness, security, and ethical use.

7) What are the two types of data privacy?

The two types of data privacy are:

Information Privacy – Protecting personal information from unauthorized access or disclosure.

Communication Privacy – Ensuring the confidentiality of communication between individuals or systems, such as emails, messages, or calls.

8) What are the 4-basic principle of data privacy?

The 4 basic principles of data privacy are:

Consent – Collect and use personal data only with the individual's informed permission. Purpose Limitation – Use data only for the specific purposes stated at the time of collection. Data Minimization – Collect only the data that is necessary for the intended purpose.

Security – Protect data from unauthorized access, loss, or breaches through appropriate safeguards.

9) What is Advantage of data privacy?

The advantage of data privacy is that it protects individuals' personal information from misuse, unauthorized access, and breaches, which helps to build trust between users and organizations, maintain confidentiality, prevent identity theft and fraud, and ensure compliance with legal regulations, ultimately promoting ethical and secure data handling.

10) Define Algorithmic bias consideration?

Algorithmic bias consideration refers to the process of identifying, understanding, and addressing biases that may exist in AI algorithms. These biases can arise from biased training data, flawed assumptions, or design choices, leading to unfair or discriminatory outcomes.

Considering algorithmic bias involves efforts to detect, mitigate, and prevent such biases to ensure that AI systems are fair, transparent, and equitable for all users.

11) Define ontological standards for ethically driven robotics?

Ontological standards for ethically driven robotics refer to the formal frameworks and guidelines that define the nature, existence, and relationships of entities and concepts involved in robotic systems to ensure they behave ethically. These standards help establish clear definitions of responsibilities, decision-making processes, and moral considerations embedded within robots, enabling consistent, transparent, and accountable ethical behavior in robotics design and deployment.

12) Define Data Breach Response plan

A Data Breach Response Plan is a predefined set of procedures and actions that an organization follows to quickly detect, contain, and respond to a data breach—an incident where sensitive, confidential, or personal data is accessed or disclosed without authorization. The plan aims to minimize damage, protect affected individuals, comply with legal requirements, and restore normal operations effectively.

13) How to detect bias in AI?

Analyze Training Data – Check if the data is representative and free from skewed or unbalanced samples related to gender, race, age, etc.

Evaluate Model Outputs – Test the AI system on diverse groups to see if outcomes disproportionately favor or harm certain populations.

Use Fairness Metrics – Apply statistical measures like demographic parity, equal opportunity, or disparate impact to quantify bias.

Conduct Audits – Perform independent reviews and ethical audits of AI algorithms and datasets. Involve

Diverse Stakeholders – Include experts and affected communities to identify potential biases.

Simulate Real-world Scenarios – Test AI in varied, realistic contexts to uncover hidden biases.

14) What are different types of bias in AI?

Data Bias – When training data is unrepresentative, incomplete, or skewed, causing the AI to learn biased patterns.

Algorithmic Bias – Bias introduced by the design or assumptions within the AI model or algorithms.

Measurement Bias – Errors or inconsistencies in data collection methods that affect data quality.

Confirmation Bias – When AI systems reinforce existing beliefs by focusing on data that confirms prior assumptions.

Sampling Bias – Occurs when certain groups are overrepresented or underrepresented in the training data.

Label Bias – When the labels or annotations in training data reflect subjective or biased judgments.

Observer Bias – Bias introduced by those who collect or interpret data, often unintentionally.

Deployment Bias – When AI behaves differently in real-world settings than during development due to context differences.

Exclusion Bias – Leaving out relevant data or groups, leading to incomplete learning. Interaction Bias – Bias that emerges from interactions between users and AI systems over time.

15) list out the activities and tasks Model process for Addressing Ethical Concerns During System Design

Identify Ethical Issues

Analyze potential risks such as bias, privacy breaches, and misuse. Engage stakeholders to gather diverse ethical perspectives.

Define Ethical Requirements

Translate ethical concerns into clear, actionable system requirements. Ensure compliance with relevant laws and standards.

Incorporate Ethical Design Principles

Integrate fairness, transparency, accountability, and privacy into system architecture. Design for user consent and control over data.

Develop Ethical Safeguards

Implement technical measures like bias mitigation algorithms and security controls. Establish data protection and access policies.

Conduct Ethical Impact Assessments

Evaluate potential social and individual impacts before deployment. Use audits or reviews by ethics experts.

Test for Ethical Compliance

Perform testing to detect bias, errors, and unintended consequences. Gather feedback from diverse user groups.

Deploy with Ethical Oversight

Monitor system behavior post-deployment for ethical issues. Set up mechanisms for reporting and correcting problems.

Continuous Ethical Improvement

Update the system based on new ethical insights, regulations, and user feedback. Maintain transparency through documentation and communication.

16) Why is transparency important in the development and deployment of autonomous system such as robots and AI?

Builds Trust – When users understand how the system works and makes decisions, they are more likely to trust and accept it.

Ensures Accountability – Clear information about system operations helps identify who is responsible for actions or errors.

Enhances Safety – Transparency allows users and developers to detect and correct mistakes or risks early.

Supports Ethical Use – Open systems enable scrutiny to ensure fairness, prevent bias, and respect user rights.

Facilitates Regulation Compliance – Transparent AI aligns with legal requirements for explain ability and data protection.

Improves User Control – Users can make informed choices and intervene if needed when system behavior is understandable.

17) Define engineering design process.

The engineering design process is a systematic, iterative approach used by engineers to develop solutions to problems. It involves defining the problem, researching, brainstorming ideas, designing prototypes, testing, and refining the solution until it meets the desired requirements and constraints. This process ensures that products or systems are functional, safe, efficient, and meet user needs.

18. List out the ieee standards 7000

The IEEE 7000 series refers to a set of standards focused on ethics in autonomous and intelligent systems.

Here are some key IEEE 7000 standards:

IEEE 7000-2021 – Model Process for Addressing Ethical Concerns during System Design IEEE 7001-

2021 – Transparency of Autonomous Systems

IEEE 7002-2021 – Data Privacy Process

IEEE 7003-2021 – Algorithmic Bias Considerations

IEEE 7004-2021 – Standard for Child and Student Data Governance IEEE

7005-2021 – Standard on Employer Data Governance

IEEE 7006-2021 – Personal Data Artificial Intelligence Agent

IEEE 7007-2021 – Ontological Standard for Ethically Driven Robotics and Automation Systems IEEE 7008-

2021 – Standard for Ethical AI Transparency

IEEE 7009-2021 – Fail-Safe Design of Autonomous and Semi-Autonomous Systems

19) Define transparency.

Transparency is the quality of being open, clear, and understandable about how a system, process, or decision works. In the context of AI and technology, it means providing accessible information about how algorithms make decisions, what data is used, and the system's limitations, so that users and stakeholders can trust, verify, and effectively oversee the system.

20) State the scope of ieee standard in AI

Ethical design and development – Addressing values like human rights, fairness, and privacy during system design.

Data governance – Managing data ethically, including privacy, security, and consent.

Algorithmic accountability – Identifying and reducing bias, ensuring explainability and fairness. Transparency and traceability – Making AI systems understandable and decisions traceable.
Human well-being – Ensuring AI systems align with human values and do not harm individuals or society.
Safety and reliability – Promoting the safe and secure functioning of AI systems.
Governance and compliance – Helping organizations meet regulatory and ethical requirements.

Part B&C

- 1) Explain in detail about Model process for addressing Ethical concerns during system Design
- 2) What are the key principles and requirements outlined in the ontological standard for Ethically Driven Robotics and Automation Systems?
- 3) Explain in detail about Data Privacy Process
- 4) Explain in detail about Transparent of Autonomous Systems
- 5) Explain in detail about Algorithmic bias consideration and its applications.

UNIT - IV

ROBOETHICS: SOCIAL AND ETHICAL IMPLICATION OF ROBOTICS

PART –A

1) What is the purpose of the roboethics?

Protect human dignity, safety, and privacy

Promote fairness, accountability, and transparency

Prevent harm caused by misuse or malfunction

Guide responsible innovation and deployment

Ensure robots serve the public good and respect legal and ethical norms

2) What are the 3 type of robots?

- Industrial Robots
- Service Robots
- Autonomous or Mobile Robots
-

3) Define Robot?

A robot is a machine capable of carrying out a series of actions automatically, especially by being programmed by a computer. Robots can be controlled externally or operate autonomously, and they often include sensors, actuators, and software to interact with their environment, perform tasks, and assist or replace human efforts in various fields like manufacturing, healthcare, and service industries.

4) Define Roboethics

Roboethics is the field of applied ethics that focuses on the moral, legal, and societal implications of designing, developing, and using robots. It aims to ensure that robots and autonomous systems act in ways that are ethically acceptable, respect human rights and dignity, and promote the well-being of individuals and society.

5) List out the moral theories?

- Deontology (Duty-Based Ethics)
- Utilitarianism (Consequentialism)
- Virtue Ethics
- Rights-Based Ethics

6) Difference between ethics and morality?

Ethics	Morality
A system of rules or principles governing right conduct.	Personal beliefs about right and wrong behavior.
Comes from external sources like laws, professions, or society.	Comes from internal values, culture, or religion.
Often applied in professional or public settings.	Often personal and individual in nature.

7) Explain the use of industrial robots?

Welding – Performing consistent and precise welding in automotive and metal industries. **Assembly** – Assembling components in electronics, machinery, and vehicle manufacturing. **Material Handling** – Moving, packing, and sorting items in warehouses and production lines. **Painting and Coating** – Applying paints or coatings evenly and safely in hazardous environments.

8) Justify the use of Robots in the Millatary, considering their impact on warfare and ethical implications?

Justification for Use:

Reduced Human Casualties

– Robots can perform dangerous missions, reducing the risk to human soldiers in high-threat environments (e.g., bomb disposal, reconnaissance in hostile zones).

Increased Efficiency and Precision

– Robotic systems can process information rapidly and carry out tasks with high accuracy, improving mission effectiveness (e.g., targeted drone strikes).

9) What is the role of robots in warfare?

- Surveillance and Reconnaissance
- Combat and Attack
- Explosive Ordnance Disposal (EOD)
- Logistics and Supply
- Communication and Support
- Force Multiplication

10) What is the impact of AI in modern warfare?

- Enhanced Decision-Making
- Autonomous Weapons Systems
- Improved Surveillance and Reconnaissance
- Cyber Warfare

11) What are the ethical implications?

- Accountability and Responsibility

- **Bias and Discrimination**
- **Loss of Human Control**
- **Privacy Violations**

12) What are the three main theories of morality?

- Deontology (Duty-Based Ethics)
- Utilitarianism (Consequentialism)
- Virtue Ethics

13) What are the 3 types of morality?

- Personal (Individual) Morality
- Social (Cultural) Morality
- Universal (Philosophical or Objective) Morality

14) What are ethics in technology?

Ethics in technology refers to the moral principles and values that guide the development, use, and impact of technology on individuals, society, and the environment. It involves asking, “What should we do?” rather than just “What can we do?” with technology.

15) What is the importance of ethics in science and Technology?

- Protecting Human Rights and Dignity
- Preventing Harm
- Ensuring Fairness and Justice
- Building Public Trust

16) What are the ethical issues in ICT?

- **Privacy**
- **Security**
- **Digital Divide**
- **Intellectual Property and Copyright**

17) Why is ethics important in ICT?

Ethics in ICT is essential because technology affects how we communicate, learn, work, and live. As ICT becomes more powerful and widespread, ethical principles ensure that it is used responsibly, fairly, and safely.

18) How does ICT affect ethics?

ICT (Information and Communication Technology) affects ethics by creating new moral challenges, changing how we interact, and raising questions about the responsible use of digital tools and information.

19) What is ethical behaviour in ICT?

Ethical behaviour in ICT means using technology in a responsible, honest, fair, and respectful way that avoids harm and respects the rights of others.

20) What is the principle of harmonization?

The principle of harmonization refers to the process of aligning laws, standards, policies, or practices across different systems, organizations, or countries to ensure consistency, compatibility, and cooperation.

Part B&C

- 1) Define (i) Robot (ii) roboethics (iii) Moral Theories (iv) Ethics and morality
- 2) Briefly explain about Ethics in science and Technology.
- 3) Summarize the Ethical Issues in an ICT Society
- 4) What are key components of the Ethics and professional responsibility
- 5) Briefly Explain about Roboethics Taxonomy

UNIT - V AI AND ETHICS- CHALLENGES AND OPPORTUNITIES

PART –A

1) What is the challenges and opportunities of AI?

1) turn data into evidence for a given outcome (henceforth conclusion), and that this outcome is then used to

(2) trigger and motivate an action that (on its own, or when combined with other actions) may not be ethically neutral. This work is performed in ways that are complex and (semi-)autonomous, which

(3) complicates apportionment of responsibility for effects of actions driven by algorithms.”

2) What are the different ethical challenges in AI?



3) What are challenges and opportunities of AI In journalism ethics?

- Accuracy and Misinformation
- Bias and Fairness
- Accountability
- Loss of Human Judgment

4) What are the ethical issues with AI?

- Job Displacement
- Accountability
- Lack of Transparency
- Privacy Violations

5) What are the 5 ethics of AI?

- Fairness
- Transparency
- Accountability
- Privacy

Beneficence (Do Good)

6) What are the social issues of artificial intelligence in medicine/?

- Inequality in Access to AI-Driven Healthcare
- Loss of Human Touch
- Job Displacement and Role Shifts
- Bias in Diagnosis and Treatment

7) What are the medical issues with AI?

- Misdiagnosis or Incorrect Predictions
- Data Quality and Reliability
- Lack of Clinical Validation
- Limited Understanding of Context

8) What is decision making in industry?

Decision making in industry refers to the process of choosing the best course of action among different options to achieve business or production goals. These decisions affect everything from operations and finances to products, people, and technologies.

9) What are roles of decision making system?

Data Collection and Management Data

Analysis and Processing Problem

Solving and Evaluation Scenario

Planning and Forecasting

10) What is national strategy for AI?

A National Strategy for Artificial Intelligence (AI) is a government-led plan that outlines how a country will develop, use, and regulate AI technologies to benefit its economy, society, and global competitiveness, while also managing risks and ethical concerns.

11) What is India's strategy for AI?

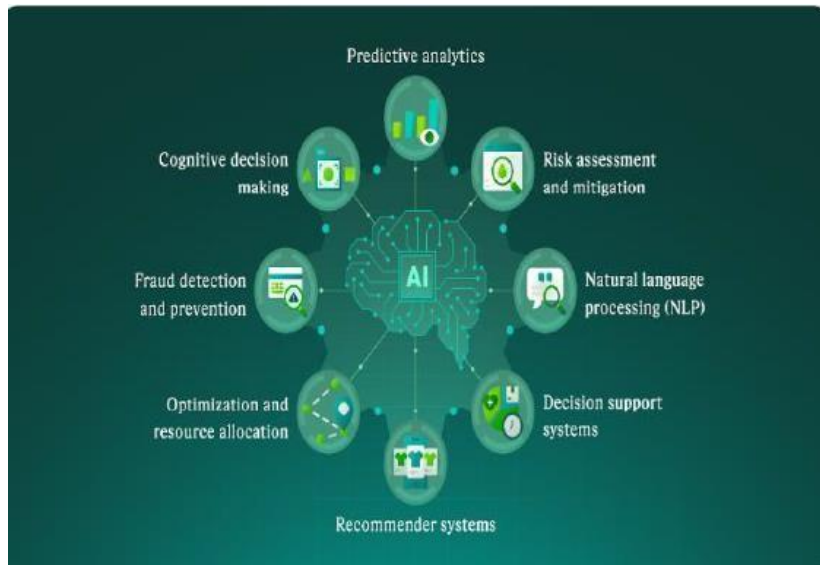
India's national strategy for Artificial Intelligence (AI) is spearheaded by the IndiaAI Mission, a comprehensive initiative launched by the Government of India to position the country as a global leader in AI innovation, development, and deployment. With a substantial investment exceeding ₹10,300 crore, the mission aims to build a robust AI ecosystem that addresses India's unique challenges while fostering inclusive growth and technological advancement.

Vivekananda International Foundation

12. List out the importance of AI in decision making.

- Enhanced accuracy.
- Faster decision making.
- Improved efficiency
- Better risk assessment and mitigation

13. State where AI Is Used in Decision-Making Processes in Industries



14. Define Natural language processing

Natural language processing (NLP) refers to a computer's ability to automatically analyze and process language in a conversational manner. Conversational chatbots such as ChatGPT use NLP to analyze human prompts and questions to produce a coherent response. NLP techniques enable AI systems to analyze human language in ways that facilitate decision-making processes that involve text data, such as sentiment analysis, contract review, or customer feedback analysis.

15. List the few main ways NLP can help with decision making:

- Sentiment analysis. NLP can provide insight into the sentiment (or emotional tone) of textual documents and data in addition to analyzing the actual information presented.
- Text classification. NLP can sort text into predefined labels or classes. This can help you organize large amounts of data into preset categories, making the information easier to understand and utilize.
- Information extraction. By extracting relevant information, you can better identify trends and patterns during the decision-making process.

16. List out the examples of NLP

- Decision support systems
- Recommender systems
- Optimization and resource allocation
- Fraud detection and prevention

17. State the Applications of AI in decision making

- Google. Google uses a deep learning system to better understand search prompts and provide personalized results.
- IBM. IBM has optimized its decision making to solve complex problems in a fraction of the time it once required. This innovation has saved customers significant time and money.
- Microsoft. Microsoft believes AI can help individuals tackle life's biggest challenges with ease. Their philosophy is that AI can provide people with a wider range of information, but humans ultimately must make the decisions.
- Deloitte. Deloitte's team is working on creating automated processes that improve human decision making by predicting and simulating future outcomes.

□ Salesforce. Salesforce incorporates AI to gain further insight into customer behavior and buying patterns. The company has improved its decision making by forecasting sales trends, which enables them to quickly respond to an ever-changing market.

18. List out the Going Digital Toolkit note provides an overview of the various AI policy initiatives

- 1) Policy design;
- 2) policy implementation;
- 3) Policy intelligence;
- 4) approaches for international and multi-stakeholder cooperation on AI policy

19. List out the OECD principles

The OECD Principles on Artificial Intelligence promote AI that is innovative, trustworthy and respects human rights and democratic values. They were adopted in May 2019 by OECD member countries when they approved the OECD Council Recommendation on Artificial Intelligence. The OECD AI Principles identify five complementary values-based principles for the responsible stewardship of trustworthy AI:

20. List out the AI strategies

- 1) information technology and communications ministries;
- 2) economics or finance ministries; or
- 3) education, science (and technology) and innovation ministries.

Part B&C

- 1) Briefly Explain about Societal Issues Concerning the Application of Artificial Intelligence in Medicine.
- 2) Explain decision making role in industry
- 3) Assess the effectiveness of national & international strategy on AI ethics
- 4) Explain about challenges and opportunities in AI?
- 5) Explain about ethical issues in Artificial Intelligence.