

Questions Bank

2 marks

1. In which year Computer chess program defeated the human chess world champion?

On May 11, 1997, an IBM computer called IBM ® Deep Blue ® beat the world chess champion after a six-game match: two wins for IBM, one for the champion and three draws.

2. Name 2 AI games.

Games have provided an environment for developing artificial intelligence with potential applications beyond gameplay. Examples include Watson, a Jeopardy! - playing computer; and the RoboCup tournament, where robots are trained to compete in soccer.

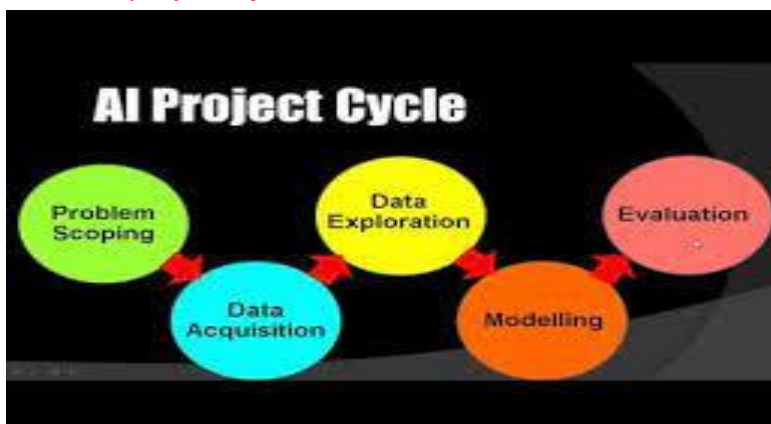
3. Write 2 risks of AI.

- Lack of AI Implementation Traceability. ...
- Introducing Program Bias into Decision Making. ...
- Data Sourcing and Violation of Personal Privacy. ...
- Black Box Algorithms and Lack of Transparency. ...
- Unclear Legal Responsibility.

4. Define Heuristic search.

heuristic search technique is a type of search performed by artificial intelligence (AI) that looks to find a good solution, not necessarily a perfect one, out of the available options. A classic example of applying heuristic search is the traveling salesman problem (Russell and Norvig 2003).

5. Draw AI project cycle?



6. Why problem solving is important in AI?

In computer science, problem-solving refers to artificial intelligence techniques, including various techniques such as forming efficient algorithms, heuristics, and performing root cause analysis to find desirable solutions. The basic crux of artificial intelligence is to solve problems just like humans .

Problem-solving enables us to identify and exploit opportunities in the environment and exert (some level of) control over the future. Problem solving skills and the problem-solving process are a critical part of daily life both as individuals and organizations.

7. Give an example of a negative correlation.

A student who has many absences has a decrease in grades. The more one works, the less free time one has. As one increases in age, often one's agility decreases. If a car decreases speed, travel time to a destination increases.

8. What is Data mining?

In simple words, data mining is defined as a process used to extract usable data from a larger set of any raw data. It implies analysing data patterns in large batches of data using one or more software. ... Data mining is also known as Knowledge Discovery in Data (KDD). Using a broad range of techniques, you can use this information to increase revenues, cut costs, improve customer relationships, reduce risks and more. For example, an early form of data mining was used by companies to analyze huge amounts of scanner data from supermarkets

9. Mention two Applications of AI in Healthcare.

AI programs are applied to practices such as diagnosis processes, treatment protocol development, drug development, personalized medicine, and patient monitoring and care. AI algorithms can also be used to analyze large amounts of data through electronic health records for disease prevention and diagnosis.

10.How AI can be helpful to the Tourism industry.

AI Assistants For Travel Booking

Thanks to AI, travelers no longer need to visit travel agencies to book flights or search for accommodation. AI assistants and Intelligent chatbots have now taken the place of travel agents allowing travelers to book flights and accommodation and hire vehicles online.

11. Law & Legal practices are mandated to run upon a nation give two points to satisfy that AI is helpful in maintaining Law & order.

5 marks questions

1. Give few applications of AI in different fields of engineering.

Application 1: Advanced Robots

The growth of AI allowed developers to create machines that can carry out complex manufacturing tasks. The goal is to develop systems that can learn and improve without the need for human intervention. As manufacturing needs continue to expand, we foresee a more significant demand for advanced robots that can replace humans in an assembly line.

Application 2: Big Data

All industries now rely heavily on data. Information has become a hot commodity that many organizations who want to beat the competition invest in. But no data would be useful without AI systems that allow users to collect, analyze, and give it context. AI, through machine learning (ML), can provide organizations with algorithms capable of detecting mistakes and formulating solutions to improve their operations.

Application 3: Internet of Things

The Internet of Things (IoT) has exploded in the past decade, as many organizations continuously work to get everyone connected. Smart devices have become prevalent, allowing people to remain in touch wherever they may be. Connectivity has benefited the engineering industry as well, as IoT devices make it possible for specialists to monitor projects remotely.

Application 4: Image Processing

While the image processing component of AI may not have that much of an impact on engineering, it can potentially change practices to a high degree. Through image processing algorithms, engineers can readily identify structural deformities and other potential issues that may not be readily identifiable with the naked eye. These engineering applications of artificial intelligence are crucial to ensure the safety of workers on a project.

Application 5: Natural Language Processing

Another AI concept that can help engineers is natural language processing (NLP), which allows machines and humans to communicate. Imagine an engineer talking to a tool to get the latter's input on how to reinforce an assembly line process in real-time. While this is still a concept, it can be an area worth looking into.

2. Explain the importance & working Agents & Actuators in AI.

An intelligent agent (IA) is an entity that makes a decision, that enables artificial intelligence to be put into action. It can also be described as a software entity that conducts operations in the place of users or programs after sensing the environment. It uses actuators to initiate action in that environment.

Actuators are the component of machines that converts energy into motion. The actuators are only responsible for moving and controlling a system. An actuator can be

an electric motor, gears, rails, etc. Effectors: Effectors are the devices which affect the environment.

3. There were periods when AI scientists stop getting funds for their research and innovation. Comment upon why and when it happened.

Eventually, it became obvious that commercial developers and researchers had grossly underestimated the difficulty of the project.[3] In 1973, in response to the criticism from James Lighthill and ongoing pressure from congress, the U.S. and British Governments stopped funding undirected research into artificial intelligence, and the difficult years that followed would later be known as an "AI winter". Seven years later, a visionary initiative by the Japanese Government inspired governments and industry to provide AI with billions of dollars, but by the late 80s the investors became disillusioned and withdrew funding again.

Investment and interest in AI boomed in the first decades of the 21st century when machine learning was successfully applied to many problems in academia and industry due to new methods, the application of powerful computer hardware, and the collection of immense data sets.

4. What is Data, Knowledge & Knowledge representation.(U2)

DATA : Data collection is the process of gathering and measuring information from countless different sources. In order to use the data we collect to develop practical artificial intelligence (AI) and machine learning solutions, it must be collected and stored in a way that makes sense for the business problem at hand.

KNOWLEDGE : Knowledge is the information about a domain that can be used to solve problems in that domain. To solve many problems requires much knowledge, and this knowledge must be represented in the computer. ... A representation scheme is the form of the knowledge that is used in an agent.

KNOWLEDGE REPRESENTATION : Knowledge representation and reasoning (KRR, KR&R, KR²) is the field of artificial intelligence (AI) dedicated to representing information about the world in a form that a computer system can use to solve complex tasks such as diagnosing a medical condition or having a dialog in a natural language.

5. Mention & Discuss data collection tools.

Word Association.-The researcher gives the respondent a set of words and asks them what comes to mind when they hear each word.

Sentence Completion.-Researchers use sentence completion to understand what kind of ideas the respondent has. This tool involves giving an incomplete sentence and seeing how the interviewee finishes it.

Role-Playing.-Respondents are presented with an imaginary situation and asked how they would act or react if it was real.

In-Person Surveys.-The researcher asks questions in person.

Online/Web Surveys.-These surveys are easy to accomplish, but some users may be unwilling to answer truthfully, if at all.

Mobile Surveys.-These surveys take advantage of the increasing proliferation of mobile technology. Mobile collection surveys rely on mobile devices like tablets or smartphones to conduct surveys via SMS or mobile apps.

Phone Surveys-.No researcher can call thousands of people at once, so they need a third party to handle the chore. However, many people have call screening and won't answer.

Observation-.Sometimes, the simplest method is the best. Researchers who make direct observations collect data quickly and easily, with little intrusion or third-party bias. Naturally, it's only effective in small-scale situations.

6.Discuss different ways by which machines can gain / store knowledge.

By building a machine with sufficient computational resources, offering training examples from real world data and by designing specific algorithms and tools that define a learning process, rather than specific data manipulations, machines can improve their own performance through learning by doing, inferring patterns, .

6 marks

1. **Write five AI developments that will shape 2021 and beyond.**

1. AI and vaccine development

The trend—and why it matters. It typically takes years, if not decades, to develop a new vaccine. But by March 2020, vaccine candidates to fight covid-19 were already undergoing human tests, just three months after the first reported cases. The record speed of vaccine development was partly thanks to AI models that helped researchers analyze vast amounts of data about coronavirus.

2. Fully automated driving and the rollout of robotaxis

The trend—and why it matters. Autonomous driving technology continued to mature in 2020, with the industry's leading companies testing driverless cars and opening up robotaxi services to the public in various cities. Fully automated driving, which enables rides without a human safety driver on board, will be necessary for the scalability and commercialization of autonomous driving.

3. Applied natural language processing

The trend—and why it matters. In 2020, natural language systems became significantly more advanced at processing aspects of human language like sentiment and intent, generating language that aligns with human speaking and writing patterns, and even

visual understanding, meaning the capability to express understanding about an image through language. These natural language models are powering more accurate search results and more sophisticated chatbots and virtual assistant

4. Quantum computing

The trend—and why it matters. Quantum computing made significant inroads in 2020, including the Jiuzhang computer's achievement of quantum supremacy. This carries significance for AI, since quantum computing has the potential to supercharge AI applications compared to binary-based classical computers. For example, quantum computing could be used to run a generative machine learning model through a larger dataset than a classical computer can process, thus making the model more accurate and useful in real-world settings. Advanced technologies such as deep learning algorithms are also playing an increasingly critical role in the development of quantum computing research, leading to better user experiences and creating value for businesses.

5. AI chips

The trend—and why it matters. AI hardware continued to develop in 2020, with the launch of several AI chips customized for specialized tasks. While an ordinary processor is capable of supporting AI tasks, AI-specific processors are modified with particular systems that can optimize performance for tasks like deep learning. As AI applications become more widespread, any increase in performance or reduction in cost can unlock more value for companies that operate a wide network of data centers for commercial cloud services, and can facilitate the company's internal operations.

<https://www.technologyreview.com/2021/01/14/1016122/these-five-ai-developments-will-shape-2021-and-beyond/>

2. Write 5 AI Innovations that made Headlines in 2021?

January

OpenAI's DALL·E

OpenAI released DALL·E, a 12-billion parameter version of GPT-3 trained to generate images from text descriptions, using a dataset of text-image pairs. OpenAI said that DALL·E is a transformer language model that receives both the text and the image as a single stream of data containing up to 1280 tokens. It added that DALL·E can render an image from scratch and also alter aspects of an image using text prompts

February

TensorFlow 3D

Google released TensorFlow 3D (TF 3D) that is designed to bring 3D deep learning capabilities into TensorFlow. The tech giant said that TF 3D comes with popular operations, loss functions, and data processing capabilities that will help to develop, train and deploy 3D scene understanding models.

March

Meta's SEER

Meta AI released SEER (SElf-supERvised), a billion-parameter self-supervised computer vision model that can learn from any random group of images on the internet. It does not need the careful curation and labelling that most computer vision training models need. The company also said that SEER also outperformed state-of-the-art supervised models on downstream such as low-shot, object detection, segmentation, and image classification.

April

EU Draft Regulation for AI

The EU's executive branch European Commission published a proposal for a Regulation on Artificial Intelligence. This aims to place mechanisms and restrictions on the use of AI, its violations, AI regulatory requirements, among others.

May

Google's Vertex AI

In May, at the Google I/O event, Google announced the general availability of Vertex AI. It is a managed machine learning platform that will allow companies to speed up the deployment and maintenance of AI models, Google claimed. Google also said that Vertex AI requires nearly 80% fewer lines of code to train a model compared to competitive platforms. It will help data scientists and ML engineers implement machine learning operations to build and manage ML projects throughout the development cycle.

June

GitHub Copilot

OpenAI and Microsoft's GitHub Copilot is an AI pair programmer to write better code. GitHub Copilot works with different languages like Python, JavaScript, TypeScript, Ruby, Java, and Go. GitHub Copilot can be used as an extension on the desktop or in the cloud on GitHub Codespaces. The company said that with the Copilot, the programmer can look at alternative suggestions, choose what to accept and reject, and edit suggested code manually.

July

DeepMind Open Sources AlphaFold 2.0

The code of AlphaFold 2.0 was made open-sourced by DeepMind. This AI algorithm predicts the shape of proteins, which is a major challenge in life sciences. In 2018, AlphaFold 1.0 was released, though it proved to be not good enough to employ researchers in the field. After further improvement, AlphaFold 2.0 was released in December 2020 and has received much appreciation. By making the source code public, DeepMind aims to offer better research opportunities to the scientific community in areas like drug discovery.

August

Tesla AI Day

At the Tesla AI Day, Elon Musk announced that the company is working on a humanoid robot. He added that Tesla will build a robot in a human form that could perform repetitive tasks, and the prototype is likely to be ready by next year. The code name for the bot is 'Optimus'. Tesla's director Ganesh Venkataramanan showed the computer chip that Tesla uses to run its supercomputer, Dojo. It contains 7nm technology and is packed with 362 teraflops of processing power.

September

Toshiba's VQA AI

Toshiba Corporation unveiled Visual Question Answering (VQA) AI that can recognize people and objects, colours, shapes, appearances, and background details in images. It said that this mechanism solves the issue of answering questions on the positioning and appearance of people and objects. It can learn the information required to handle a wide range of questions and answers and can find applications to a diverse range of applications without any customization requirements.

October

Facebook rebrands into Meta

In a major move, CEO Mark Zuckerberg announced that Facebook has changed its name to Meta at Connect 2021 held recently. The reach of Meta will be much beyond just social media. The metaverse will give the feeling of a hybrid structure of online social experiences expanded into the physical world.

November

NVIDIA Omniverse

NVIDIA has also jumped on the metaverse bandwagon. It announced Omniverse VR, where creators, designers, researchers, and engineers can connect major design tools and assets to collaborate in a shared virtual space. It also revealed Omniverse Avatar, a new platform for creating interactive AI avatars with the help of computer vision, NLP, and simulation technologies. The company also showed us the NVIDIA Omniverse Replicator, a synthetic data generation engine to train deep neural networks. NVIDIA also announced that Omniverse Enterprise is now generally available.

Isomorphic Labs launched

Alphabet announced the launch of Isomorphic Labs that aims to accelerate the drug discovery process. Demis Hassabis has taken over as the founder and CEO of Isomorphic Labs. He posted on Twitter that the goal is to reimagine the drug discovery process from first principles with an AI-first approach.

[AI Innovations That Made Headlines In 2021
\(analyticsindiamag.com\)](https://analyticsindiamag.com)

3. What Is A Deepfake?
Everything You Need To Know |DeepFake.com

Sometimes, the results can be unbelievably imaginative, leading to creative output that can entertain, educate, or inspire.

But things can also take a sinister turn. That's where deepfake technology seems to be headed, and it has many people concerned about its deceitful possibilities.

Perhaps most troubling is the potential use of deepfake content in disinformation campaigns.

Fake news is already a serious threat, and deepfakes could make this type of propaganda more convincing than ever before.

If you're not familiar with deepfakes yet, you'll likely come across them sooner rather than later.

That's why it's so important to read up on the ins and outs of this relatively recent internet-fueled phenomenon.

8 marks

1. Discuss correlation vs regression with suitable examples.

The main difference in correlation vs regression is that the measures of the degree of a relationship between two variables; let them be x and y . Here, correlation is for the measurement of degree, whereas regression is a parameter to determine how one variable affects another. For example, in patients attending an accident and emergency unit (A&E), we could use correlation and regression to determine whether there is a relationship between age and urea level, and whether the level of urea can be predicted for a given age.

Correlation	Regression
'Correlation' as the name says it determines the interconnection or a co-relationship between the variables.	'Regression' explains how an independent variable is numerically associated with the dependent variable.
In Correlation, both the independent and dependent values have no difference.	However, in Regression, both the dependent and independent variable are different.
The primary objective of Correlation is, to find out a quantitative/numerical value expressing the association between the values.	When it comes to regression, its primary intent is, to reckon the values of a haphazard variable based on the values of the fixed variable.
Correlation stipulates the degree to which both of the variables can move together.	However, regression specifies the effect of the change in the unit, in the known variable(p) on the evaluated variable (q).
Correlation helps to constitute the connection between the two variables.	Regression helps in estimating a variable's value based on another given value.

2. When we learn from data it is known as _ Supervised learning

The data is known as training data, and consists of a set of training examples. Each training example has one or more inputs and the desired output, also known as a supervisory signal._____.

When we learn from labelled data it is known as_____.

When we learn from unlabelled data it is known as_____.

Computers use labeled and unlabeled data to train ML models, but what is the difference?

Labeled data is used in supervised learning, whereas unlabeled data is used in unsupervised learning .

Labeled data is more difficult to acquire and store (i.e. time consuming and expensive), whereas unlabeled data is easier to acquire and store.

Labeled data can be used to determine actionable insights (e.g. forecasting tasks), whereas unlabeled data is more limited in its usefulness. Unsupervised learning methods can help discover new clusters of data, allowing for new categorizations when labeling.

Computers can also use combined data for semi-supervised learning, which reduces the need for manually labeled data while providing a large annotated dataset.

3. Write applications of AI in Robotics.

- Vision and Imaging

A robot that continuously makes the same motion over and over again is common in manufacturing, but the flexibility of artificial intelligence allows for even more capabilities. Artificial intelligence can be used to improve a robot's visual acuity and the accuracy of its image recognition. These are important for assembly, as robots welding or cutting can adapt to the smallest micro-level tolerances. Accurate vision is also important to logistics, as a robot with high visual acuity can put the right objects in the right containers no matter what those objects or containers are.

- Grasping and Manipulation

Artificial intelligence is about more than just enabling independent action—a robot in manufacturing can actually develop better ways to mechanically interact with the world. A robot using artificial intelligence in developing the best, most efficient ways to utilize its moving parts. Like most applications of AI in robotics, the bulk of work done in this area is done long before the robot is operating on the factory floor and is a part of an overall machine learning phase.

- Machine Learning Applications

If you have a robotic vacuum in your home, you've already seen a smaller, less advanced version of the methods used to train robots in manufacturing. A robot explores its surroundings, learning more about where it is, what obstacles it will need to navigate, and what challenges it will need to overcome in order to accomplish the tasks important to its primary purpose. For a vacuum cleaner, this data is usually no more complicated than a path to travel or, occasionally, what strength of suction is needed depending on the surface.

Once a robot learns where it can go and what it needs to do, those computing cycles can be focused on accomplishing its tasks rather than learning how to do them. There is always the option of pre-programming in those situations where learning might not be the best approach.

- Customer Service

Another kind of artificial intelligence that many people have encountered in their daily lives is the customer service artificial intelligence implementation known as a chatbot. These are the automated service agents on websites that can help with simple, frequent, repeatable requests that don't require a human agent. Customers often have questions like "did my package ship yet?" or "what are your hours?" that are easy for AI to parse, and can be answered with much the same simplicity.

4. Write Applications of AI in Education.

AI in classroom and learning

Several Indian startups these days are using artificial intelligence technologies to provide students with a better learning experience from the comfort of their homes. These AI and machine learning-powered technologies were very helpful during the Covid-19 pandemic when more than 1.5 billion students were forced to stay home. These technologies provide a means of personalized study plans and convenient learning. Other more commonplace use cases of AI are the cluster of applications by Google Cloud. Google Docs, Sheets, Slides, Keep, etc. have made collaborative learning easier. Augmented reality (AR) is also used by several universities abroad in order to help students get more interactive classroom education.

AI algorithms in test-taking

Similar to lectures and routine education, test-taking went online during Covid-19. According to an Educause poll in 2020, more than 54 percent institutions were already using online or remote proctoring services. This allows students to continue their education assessments from the safety of their homes and be assured that the tests are being assessed fairly and monitored in an unbiased manner. High-value global tests such as LSAT, GMAT, SATs are being proctored using AI to ensure unbiased testing environments for students. Not only that, but institutions worldwide, mainly North American institutions which include names like the University of Florida, University of Mississippi, and more, have now conducted millions of tests.

Write your essays using machine learning tech

There are several organisations with expertise in higher education, that have developed technologies that help students in writing essays, creating resumes, and even writing the Statements of Purpose required for overseas university applications. Assistive softwares like Grammarly have been in the running for a while now and use AI to check issues with grammar, plagiarism, sentence structure, etc. Other companies like iSchoolConnect use machine learning algorithms to take things a step further. Depending upon the nature of the content, these tools provide suggestions about the presence or absence of

multiple parameters that make a resume or an essay impressive, without actually writing them for the student.

Preparing for university and job interviews

What if you could ensure that you ace your university or job interviews? Well, there are AI-powered technologies that can now make it possible. These tools help individuals take mock interviews and then give them feedback on a variety of parameters such as facial movement, gestures, voice pitch, and more. It also gives the users detailed insights into characteristics such as confidence, focus and several other behavioral characteristics. Such sophisticated AI-technologies allow individuals to prepare for these interviews and gain the necessary skills to boost their chances of success in the final interviews. These also help take that edge off during the final interview.

Chatbots to your rescue

This generation's affinity to the internet and their devices is undeniable. To make sure that they can assist students all around the globe as well as within their institutions, many universities have deployed virtual assistants or chatbots on their websites, mobile apps, and all social channels. These chatbots can understand and answer thousands of questions posted by students and can respond accurately within a split second. Some of the best examples of that are the chatbots employed by New York University, Carnegie Mellon University, Stanford University, and many others.

5. Write Applications of AI in Data Security.

Artificial intelligence endeavours to simulate human intelligence. It has immense potential in cybersecurity. If harnessed correctly, Artificial Intelligence or AI systems can be trained to generate alerts for threats, identify new types of malware and protect sensitive data for organisations. Different types of application security features include authentication, authorization, encryption, logging, and application security testing. Developers can also code applications to reduce security vulnerabilities.