Gen AI Primer 2025

1. In a neural network, what does a neuron compute?
ANS: A weighted sum followed by an activation function

2. Which function introduces non-linearity in a neural network?
ANS: Activation Function

3. Which of the following is NOT a layer type in a typical neural network?
ANS:Quantum Layer

4. Which application of ML is used to detect unusual patterns in data?
ANS: Anomaly Detection

5. In which type of ML does an agent learn by interacting with an environment?
ANS: Reinforcement Learning

6. Which of the following is a common activation function in neural networks?
ANS: ReLU (Rectified Linear Unit)

7. How is a neural network's performance typically evaluated during training?
ANS: Using a validation set

8. Which of the following is a challenge in training deep neural networks?
ANS: Vanishing/Exploding gradients

9. What is the role of the loss function in training a neural network?
ANS: To quantify the difference between predicted and actual values

10. What is the primary purpose of backpropagation?
ANS: Adjusting weights based on the error

1. What is the primary purpose of a loss function in training neural networks?
ANS: To quantify the difference between predicted and actual values

2. Which of the following is a technique to prevent overfitting in neural networks?
ANS: Dropout

3. Which of the following is NOT a common machine learning algorithm?
ANS: Quantum Entanglement

4. What is the main difference between regression and classification?
ANS: Regression predicts a continuous output, Classification predicts a discrete label

5. What is the primary goal of machine learning?
ANS: To allow computers to learn from data

6. In the context of neural networks, what does the term "backpropagation" refer to?
ANS: The method of adjusting weights based on the error

7. Which component of a neural network is responsible for combining inputs and passing them to the next layer?
ANS: Neuron (or Node)

8. Which activation function outputs a value between 0 and 1?
ANS: Sigmoid

9. Which of the following is NOT a type of machine learning?
ANS: Recursive Learning

10. Which application of ML is used to group similar items?
ANS: Clustering

1. Which of the following is NOT a direct application of the Transformer architecture?
ANS: Image recognition

2. Which generative model introduced a stochastic layer that models data in a latent space?
ANS: VAE

3. What is the primary advantage of Transformers over RNNs in terms of processing sequences?
ANS: Parallel Processing

4. Which AI model series by OpenAI, based on the Transformer architecture, is known for generating highly coherent content?
ANS: GPT series

5. What mechanism allows the Transformer model to weigh the importance of different words in a sequence?
ANS: Self-Attention Mechanism

6. Which model can transform horse photos into zebra photos without direct comparison?
ANS: CycleGAN

7. What is the main innovation introduced by the "Attention Is All You Need" paper?
ANS: Transformer architecture

8. Which model is known for its rules for creating stable and effective AI image-makers?
ANS: DCGAN

9. Which model demonstrated that using larger architectures can produce better images?
ANS: BigGAN

10. In the context of GANs, what is the role of the Discriminator?
ANS: To distinguish between real and generated data

1. Who introduced Generative Adversarial Networks (GANs)?
ANS: Ian Goodfellow

2. What is the primary purpose of generative models?
ANS: Generating new data

3. Which of the following research papers is foundational for Variational Autoencoders (VAEs)?
ANS: "Generative Adversarial Nets"

4. Which model uses a probabilistic approach to encode and decode data?
ANS: VAE

5. Which of the following is NOT a direct application of GANs but rather an outcome of its influence?
ANS: Reinforcement learning in game playing

6. In which year were Generative Adversarial Networks (GANs) first introduced?
ANS: 2014

7. Which architecture is primarily associated with attention mechanisms?
ANS: Transformer

8. What are the two main components of a GAN?
ANS: Generator and Discriminator

9. Which model marked a significant milestone in the use of transformers in NLP?
ANS: BERT

10. Which pioneering research in Generative AI specifically emphasized the generation of text sequences?
ANS: "Sequence to Sequence Learning with Neural Networks"

1. How might AI transform the fitting experience in fashion retail?
ANS: By allowing customers to virtually "try on" clothes

2. What is a potential challenge of over-relying on AI in fashion?
ANS: Overshadowing human creativity and intuition

3. Which is a potential future application of Generative AI in fashion?
ANS: Hyper-personalized clothing

4. What could be a futuristic application of Generative AI in creating personalized clothing?
ANS: By designing clothing based on an individual's mood

5. Which brand has utilized AI for generating new clothing designs?
ANS: StitchFix

6. How can Generative AI contribute to sustainable fashion?
ANS: By designing sustainable fabrics

7. What aspect of AI in fashion raises concerns about user privacy?
ANS: Personalized shopping experiences

8. In the context of sustainability, how might AI be used in material design?
ANS: By simulating and designing eco-friendly materials

9. Who is a prominent virtual influencer mentioned in the case study?
ANS: Lil Miquela

10. How can Generative AI potentially impact inventory management in fashion?
ANS: By predicting fashion trends with higher accuracy

11. Beyond body image standards, what's another ethical concern regarding virtual models?
ANS: The authenticity of virtual influencers in advertising campaigns

12. Why might there be concerns about an over-reliance on data-driven AI in fashion?
ANS: Fashion inherently values human creativity and intuition

13. How does AI enhance the shopping experience?
ANS: By providing personalized product recommendations

14. What ethical concern arises from the use of virtual models in fashion?
ANS: Questions about body image standards and job losses for human models

15. What is the global valuation of the fashion industry?
ANS: $2.5 trillion

1. If an AI system is designed to label images of cats and dogs, it is primarily a _____ model.
ANS: Discriminative

2. Which AI type is best for predicting outcomes?
ANS: Regression AI

3. Which is NOT a real-world application of Generative AI?
ANS: Predicting stock market prices

4. Which of the following is a direct application of Generative AI in the entertainment industry?
ANS: Creating realistic CGI characters

5. In the context of AI, which model type is more concerned with the underlying distribution of data?
ANS: Generative AI

6. What is Generative AI primarily used for?
ANS: Generating new data

7. Generative AI can be used to create which of the following?
ANS: New artworks and music pieces

8. How does Generative AI differ from Classification AI?
ANS: It generates new data rather than categorizing existing data

9. Which statement best describes the role of Generative AI?
ANS: It focuses on generating data based on learned patterns

10. Why is Generative AI considered significant in the realm of artificial intelligence?
ANS: It can produce new, previously unseen data samples

1. Which of the following fields can utilize Generative AI to create new, original content or simulations?
ANS: Art and Music

2.Which AI type primarily focuses on labeling data?
ANS: Supervised AI

3. Generative AI is closely related to which type of models?
ANS: Generative models

4. Which type of AI is primarily concerned with how data is generated rather than how it's separated?
ANS: Generative AI

5. In which application is Generative AI NOT typically used?
ANS: Automating customer service chats

6. What does AI stand for?
ANS: Artificial Intelligence

7. Which of the following is NOT a type of AI?
ANS: Generative Art

8. Which statement best defines Generative AI?
ANS: GenerativeAI that can generate new data samples

1. Which of the following is NOT a property of likelihood?
ANS: It is normalized like a probability

2. Which model type aims to capture the joint probability $P(x, y)$?

ANS: Generative Model

3.Which claim regarding generative models isn't true?
ANS: They always require labeled data for training

4. Which of the following best describes the difference between generative and discriminative models?
ANS: Generative models learn the data distribution, while discriminative models learn the decision boundary

5. Within the architecture of Generative Adversarial Networks (GANs), which duo of fundamental elements are paramount?
ANS: Generator and Discriminator

6. For what tasks can generative models be applied?
ANS: Data generation, denoising, inpainting, and more

7. What does a probability distribution provide?
ANS: A mathematical description of outcomes for a random variable

8. What's a significant hurdle when training GANs?
ANS: Mode collapse

9. Within generative models, what function does the discriminator serve in GANs?
ANS: To distinguish between real and generated data

10. How is the likelihood of data given a model symbolized?
ANS: P(data | model)

1. If a model is better at distinguishing between classes rather than generating data, it is likely a _____.
ANS: Discriminative model

2. Which model type is primarily concerned with determining P(y | x)?
ANS: Discriminative Model

3. What is the primary goal of generative models in AI?
ANS: To generate new data samples

4. Which statement best differentiates generative from discriminative models?
ANS: Generative models learn the joint probability distribution, while discriminative models learn the conditional probability

5. Which of the following is crucial for understanding the behavior of generative models?
ANS: Probability distributions and likelihood

6. In the context of generative models, what does P(x) represent?
ANS: The probability distribution of the data x

7. Which of the following is NOT a generative model?
ANS: Support Vector Machines

8. Generative models are primarily used for which of the following tasks?
ANS: Generating new data samples similar to the input data

9. What does likelihood measure in the context of a model?
ANS: How well the model explains the observed data

10. In the context of models, what does P(x | y) typically represent?

ANS:The probability of x given y

1. What is a primary application of VAEs mentioned in the case study?
ANS: Anomaly Detection

2. What is the y-axis label of the chart visualizing the error?
ANS: Reconstruction Error

3. Which is NOT a challenge in implementing VAEs for this use-case?
ANS: Increasing data storage costs

4. For how many epochs is the VAE trained?
ANS: 50

5. What criterion is used to determine if a data point is anomalous?
ANS: If its error is above the 99th percentile

6. What is the VAE trained to learn effectively?
ANS: A compressed representation of the data

7. Why is understanding the VAE's outputs challenging?
ANS: They can be complex and non-intuitive

8. In the VAE, what does the sampling function introduce?
ANS: Randomness

9. What two components combine to form the VAE's loss?
ANS: MSE and KL divergence

10. Which of the following is NOT an attribute in the given data?
ANS: Humidity

11. What type of dataset does the manufacturing plant collect?
ANS: Time Series Dataset

12. How is the data divided for training the VAE?
ANS: 80-20

13. What does the VAE attempt to minimize during training?
ANS: Loss

14. Why is data preprocessing required before training the VAE?
ANS: To ensure it is suitable for training

15. Over time, due to certain changes, what might be required of the VAE model?
ANS: Continuous adaptation

1. In which application can VAEs detect unusual patterns?
ANS: Anomaly detection in industrial equipment

2. Which of the following is a key component of the VAE loss function?
ANS: KL divergence

3. In which application might VAEs be used to enhance image quality?
ANS: Medical imaging

4. Why is the reparameterization trick important in VAEs?
ANS: It allows backpropagation through random nodes

5. Which optimization technique is commonly used with VAEs?
ANS: Stochastic gradient descent (SGD)

6. Autoencoders primarily focus on which aspect of data?
ANS: Reconstruction

7. Which of the following is NOT a typical use case for VAEs?
ANS: Real-time speech translation

8. Why is variational inference used in VAEs?
ANS: To approximate intractable posterior distributions

9. How do VAEs differ from traditional autoencoders?
ANS: VAEs introduce randomness via a probabilistic layer

10. What do VAEs use to generate a distribution over latent variables?
ANS: Variational inference

1. Why are autoencoders considered generative models?
ANS: They can reconstruct and generate data similar to the input

2. Reparameterization trick is used to...
ANS: Deal with the non-differentiability of sampling in VAEs

3. What does VAE stand for?
ANS: Variational Autoencoder

4. What is the primary role of autoencoders in generative modeling?
ANS: Data compression and reconstruction

5. Which application does NOT typically use VAEs?
ANS: Text summarization

6. Why is the reparameterization trick crucial in training VAEs?
ANS: It allows backpropagation through stochastic nodes

7. In the context of Variational Autoencoders (VAEs), what does variational inference help achieve?
ANS: Approximation of complex posterior distributions

8. Which component of the VAE loss function ensures the latent variables adhere to a standard distribution?
ANS: KL divergence

9. In which application might you use a VAE for generating new, coherent samples?
ANS: Designing virtual fashion items

10. Which of the following is NOT a type of autoencoder?
ANS: Supervised autoencoder