20 août 1955 SKIKDA University
Sciences faculty
Computer science department

Level : M2-IA (2023/2024)
Subject : Deep Learning
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FIRST PARTIAL EXAM

CHOOSE THE CORRECT OPTION FROM THE CHOICES PROVIDE(Select all that apply)

Question1: Select the applications that commonly use deep learning techniques:
- **Image Recognition**
- **Speech Processing**
- **Sentiment Analysis**
- **Drug Discovery**

Question2: Which activation functions are commonly used in deep neural networks?
- **Sigmoid**
- **ReLU (Rectified Linear Unit)**
- **Softmax**
- **Linear Activation**

Question3: Choose the common deep learning frameworks:
- **TensorFlow**
- ~~Sci-kit Learn~~
- **PyTorch**
- **Keras**

Question 4: Which tasks fall under supervised learning in deep learning?
- **Image Classification**
- ~~Clustering~~
- ~~Structure Discovery~~
- **Regression**

Question 5: Choose steps that do not play a part in training a neural network in the context of deep learning.
- ~~Forward Propagation~~
- ~~Backward Propagation~~
- **Feature Engineering**
- ~~Optimization~~

Question 6: Select the elements affecting the computational demands in deep learning models:
- **Model complexity**
- **Data size**
- **Learning rate**
- **Hardware resources**

Question 7: Select the characteristics of the Rectified Linear Unit (ReLU) activation function:
- ~~Aids in mitigating the vanishing gradient problem~~
- **Fast computation due to linearity**
- ~~Provides output between -1 and 1~~
- ~~Efficiently handles negative input values~~

Question 8: Choose the activation functions suitable for output in binary classification tasks:
- ~~Softmax~~
- **Sigmoid**
- ~~Hyperbolic Tangent (tanh)~~
- ~~Leaky ReLU~~

Question 9: Select the purpose of the Hyperbolic Tangent (tanh) activation function:

- ~~Similar to ReLU but computationally faster~~
- **Mitigates the vanishing gradient problem**
- ~~Provides output between 0 and 1~~
- **Maps input values between -1 and 1**

Question 10: Choose the characteristic of the Softmax activation function:

- **Ideal for output in multi-class classification tasks**
- ~~Introduces linearity in neural networks~~
- ~~Mitigates the vanishing gradient problem~~
- ~~Suitable for regression tasks~~

Question11: Choose the activation functions effective in handling the vanishing gradient problem:

- **Leaky ReLU**
- **Sigmoid**
- **Tanh**
- ~~Softmax~~

Question 12: Sources of Bias in Machine Learning:

- **Biased Labels**
- **Dataset Imbalance**
- **Model Architecture**
- ~~Computational resources~~

Question 13: Bias in Machine Learning refers to:

- **An algorithm's inherent prejudice towards certain outcomes**
- ~~The variance between training and testing data~~
- ~~An error in the model's predictions~~
- ~~The model's inability to learn from the data~~

Question 14: Common Types of Bias in Datasets:

- **Group Bias**
- **Data Sparsity**
- **Overfitting**
- **Precision Bias**

Question 15: Ethical Consideration in Addressing Bias involves:

- **Preprocessing techniques to balance data**
- ~~Ignoring biased data to avoid model inaccuracies~~
- ~~Limiting the dataset to avoid controversial information~~
- ~~Increasing bias for fair representation~~

Question 16: Bias mitigation techniques involve:

- ~~Increasing bias to improve model accuracy~~
- **Removing biased attributes from the dataset**
- ~~Ignoring the biased sections of the data~~
- ~~Using biased data exclusively for testing~~

Question 17: Unintended consequences of biased models include:

- ~~Increased fairness in predictions~~
- **Reinforcement of societal prejudices**
- ~~Overfitting issues~~
- ~~Reduced model complexity~~

Question 18: Bias in Machine Learning affects:

- **Model predictions and outcomes**
- Data collection only

- Training time
- **Legal and ethical concerns**

Question 19: Underrepresentation in training data can lead to:

- **Increased bias in predictions**
- ~~Improved model generalization~~
- ~~Reduced computational complexity~~
- **Decreased model performance**

Question 20: Addressing Bias in Machine Learning involves:

- ~~Overlooking biased patterns to speed up model training~~
- ~~Introducing more bias for comprehensive analysis~~
- **Regular auditing and continuous improvement**
- ~~Restricting model access to biased data only~~

Question 21: Data Types in Datasets:

- **Numerical**
- **Categorical**
- **Text**
- **Audio**
- **Image**

Question 22: Sources of Bias in Machine Learning Models:

- **Feature Selection**
- **Algorithm Design**
- **Training Data**
- **Evaluation Metrics**
- **Model Interpretation**

Question 23: Ways to Mitigate Bias in Datasets:

- **Data Augmentation**
- **Bias Correction Algorithms**
- ~~Ethical AI Frameworks~~
- ~~Fairness-aware Model Training~~

Question 24: Impact of Bias in AI Systems:

- **Unfair Predictions**
- **Reinforcing Stereotypes**
- ~~Reduced Model Complexity~~
- **Inequality in Outcomes**

Question 25: Types of Algorithmic Bias:

- **Racial Bias**
- **Gender Bias**
- **Age Bias**
- **Socio-economic Bias**
- **Cultural Bias**

Question 26: Bias Mitigation Strategies in AI Ethics:

- **Diversity in Data Collection**
- **Explainability in Models**
- **Regular Ethical Audits**
- **Incorporating Ethical Frameworks**

Question 27: Factors Affecting Computational Demands:

- **Model Complexity**
- **Dataset Size**

- **Algorithm Selection**
- **Hardware Infrastructure**
- **Hyperparameter Tuning**

Question 28: Hardware Requirements for Deep Learning:

- **GPU (Graphics Processing Unit)**
- CPU (Central Processing Unit)
- **TPU (Tensor Processing Unit)**
- **FPGA (Field-Programmable Gate Array)**
- **HPC (High-Performance Computing Clusters)**

Question 29: Adapting Hardware to Model Size:

- **Larger Models Require Higher Memory Bandwidth**
- ~~Smaller Models Are More Computationally Intensive~~
- ~~Model Size Does Not Affect Hardware Adaptation~~
- **Hardware Adaptation Depends on Algorithm Choice**
- **Specialized Hardware Is Essential for Large Models**

Question 30: Factors Influencing Model Interpretability:

- **Model Complexity**
- ~~Choice of Activation Function~~
- **Feature Importance**
- Explainable AI Techniques
- **Training Data Size**

Question 31: Interpreting Model Outputs:

- **Understanding Model Confidence Levels**
- **Identifying Prediction Boundaries**
- **Explaining False Positive Predictions**
- **Analyzing Model Uncertainty**
- ~~Examining Loss Function Values~~

Question 32: Explainability Techniques:

- **SHAP (SHapley Additive exPlanations)**
- ~~ReLU (Rectified Linear Unit)~~
- **LIME (Local Interpretable Model-agnostic Explanations)**
- ~~PCA (Principal Component Analysis)~~

Question 33: Trade-offs in Model Explainability:

- **Higher Model Explainability Reduces Performance**
- ~~Model Explainability Always Enhances Model Trust~~
- **Explainable Models Might Sacrifice Complexity**
- Increasing Model Explainability slows down Generalization