Student 6: Struggling Performer

Question 1: Explain the differences between supervised, unsupervised, and reinforcement learning in machine learning. Provide examples of applications for each approach.

Answer:

Supervised learning is when you teach the computer with examples. Like showing it many pictures of cats and telling it "this is a cat" so it learns what cats look like. It's used for email spam and predicting things.

Unsupervised learning is when the computer learns by itself without being told what's right or wrong. It finds patterns in data. Like grouping customers who buy similar things.

Reinforcement learning is like video games where you get points for doing good things. The computer learns by trying different actions and seeing what gives the best score. It's used for playing chess and driving cars.

Question 2: Describe the architecture and functioning of Convolutional Neural Networks (CNNs) and explain why they are particularly effective for image recognition tasks.

Answer:

CNNs are special neural networks for pictures. They have layers that look at parts of the image and find important features. There are convolutional layers and pooling layers.

They work good for images because they can see patterns in pictures no matter where they are. Like if there's a cat in the corner or center of the picture, it can still recognize it.

CNNs are used for face recognition and finding objects in photos.

Question 3: Discuss the ethical considerations and potential societal impacts of implementing artificial intelligence systems in critical decision-making processes.

Answer:

AI can be unfair sometimes. If the data used to train it has bias, then the AI will also be biased. This is bad for hiring people or giving loans.AI decisions are hard to understand because they're like black boxes. We don't know why they make certain choices.

AI might take away jobs from people. This could cause problems for society.

Privacy is also an issue because AI uses lots of personal data.

Question 4: Explain the concept of transfer learning in deep neural networks and discuss its advantages and limitations.

Answer:

Transfer learning is when you use a model that was already trained for something else. Instead of starting over, you use what it already learned.

Good things about transfer learning:

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Saves time

Needs less data

Works better

Bad things:

Only works if tasks are similar ☐

Might have problems from the old training

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Question 5: Describe the principles of natural language processing (NLP) and howtransformer-based models like BERT have revolutionized language understanding tasks.

Answer: