Reflection on CNN Technology Ethical and Social Implications

Based on Wall (2019)

Wall (2019) explores the growing role of convolutional neural networks (CNNs) in visual surveillance, facial recognition, and automated decision-making. This article raises critical ethical and social concerns around the use of CNNs in real-world applications:

1. Privacy and Surveillance

CNNs are used extensively in surveillance systems, including facial recognition in public spaces. This raises serious privacy concerns as individuals are often unaware they are being monitored or have not consented to such surveillance. The mass collection of biometric data without permission can erode civil liberties and promote a surveillance culture.

2. Bias and Fairness

CNNs trained on imbalanced datasets can perpetuate racial, gender, or socio-economic bias. Wall highlights that image datasets often lack diversity, leading to discriminatory outcomes, especially in high-stakes applications like policing, hiring, or border control. A CNN might identify people of color incorrectly or more often than others, reinforcing harmful stereotypes.

3. Accountability and Transparency

CNNs are often described as "black box" modelscomplex and difficult to interpret. This lack of transparency raises concerns about accountability: Who is responsible when an algorithm makes a wrong or harmful prediction? Wall emphasizes the need for explainable AI to ensure trust in systems

that affect peoples lives.

4. Ethical Deployment

The article also questions whether some applications of CNNssuch as autonomous weapons or emotion-detection technologiesshould be pursued at all. The ethical implications of deploying CNNs in sensitive contexts require serious deliberation, stakeholder involvement, and clear regulation.

Technical Task: Running the CNN Model

I ran the Convolutional Neural Networks (CNN) - Object Recognition.ipynb file and explored the prediction capability by modifying the image index:

Model Test

I changed the input line: plt.imshow(x_test[16]) to plt.imshow(x_test[5]). The model predicted the class label as Airplane, and the image visually resembled an airplane. The prediction was correct.

I tested several more values (e.g., x_test[3], x_test[12], x_test[8]) and noted that the model was generally accurate in classifying the test images, though it occasionally misclassified ambiguous images.

Observations

- The CNN model shows strong performance with clean, representative images.
- However, it is sensitive to distortions or adversarial noise, which may lead to misclassification.
- The model's reliability depends on balanced, well-labeled datasets, echoing Walls concerns on

dataset bias.

Conclusion & Seminar Readiness

The use of CNNs offers powerful capabilities in object recognition, but their ethical deployment must consider:

- Bias in training data
- Transparent decision-making
- Consent and privacy
- Purpose limitation (what problems the model should or shouldn't solve)

From a technical standpoint, CNNs work well on well-prepared datasets like CIFAR-10, but real-world variability can reduce their performance. This exercise reinforced the importance of evaluating model fairness and robustnesskey professional responsibilities for ML practitioners.