**(a) Explain how you can implement DL in a real-world application.**

Answer

Implementing deep learning (DL) in a real-world application like detecting cancer cells using image data involves several essential steps:

Data Collection: Gather a dataset of medical images containing both cancerous and non-cancerous cells.

Data Preprocessing: Prepare the images for training by resizing, normalizing, and augmenting them to increase variability.

Model Selection: Choose a deep learning model suitable for image classification tasks, such as a convolutional neural network (CNN).

Model Training: Train the CNN using the labeled images, adjusting its parameters to minimize classification errors.

Model Evaluation: Assess the trained model's performance using a separate set of test images, measuring metrics like accuracy and sensitivity.

Deployment: Integrate the trained model into a medical imaging system or application for real-time cancer detection.

Monitoring and Maintenance: Continuously monitor the model's performance and update it with new data or improvements as needed.

Ethical and Legal Considerations: Ensure compliance with regulations and ethical guidelines regarding patient privacy and data protection.

**(b) What is the use of Activation function in Artificial Neural Networks? What would be the problem if we don't use it in ANN networks.**

Answer

Activation functions play a crucial role in artificial neural networks (ANNs) by introducing non-linearity into the network's decision-making process. They are applied to the output of each neuron in a neural network layer, transforming the input signal into the neuron's output signal, which is then passed to the next layer.

Activation functions in neural networks help introduce non-linearity, allowing networks to learn and solve complex problems better.

They also enable the network to adjust its weights during training, improving accuracy and performance.

**If we don't use activation functions in ANN networks:**

Loss of Non-Linearity: Without activation functions, the network would effectively become a linear transformation of the input data. This would severely limit its ability to learn and represent complex, non-linear relationships in the data, significantly reducing its performance on tasks requiring non-linear modeling.

Inability to Learn Complex Patterns: The absence of activation functions would prevent the network from learning complex patterns and features in the data, resulting in poor performance on tasks with intricate data distributions. The network's predictive capabilities would be severely limited, and it may struggle to generalize to unseen data effectively.

Saturation and Vanishing Gradient : Without activation functions, neurons would be prone to saturation, becoming insensitive to changes in input signals and leading to vanishing gradients during backpropagation. This would hinder the training process, making it difficult to optimize the network's parameters and converge to an optimal solution.