KEY TERMS IN DEEP LEARNING

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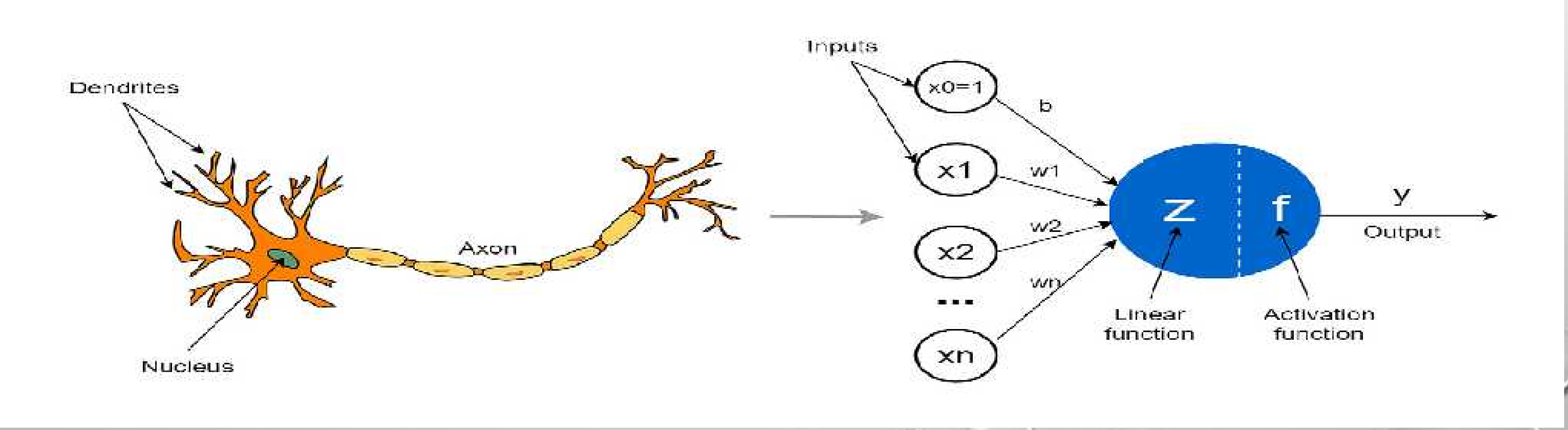
NEURON

- A neuron is a fundamental unit in a neural network. It receives input, applies a mathematical transformation, and produces an output. Neurons are inspired by the neurons in the human brain.



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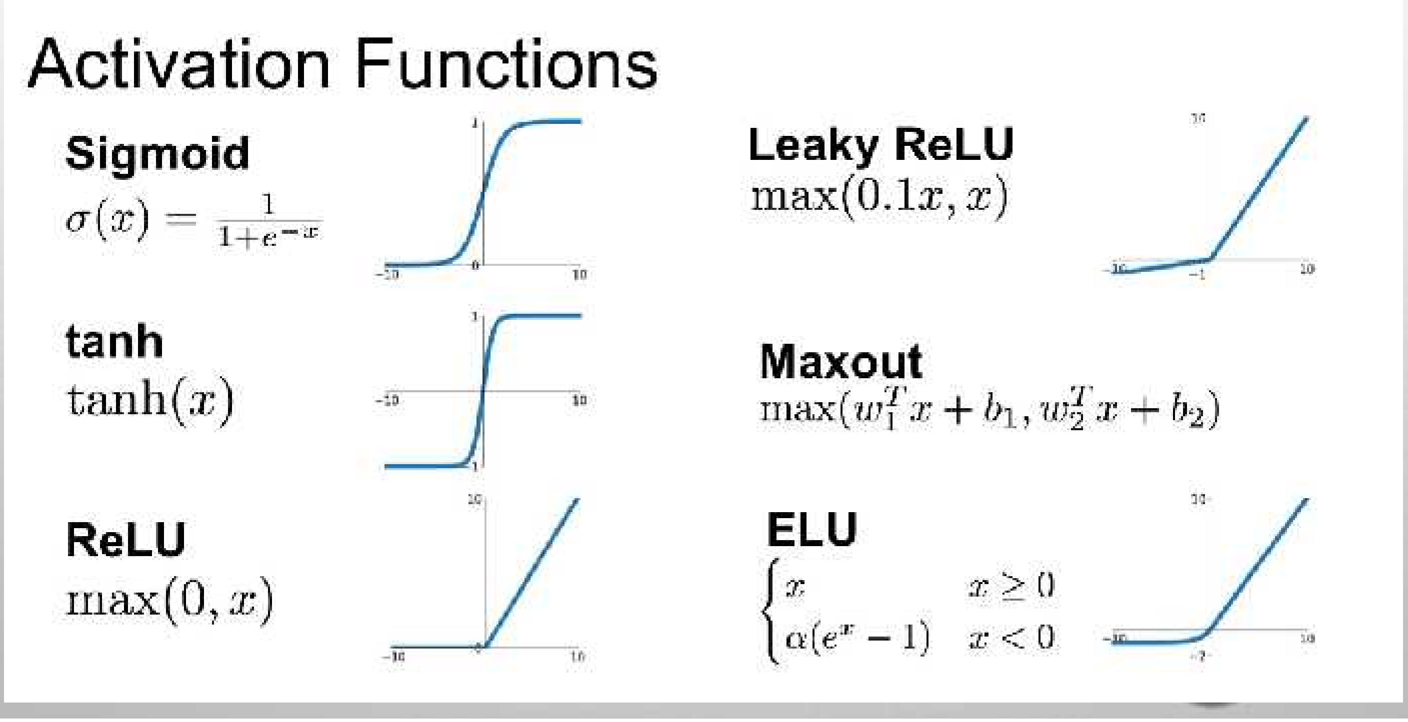
ACTIVATION FUNCTION

- An activation function introduces non-linearity into the output of a neuron. It helps in capturing complex patterns and relationships in the data. Common activation functions include the sigmoid function, relu (rectified linear unit), and tanh (hyperbolic tangent).



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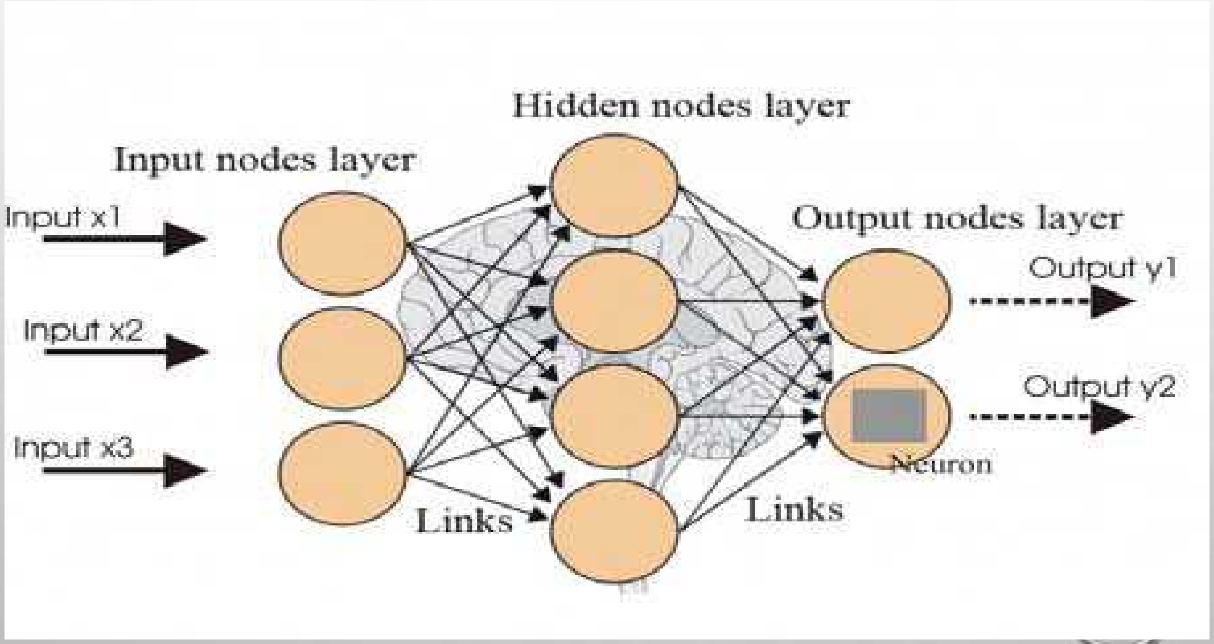
LAYER

- A layer is a collection of neurons. In a neural network, there are typically multiple layers, including an input layer, hidden layers, and an output layer. Each layer receives input from the previous layer and passes its output to the next layer.



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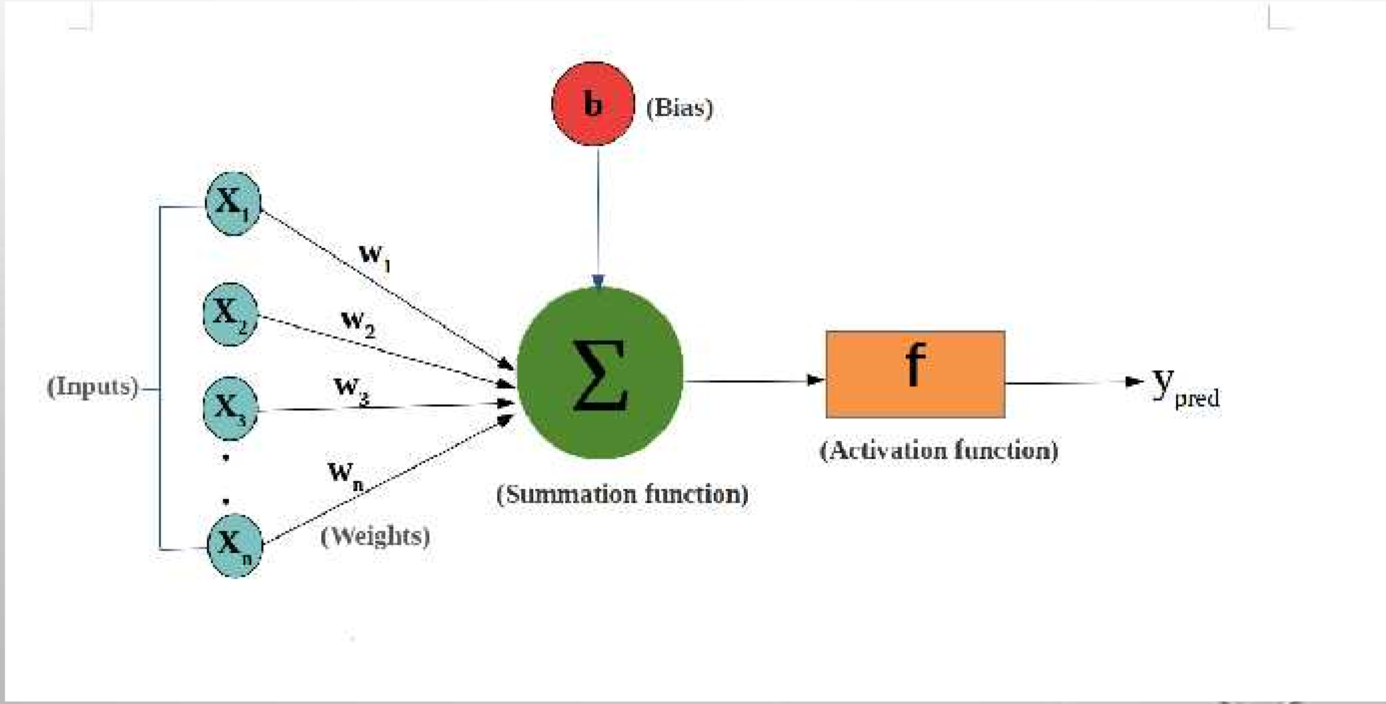
WEIGHT

- Each connection between neurons in a neural network is assigned a weight. The weight determines the strength of the connection and indicates the importance of the input in the overall computation.



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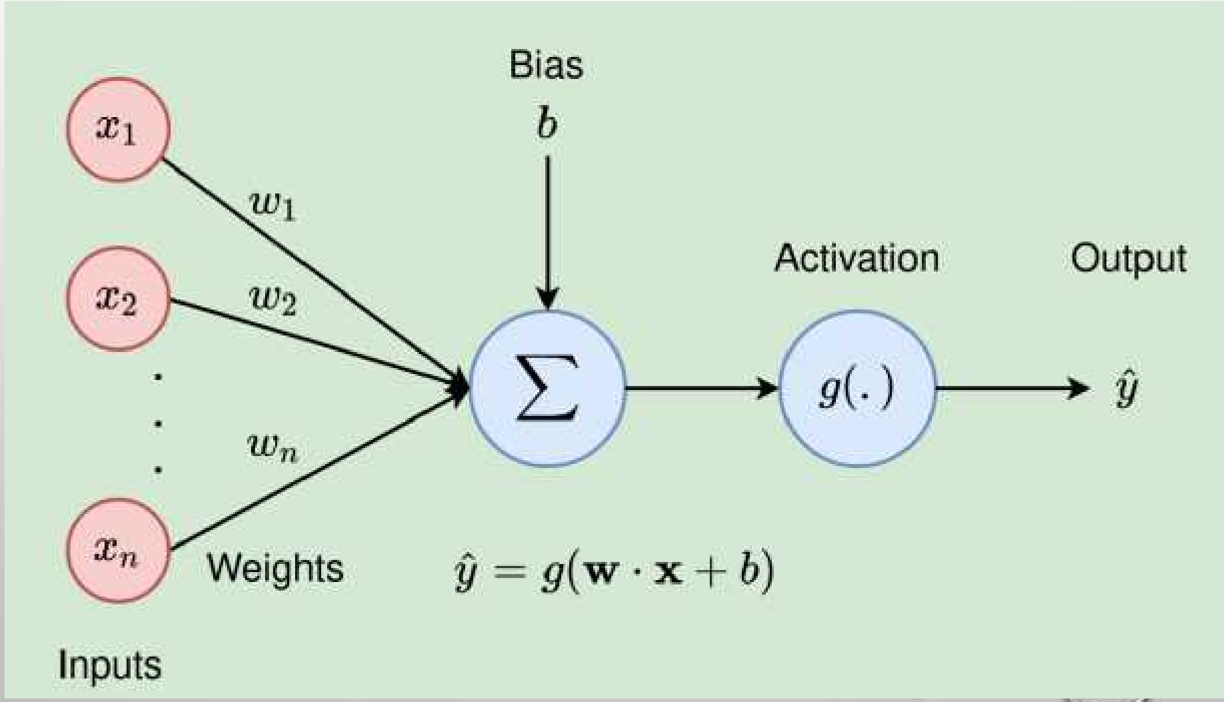
BIAS

- Bias is an additional term added to the weighted sum of inputs in a neuron. It allows for shifting the activation function's output, enabling greater flexibility and better fitting of the data.



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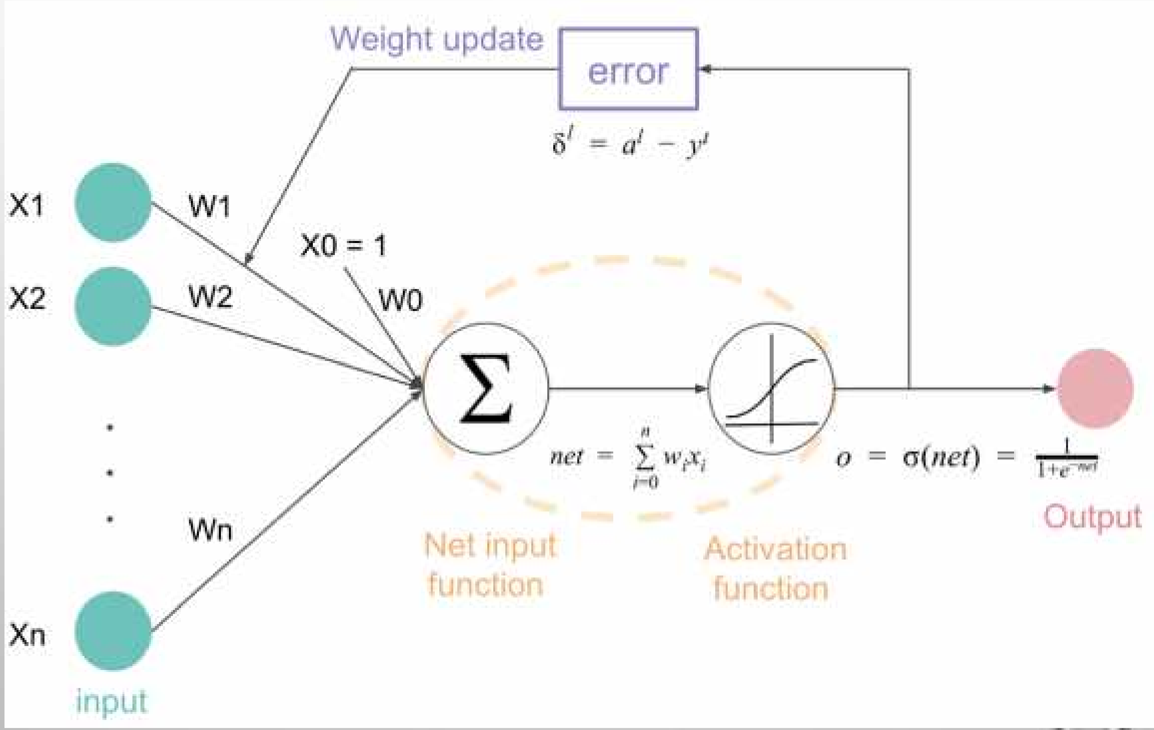
LOSS FUNCTION

- A loss function measures the difference between predicted and actual outputs. It quantifies the error or cost of the model's predictions. The choice of the loss function depends on the specific problem being solved.



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GRADIENT DESCENT

- Gradient descent is an optimization algorithm used to update the weights and biases of a neural network during training. It calculates the gradients of the loss function with respect to the network parameters and adjusts them in the direction that minimizes the loss.

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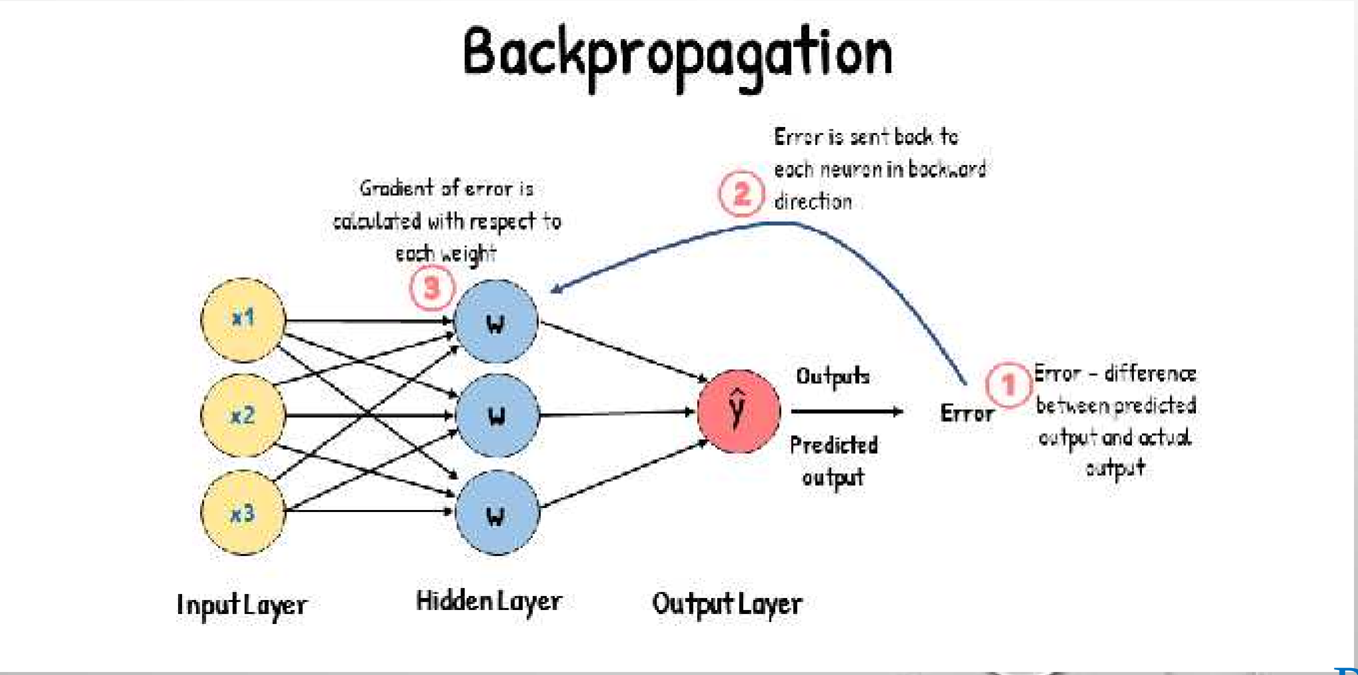
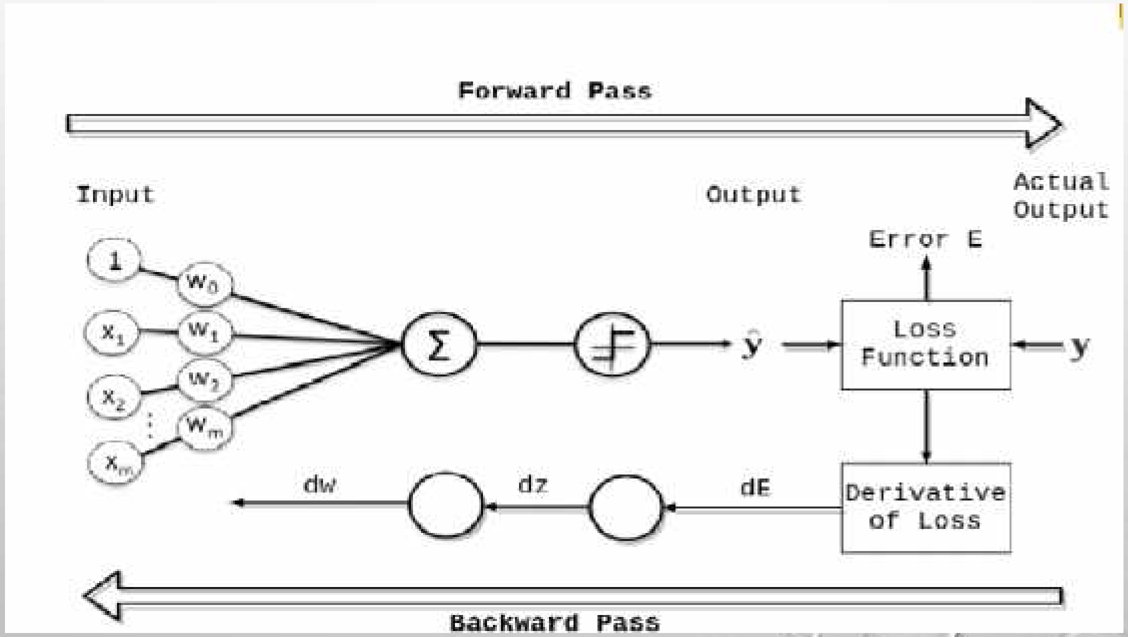
BACKPROPAGATION

- Backpropagation is an algorithm used to efficiently compute the gradients in a neural network. It propagates the error gradients from the output layer to the input layer, allowing for efficient weight updates.



EPOCH

- An epoch refers to a complete pass of the entire training dataset through the neural network. During training, multiple epochs are performed to improve the model's performance.



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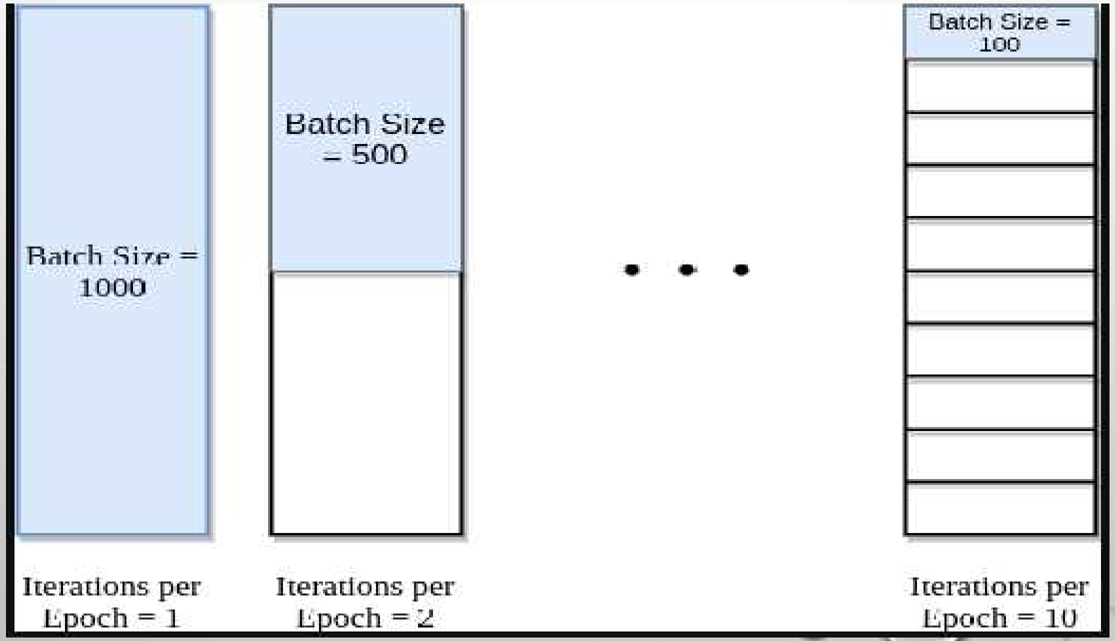
BATCH SIZE

- During training, the data is divided into batches, and the model updates its weights after processing each batch. Batch size determines the number of samples seen by the model before updating the weights.



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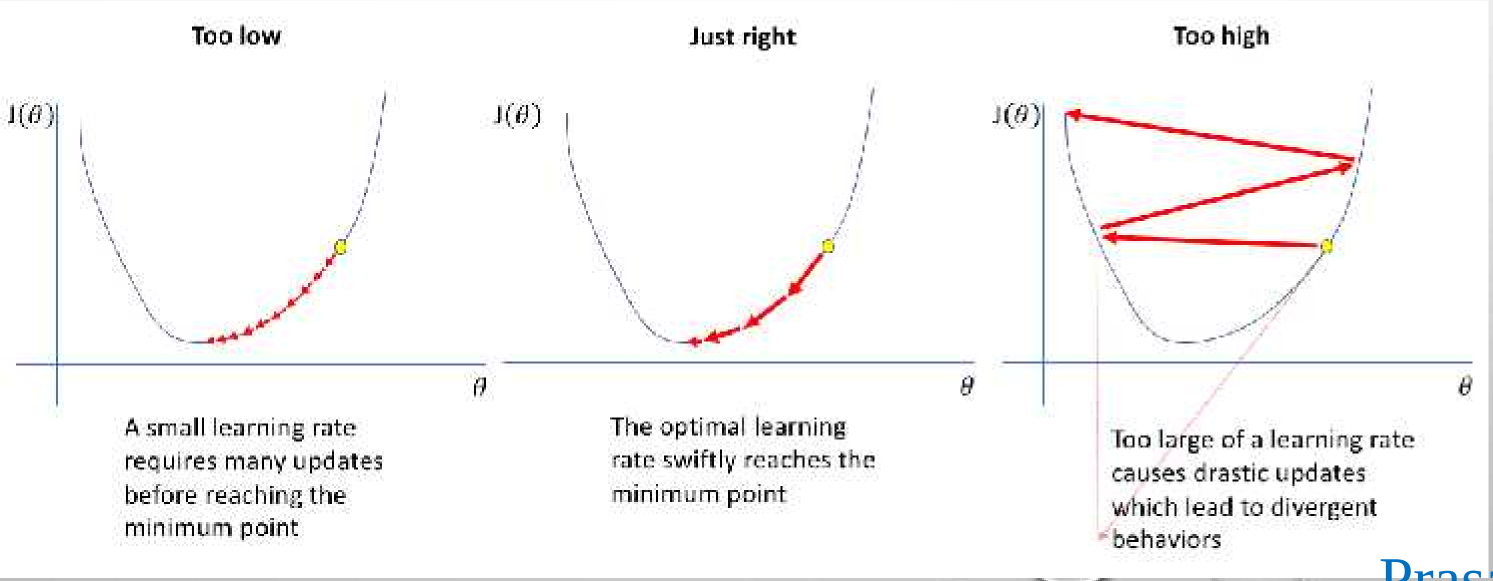
LEARNING RATE

- The learning rate determines the step size at which the weights are updated during gradient descent. It controls how quickly or slowly the model learns from the data. A high learning rate may cause the model to overshoot the optimal weights, while a low learning rate may lead to slow convergence.



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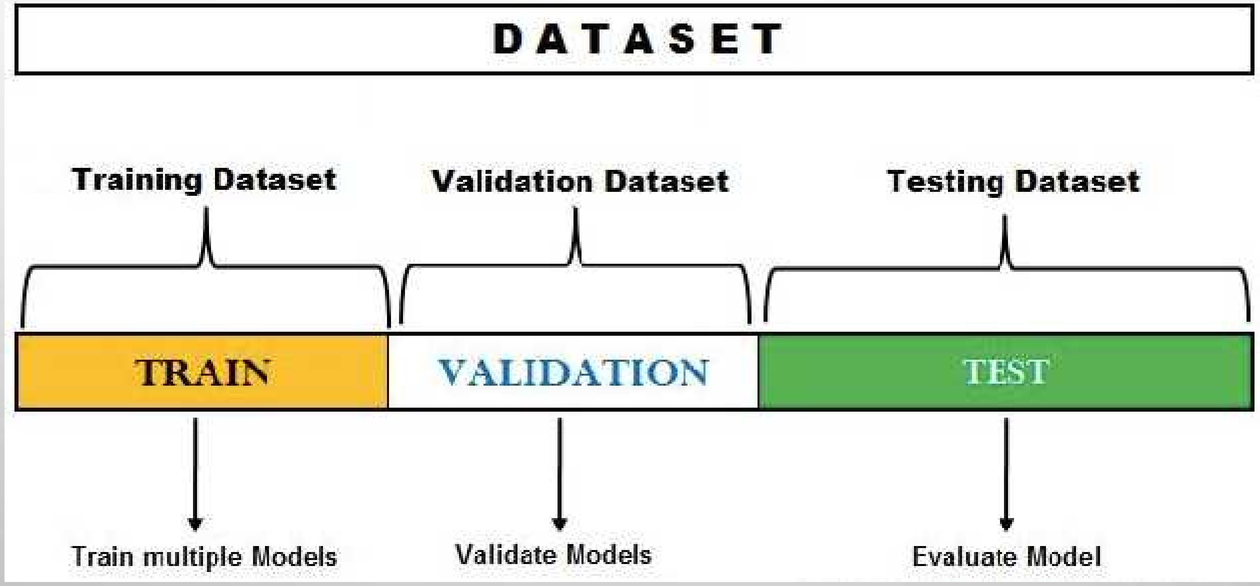
VALIDATION SET

- A validation set is a separate subset of the data used to evaluate the model's performance during training. It helps in monitoring the model's generalization ability and making decisions regarding hyperparameter tuning and model selection.



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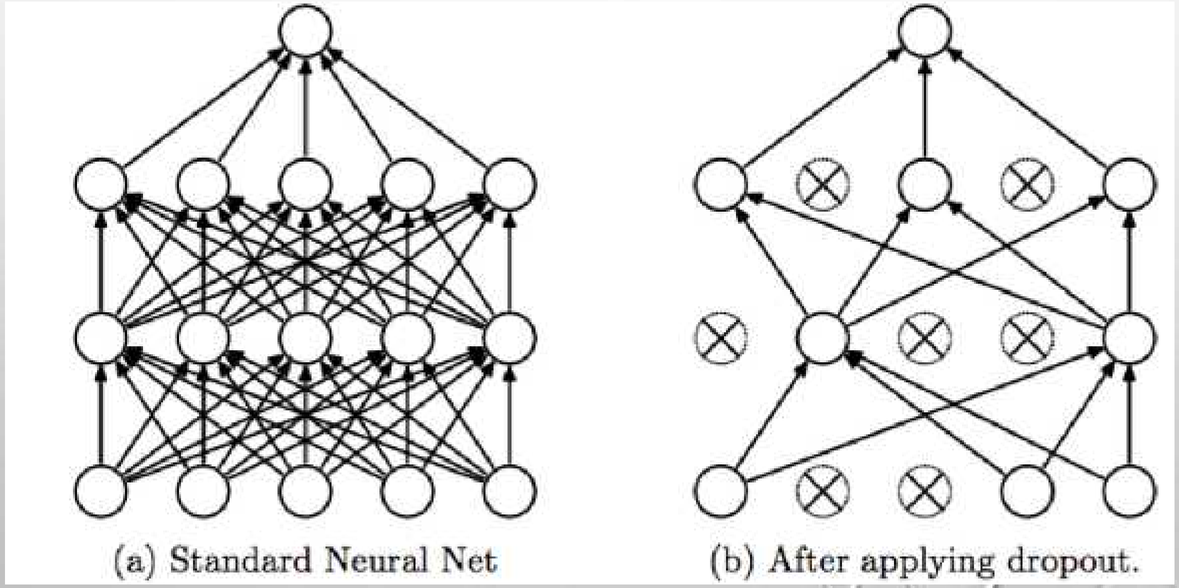
DROPOUT

- Dropout is a regularization technique used to prevent overfitting in deep neural networks. During training, random neurons are "dropped out" by setting their outputs to zero with a certain probability. This encourages the network to learn more robust and generalized features.



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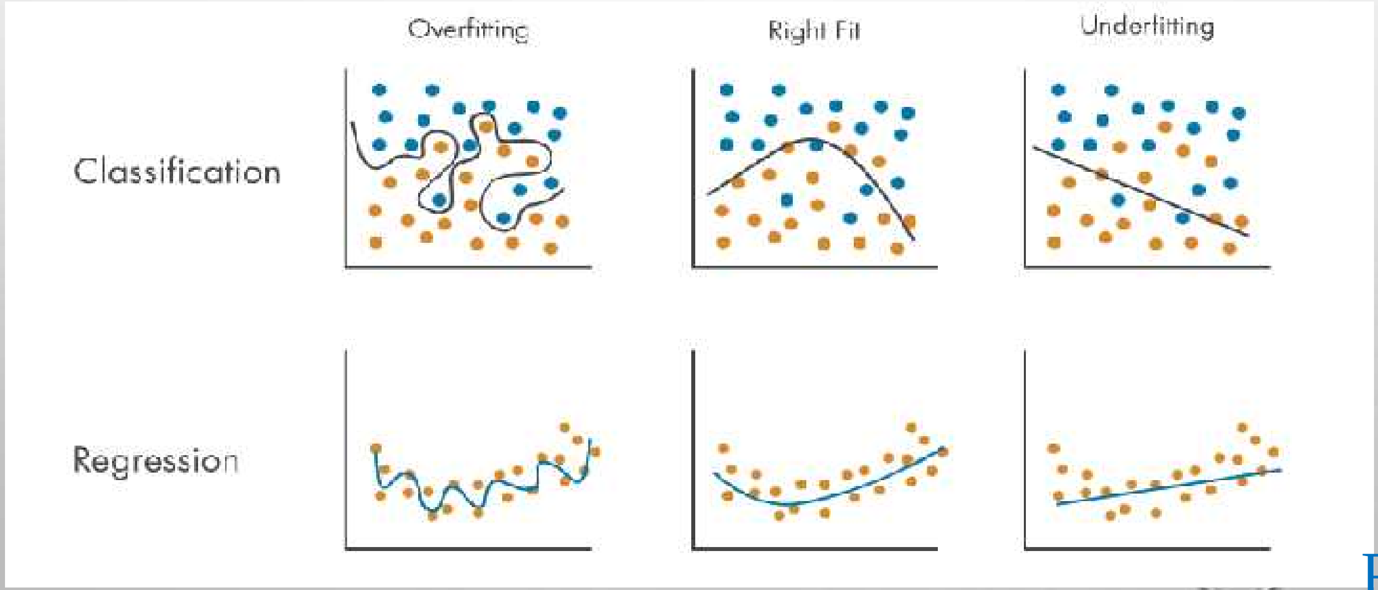
OVERFITTING

- Overfitting occurs when a deep learning model performs well on the training data but fails to generalize to new, unseen data. It happens when the model learns to memorize the training examples instead of capturing the underlying patterns. Regularization techniques like dropout and weight decay are often used to mitigate overfitting.



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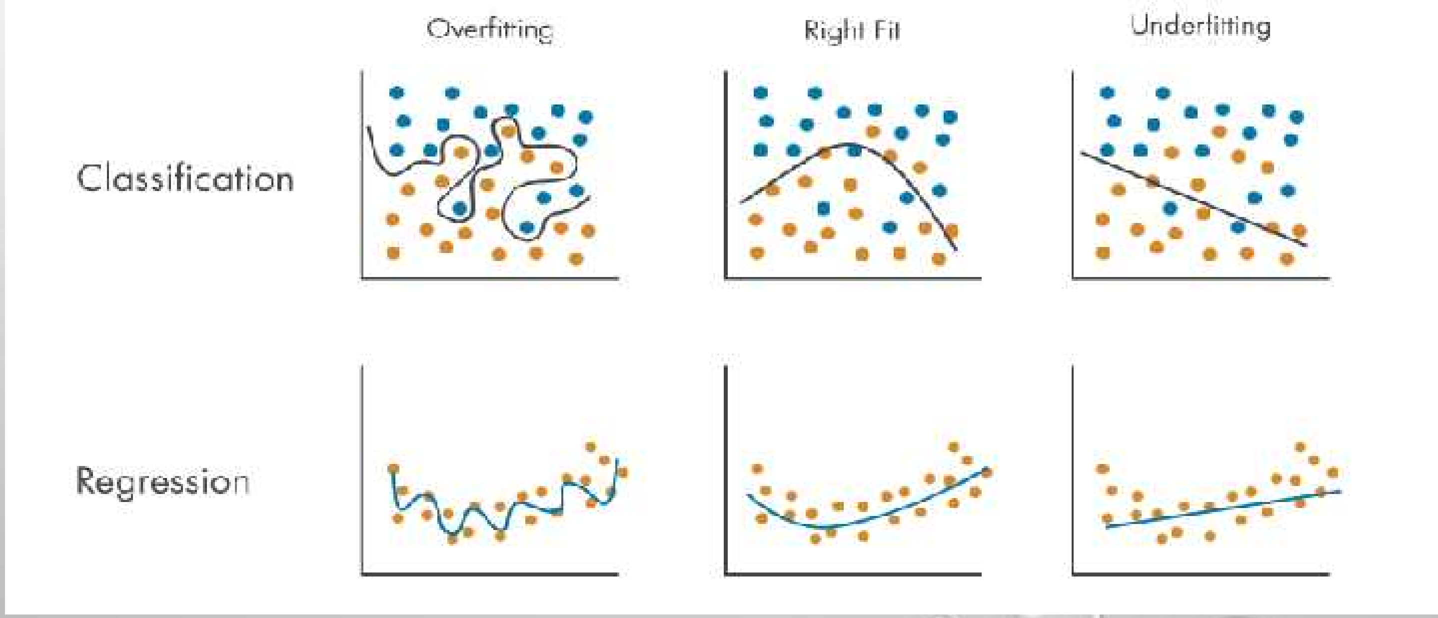
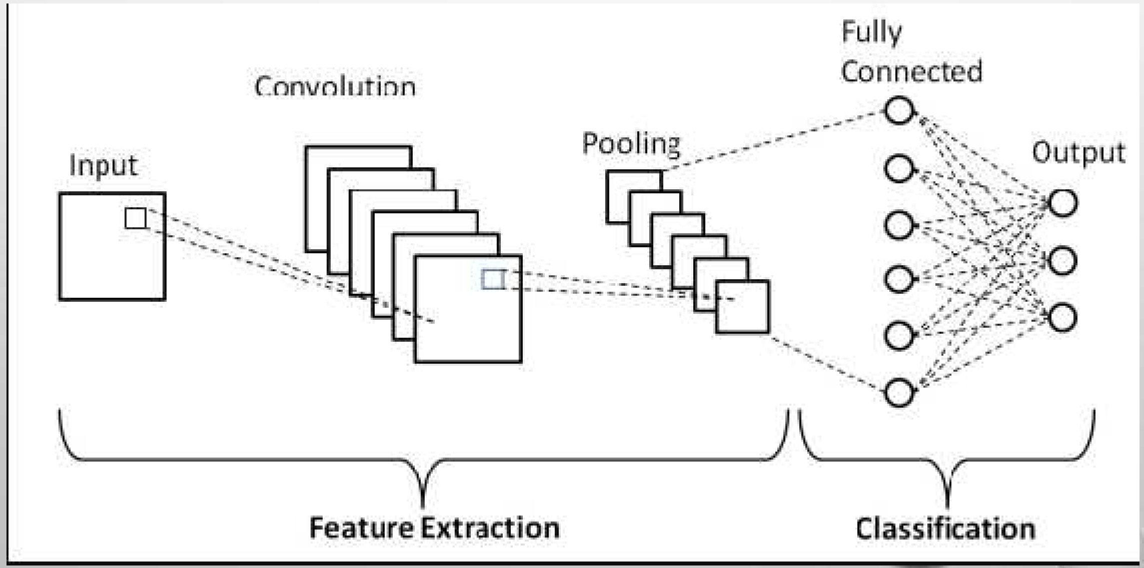
UNDERFITTING

- Underfitting happens when a deep learning model is too simple and fails to capture the patterns in the training data. It results in poor performance both on the training data and new data. Underfitting can be addressed by using more complex models or increasing the model's capacity.



CONVOLUTIONAL NEURAL NETWORKS (CNNS)

- CNNs are widely used for image and video processing tasks. They consist of convolutional layers that perform local receptive field operations, pooling layers for down sampling, and fully connected layers for classification. CNNs excel at capturing spatial relationships and extracting hierarchical features from images.



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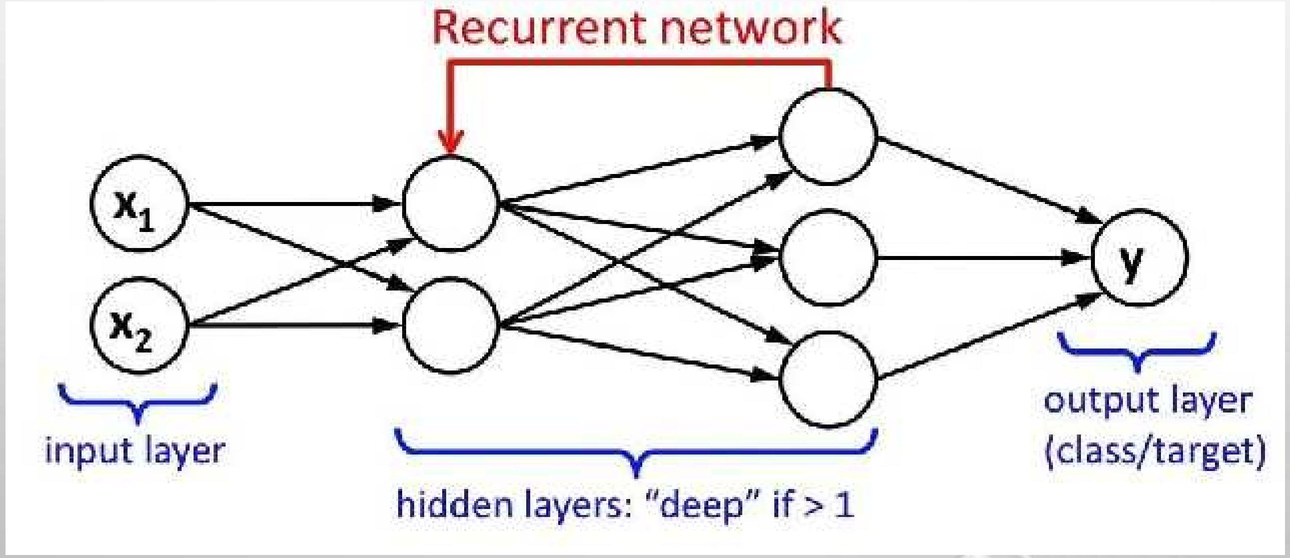
RECURRENT NEURAL NETWORKS (RNNS)

- RNNs are designed to handle sequential data, such as text or speech. They have feedback connections that allow information to persist and flow across different time steps. RNNs are effective in capturing temporal dependencies and context in sequential data.



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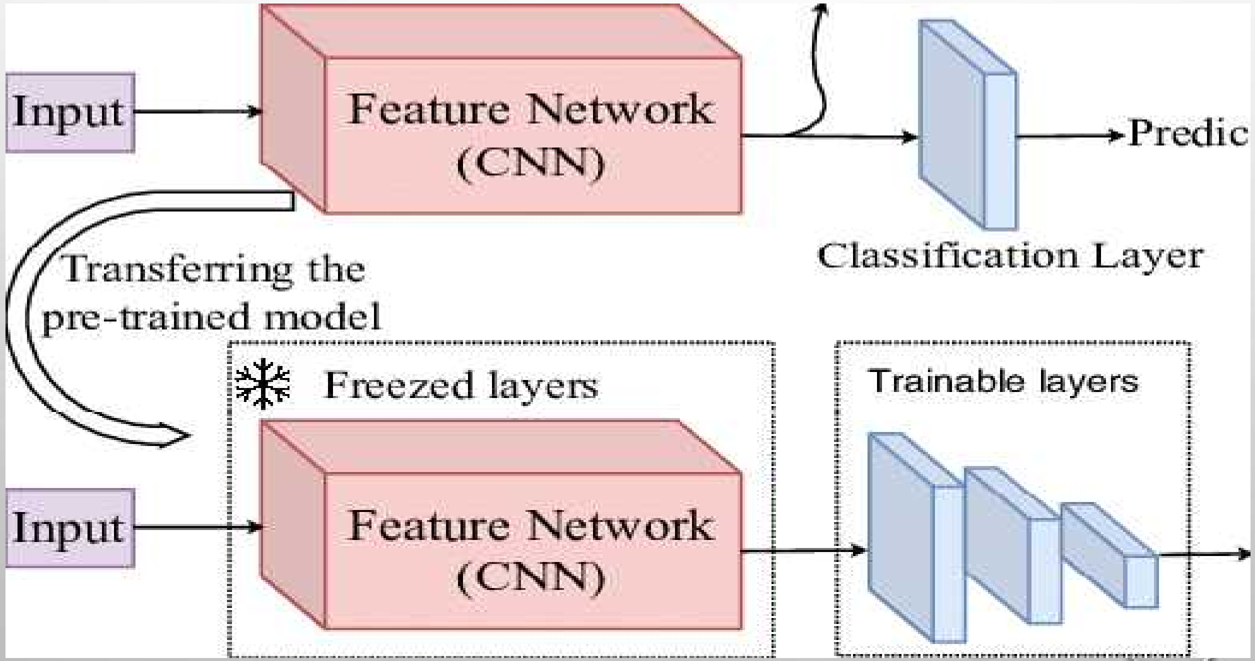
TRANSFER LEARNING

- Transfer learning involves leveraging pre-trained models on large datasets and fine-tuning them for specific tasks or domains with limited data. It saves computational resources and enables faster development by utilizing the learned features and weights from pre-trained models.



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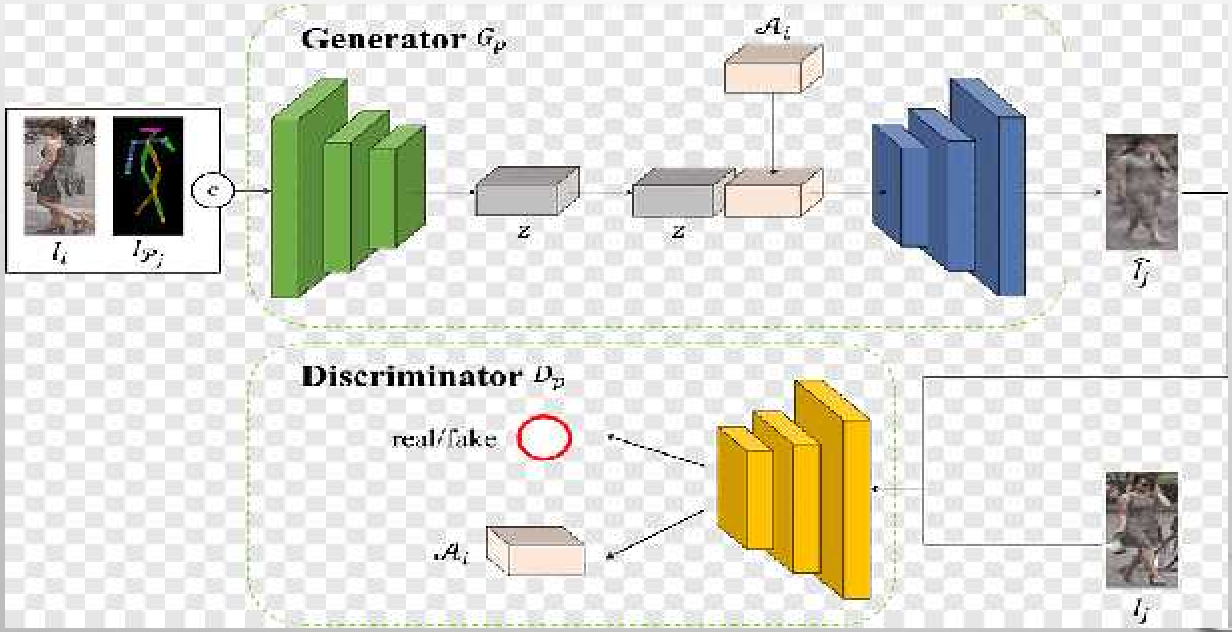
GENERATIVE ADVERSARIAL NETWORKS (GANS)

- GANs consist of a generator and a discriminator network that are trained simultaneously. The generator generates synthetic data samples, while the discriminator tries to distinguish between real and fake samples. GANs are used for tasks like image generation, style transfer, and data augmentation.



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These terms cover a broader range of deep learning concepts. Remember that deep learning is a vast field, and further exploration and practice will enhance your understanding. Experimenting with real-world projects and studying specific use cases will also deepen your knowledge and expertise.

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THANK YOU

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