

Impact of Learning Rate on Convergence

1. **Convergence Speed:** A higher learning rate can lead to faster convergence by taking larger steps, while a lower learning rate results in slower convergence with smaller steps.
2. **Overshooting:** If the learning rate is too high, the model may overshoot the minimum of the loss function, causing oscillations and instability in the training process.

CNN and its strengths?

A Convolutional Neural Network (CNN) is a type of deep learning model specifically designed for processing structured grid data, like images. Imagine it as a series of layers that automatically and adaptively learn spatial hierarchies of features from the input images. In simple terms, a CNN can be thought of as a machine that can automatically recognize patterns and objects in images, just like how our brain processes visual information.

- **Automatic Feature Extraction:** CNNs automatically learn to extract important features from raw input data, eliminating the need for manual feature engineering.
- **Spatial Hierarchy:** By using multiple layers of convolutions, CNNs create a hierarchy of features from simple to complex, allowing them to understand and recognize intricate patterns in data.
- **Parameter Sharing:** Convolutional layers use the same filter (set of weights) across different parts of the input, significantly reducing the number of parameters and computational complexity compared to fully connected networks.
- **Translation Invariance:** Due to their structure, CNNs are effective at recognizing patterns regardless of their position in the input, making them robust to translations and shifts in the input data.