Deep Learning for Omics — CNN, RNN & Transformers — Hands-on

Learn how to design and train deep learning models tailored to omics, clinical and biomedical data. This module covers data pipelines, core architectures (MLP, CNN, RNN, Transformers), regularization, training best practices and evaluation, implemented in R and Python with reproducible notebooks.

Deep Learning for Omics — CNN, RNN, Transformers

Help Desk · WhatsApp

Session Index

Session 1

Fee: Rs 8800 Apply Now

Deep Learning Foundations for Omics

Neural network basics and terminology

perceptrons and MLPs | **activation functions** | **losses and optimizers**

Data preparation for deep learning

train/validation/test splits | **tensor shapes and batching** | **GPU vs CPU considerations**

Overfitting, regularization and monitoring

dropout and weight decay **early stopping and learning rate schedules** **training and validation curves**

Session 2
Fee: Rs 11800 Apply Now

CNN Architectures for Omics & Images

Convolutional building blocks

convolutions and receptive fields **pooling and padding** **batch normalization**

CNNs for omics and biomedical signals

1D CNNs for sequences and profiles **2D CNNs for contact maps or images** **data augmentation ideas**

Transfer learning and fine tuning

pretrained backbones **freezing vs unfreezing layers** **small sample strategies**

Session 3
Fee: Rs 14800 Apply Now

RNNs & Sequence Models

Recurrent architectures

vanilla RNNs **LSTM and GRU cells** **bidirectional variants**

Modeling biological and clinical sequences

DNA / protein sequence encodings **time ordered lab and visit data** **sequence to label tasks**

Training stability and sequence length issues

vanishing and exploding gradients | truncated backpropagation | padding and masking

Session 4

Fee: Rs 18800 Apply Now

Transformers, Attention & End-to-End Pipeline

Attention and Transformer basics

self attention mechanism | multi head attention blocks | positional encodings

Using pretrained models and embeddings

bio specific Transformers (concepts) | feature extraction vs fine tuning | integration with classical ML

Deliverables: end to end deep learning pipeline

training notebook with metrics | saved model and config | inference script or function