AI & ML Learning Path: Complete Video Index

A carefully sequenced collection of the best AI/ML/DL video playlists for complete learning - from foundations to advanced implementations.

Learning Path Overview

1. **Machine Learning Foundations** - Start here for core ML concepts, data prep, and classical algorithms
2. **API Development & Deployment** - Learn to build and deploy ML models via APIs
3. **Natural Language Processing** - Master text data and NLP techniques
4. **Deep Learning Fundamentals** - Neural networks from basics to advanced architectures
5. **Building Neural Networks from Scratch** - The Karpathy way of truly understanding NNs

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1. 100 Days of Machine Learning (CampusX)

Foundations & Core Concepts
- [What is Machine Learning? | 100 Days of Machine Learning](https://www.youtube.com/watch?v=ZftI2fEz0Fw)
- [AI Vs ML Vs DL for Beginners in Hindi](https://www.youtube.com/watch?v=1v3_AQ26jZ0)
- [Types of Machine Learning for Beginners | Types of Machine learning in Hindi | Types of ML in Depth](https://www.youtube.com/watch?v=81ymPYEtFOw)
- [Batch Machine Learning | Offline Vs Online Learning | Machine Learning Types](https://www.youtube.com/watch?v=nPrhFxEuTYU)
- [Online Machine Learning | Online Learning | Online Vs Offline Machine Learning](https://www.youtube.com/watch?v=3oOipgCbLIk)
- [Instance-Based Vs Model-Based Learning | Types of Machine Learning](https://www.youtube.com/watch?v=ntAOq1ioTKo)
- [Challenges in Machine Learning | Problems in Machine Learning](https://www.youtube.com/watch?v=WGUNAJki2S4)
- [Application of Machine Learning | Real Life Machine Learning Applications](https://www.youtube.com/watch?v=UZio8TcTMrI)
- [Machine Learning Development Life Cycle | MLDLC in Data Science](https://www.youtube.com/watch?v=iDbhQGz_rEo)
- [Data Engineer Vs Data Analyst Vs Data Scientist Vs ML Engineer | Data Science Job Roles](https://www.youtube.com/watch?v=93rKZs0MkgU)
- [What are Tensors | Tensor In-depth Explanation | Tensor in Machine Learning](https://www.youtube.com/watch?v=vVhD2EyS41Y)

Environment Setup & First Projects
- [Installing Anaconda For Data Science | Jupyter Notebook for Machine Learning | Google Colab for ML](https://www.youtube.com/watch?v=82P5N2m41jE)
- [End to End Toy Project | Day 13 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=dr7z7a_8lQw)
- [How to Frame a Machine Learning Problem | How to plan a Data Science Project Effectively](https://www.youtube.com/watch?v=A9SezQlvakw)

Data Collection & Loading
- [Working with CSV files | Day 15 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=a_XrmKlaGTs)
- [Working with JSON/SQL | Day 16 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=fFwRC-fapIU)
- [Fetching Data From an API | Day 17 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=roTZJaxjnJc)
- [Fetching data using Web Scraping | Day 18 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=8NOdgjC1988)

Exploratory Data Analysis
- [Understanding Your Data | Day 19 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=mJIRTUuVr04)
- [EDA using Univariate Analysis | Day 20 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=4HyTIbHUKSw)
- [EDA using Bivariate and Multivariate Analysis | Day 21 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=6D3VtEfCw7w)
- [Pandas Profiling | Day 22 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=E69Lg2ZgOxg)

Feature Engineering
- [What is Feature Engineering | Day 23 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=sluoVhT0ehg)
- [Feature Scaling - Standardization | Day 24 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=1Yw9sC0PNwY)
- [Feature Scaling - Normalization | MinMaxScaling | MaxAbsScaling | RobustScaling](https://www.youtube.com/watch?v=eBrGyuA2MIg)
- [Encoding Categorical Data | Ordinal Encoding | Label Encoding](https://www.youtube.com/watch?v=w2GglmYHfmM)
- [One Hot Encoding | Handling Categorical Data | Day 27 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=U5oCv3JKWKA)
- [Column Transformer in Machine Learning | How to use ColumnTransformer in Sklearn](https://www.youtube.com/watch?v=5TVj6iEBR4I)
- [Machine Learning Pipelines A-Z | Day 29 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=xOccYkgRV4Q)
- [Function Transformer | Log Transform | Reciprocal Transform | Square Root Transform](https://www.youtube.com/watch?v=cTjj3LE8E90)
- [Power Transformer | Box - Cox Transform | Yeo - Johnson Transform](https://www.youtube.com/watch?v=IV_Z4HbNAx0)
- [Binning and Binarization | Discretization | Quantile Binning | KMeans Binning](https://www.youtube.com/watch?v=kKWsJGKcMvo)
- [Handling Mixed Variables | Feature Engineering](https://www.youtube.com/watch?v=9xiX-I5_LQY)
- [Handling Date and Time Variables | Day 34 | 100 Days of Machine Learning](https://www.youtube.com/watch?v=J73mvgG9fFs)

Missing Data & Outliers
- [Handling Missing Data | Part 1 | Complete Case Analysis](https://www.youtube.com/watch?v=aUnNWZorGmk)
- [Handling missing data | Numerical Data | Simple Imputer](https://www.youtube.com/watch?v=mCL2xLBDw8M)
- [Handling Missing Categorical Data | Simple Imputer | Most Frequent Imputation | Missing Category Imp](https://www.youtube.com/watch?v=I_Wip8bEDFQ)
- [Missing Indicator | Random Sample Imputation | Handling Missing Data Part 4](https://www.youtube.com/watch?v=Ratcir3p03w)
- [KNN Imputer | Multivariate Imputation | Handling Missing Data Part 5](https://www.youtube.com/watch?v=-fK-xEev2I8)
- [Multivariate Imputation by Chained Equations for Missing Value | MICE Algorithm | Iterative Imputer](https://www.youtube.com/watch?v=a38ehxv3kyk)
- [What are Outliers | Outliers in Machine Learning](https://www.youtube.com/watch?v=LIn1PKgGr_M)
- [Outlier Detection and Removal using Z-score Method | Handling Outliers Part 2](https://www.youtube.com/watch?v=OnPE-Z8jtqM)
- [Outlier Detection and Removal using the IQR Method | Handing Outliers Part 3](https://www.youtube.com/watch?v=Ccv1-W5ilak)
- [Outlier Detection using the Percentile Method | Winsorization Technique](https://www.youtube.com/watch?v=bcXA4CqRXvM)

Dimensionality Reduction

- [Feature Construction | Feature Splitting](https://www.youtube.com/watch?v=ma-h30PoFms)
- [Curse of Dimensionality](https://www.youtube.com/watch?v=ToGuhynu-No)
- [Principle Component Analysis (PCA) | Part 1 | Geometric Intuition](https://www.youtube.com/watch?v=iRbsBi5W0-c)
- [Principle Component Analysis (PCA) | Part 2 | Problem Formulation and Step by Step Solution](https://www.youtube.com/watch?v=tXXnxjj2wM4)
- [Principle Component Analysis (PCA) | Part 3 | Code Example and Visualization](https://www.youtube.com/watch?v=tofVCUDrg4M)

Linear Regression & Optimization
- [Simple Linear Regression | Code + Intuition | Simplest Explanation in Hindi](https://www.youtube.com/watch?v=UZPfbG0jNec)
- [Simple Linear Regression | Mathematical Formulation | Coding from Scratch](https://www.youtube.com/watch?v=dXHIDLPKdmA)
- [Regression Metrics | MSE, MAE & RMSE | R2 Score & Adjusted R2 Score](https://www.youtube.com/watch?v=Ti7c-Hz7GSM)
- [Multiple Linear Regression | Geometric Intuition & Code](https://www.youtube.com/watch?v=ashGekqstI8)
- [Multiple Linear Regression | Part 2 | Mathematical Formulation From Scratch](https://www.youtube.com/watch?v=NU37mF5q8VE)
- [Multiple Linear Regression | Part 3 | Code From Scratch](https://www.youtube.com/watch?v=VmZWXzxmNrE)
- [Gradient Descent From Scratch | End to End Gradient Descent | Gradient Descent Animation](https://www.youtube.com/watch?v=ORyfPJypKuU)
- [Batch Gradient Descent with Code Demo | Simple Explanation in Hindi](https://www.youtube.com/watch?v=Jyo53pAyVAM)
- [Stochastic Gradient Descent](https://www.youtube.com/watch?v=V7KBAa_gh4c)
- [Mini-Batch Gradient Descent](https://www.youtube.com/watch?v=_scscQ4HVTY)
- [Polynomial Regression | Machine Learning](https://www.youtube.com/watch?v=BNWLf3cKdbQ)
- [Bias Variance Trade-off | Overfitting and Underfitting in Machine Learning](https://www.youtube.com/watch?v=74DU02Fyrhk)

Regularization & Classification
- [Ridge Regression Part 1 | Geometric Intuition and Code | Regularized Linear Models](https://www.youtube.com/watch?v=aEow1QoTLo0)
- [Ridge Regression Part 2 | Mathematical Formulation & Code from Scratch | Regularized Linear Models](https://www.youtube.com/watch?v=oDlZBQjk_3A)
- [Ridge Regression Part 3 | Gradient Descent | Regularized Linear Models](https://www.youtube.com/watch?v=Fci_wwMp8G8)
- [5 Key Points - Ridge Regression | Part 4 | Regularized Linear Models](https://www.youtube.com/watch?v=8osKeShYVRQ)
- [Lasso Regression | Intuition and Code Sample | Regularized Linear Models](https://www.youtube.com/watch?v=HLF4bFbBgwk)
- [Why Lasso Regression creates sparsity?](https://www.youtube.com/watch?v=FN4aZPIAfI4)
- [ElasticNet Regression | Intuition and Code Example | Regularized Linear Models](https://www.youtube.com/watch?v=2g2DBkFhTTY)
- [Logistic Regression Part 1 | Perceptron Trick](https://www.youtube.com/watch?v=XNXzVfItWGY)
- [Logistic Regression Part 2 | Perceptron Trick Code](https://www.youtube.com/watch?v=tLezwPKvPK4)
- [Logistic Regression Part 3 | Sigmoid Function | 100 Days of ML](https://www.youtube.com/watch?v=ehO0-6i9qD4)
- [Logistic Regression Part 4 | Loss Function | Maximum Likelihood | Binary Cross Entropy](https://www.youtube.com/watch?v=6bXOo0sxY5c)
- [Derivative of Sigmoid Function](https://www.youtube.com/watch?v=awjXaFR1jOM)
- [Logistic Regression Part 5 | Gradient Descent & Code From Scratch](https://www.youtube.com/watch?v=ABrrSwMYWSg)
- [Accuracy and Confusion Matrix | Type 1 and Type 2 Errors | Classification Metrics Part 1](https://www.youtube.com/watch?v=c09drtuCS3c)
- [Precision, Recall and F1 Score | Classification Metrics Part 2](https://www.youtube.com/watch?v=iK-

kdhJ-7yI)
- [Softmax Regression || Multinomial Logistic Regression || Logistic Regression Part 6](https://www.youtube.com/watch?v=Z8noL_0M4tw)
- [Polynomial Features in Logistic Regression | Non Linear Logistic Regression | Logistic Regression 7](https://www.youtube.com/watch?v=WnBYW_DX3sM)
- [Logistic Regression Hyperparameters || Logistic Regression Part 8](https://www.youtube.com/watch?v=ay_OcblJasE)

Decision Trees & Ensembles
- [Decision Trees Geometric Intuition | Entropy | Gini impurity | Information Gain](https://www.youtube.com/watch?v=IZnno-dKgVQ)
- [Decision Trees - Hyperparameters | Overfitting and Underfitting in Decision Trees](https://www.youtube.com/watch?v=mDEV0Iucwz0)
- [Regression Trees | Decision Trees Part 3](https://www.youtube.com/watch?v=RANHxyAvtM4)
- [Awesome Decision Tree Visualization using dtreeviz library](https://www.youtube.com/watch?v=SlMZqfvl5uw)
- [Introduction to Ensemble Learning | Ensemble Techniques in Machine Learning](https://www.youtube.com/watch?v=bHK1fE_BUms)
- [Voting Ensemble | Introduction and Core Idea | Part 1](https://www.youtube.com/watch?v=_W1i-c_6rOk)
- [Voting Ensemble | Classification | Voting Classifier | Hard Voting Vs Soft Voting | Part 2](https://www.youtube.com/watch?v=pGQnNYdPTvY)
- [Voting Ensemble | Regression | Part 3](https://www.youtube.com/watch?v=ut4vh59rGkw)
- [Bagging | Introduction | Part 1](https://www.youtube.com/watch?v=LUiBOAy7x6Y)
- [Bagging Ensemble | Part 2 | Bagging Classifiers](https://www.youtube.com/watch?v=4wLcUnbRxFE)
- [Random Forests | Part 1 | Intuition](https://www.youtube.com/watch?v=Jq8hFqR-RoA)
- [Random Forests | Part 2 | Code Demo](https://www.youtube.com/watch?v=cLoDSk2BMOA)
- [Feature Importance in Random Forests](https://www.youtube.com/watch?v=WkvNRxPzMEY)
- [Boosting | Introduction | Part 1](https://www.youtube.com/watch?v=I_qGUX0F1i4)
- [AdaBoost | Part 2 | Intuition and Implementation](https://www.youtube.com/watch?v=0VNRkkY5mVA)
- [Gradient Boosting | Part 3 | Intuition](https://www.youtube.com/watch?v=T25bGzIBxKg)
- [Gradient Boosting | Part 4 | Implementation and Code Demo](https://www.youtube.com/watch?v=ztHz_Lk2nCw)
- [XGBoost | Part 5 | XGBoost from Scratch](https://www.youtube.com/watch?v=60R5WzBz1E4)

Unsupervised Learning & Clustering
- [K-Means Clustering Intuition & Code](https://www.youtube.com/watch?v=AT6G4Vt8fg4)
- [K-Means ++ | Cluster Initialization](https://www.youtube.com/watch?v=JPv9GouUakk)
- [Gaussian Mixture Model | Intuition](https://www.youtube.com/watch?v=Qw6TwmDko4I)
- [EM Algorithm | Expectation Maximization Explained](https://www.youtube.com/watch?v=IhQmYU7e9C0)
- [Hierarchical Clustering | Agglomerative Clustering](https://www.youtube.com/watch?v=n3pWc9nqt-A)
- [DBSCAN Clustering | Density Based](https://www.youtube.com/watch?v=PmxE3kXvm-A)

Model Selection, Validation & Advanced Topics
- [Cross Validation | Holdout vs K-Fold](https://www.youtube.com/watch?v=TiCNG8YVKgA)
- [Stratified K-Fold Cross Validation](https://www.youtube.com/watch?v=P_C4o5ezD44)
- [Hyperparameter Tuning | Grid Search vs Random Search](https://www.youtube.com/watch?v=wvA0EqbGGak)
- [Pipeline with Grid SearchCV](https://www.youtube.com/watch?v=UACDTu5kXw4)
- [Bias-Variance Decomposition | Visualization](https://www.youtube.com/watch?v=oSHdJ9CKkII)
- [Learning Curves in Machine Learning](https://www.youtube.com/watch?v=5kyL6WjoJ3A)
- [Principal Component Regression](https://www.youtube.com/watch?v=Mf60x3NWhbQ)
- [End-to-End Project: Credit Card Fraud Detection](https://www.youtube.com/watch?v=LhvEJc_BsLI)
FastAPI + Docker + Deployment (CampusX)

- [What is an API? | Introduction to APIs | FAST API for Machine Learning](https://www.youtube.com/watch?v=WJKsPchji0Q)
- [FastAPI Philosophy | How to setup FastAPI | Installation and Code Demo]

(https://www.youtube.com/watch?v=lXx-_1r0Uss)
- [HTTP Methods in FastAPI](https://www.youtube.com/watch?v=O8KrViWNhOM)
- [Path & Query Params in FastAPI](https://www.youtube.com/watch?v=VVVKEfhXCQ4)
- [Pydantic Crash Course | Data Validation in Python](https://www.youtube.com/watch?v=lRAryIZCeOs)
- [Post Request in FastAPI | What is Request Body?](https://www.youtube.com/watch?v=sw8V7mLl3OI)
- [PUT & DELETE in FastAPI](https://www.youtube.com/watch?v=XVu22pTwWE8)
- [Serving ML Models with FastAPI](https://www.youtube.com/watch?v=JdDoMi_vqbM)
- [Improving the FastAPI API](https://www.youtube.com/watch?v=M17qwKnmG38)
- [Docker for Machine Learning | Docker Crash Course | CampusX](https://www.youtube.com/watch?v=GToyQTGDOS4)
- [FastAPI + Docker Tutorial for Beginners | How to Dockerize a FastAPI API Application](https://www.youtube.com/watch?v=jlLs6hfAga4)
- [How to Deploy a FastAPI API on AWS | FastAPI Video #10](https://www.youtube.com/watch?v=X0lnToYN21k)
End to End NLP Course (CampusX)

- [Introduction to NLP | NLP Lecture 1 | End to End NLP Course](https://www.youtube.com/watch?v=zlUpTlaxAKI)
- [End to End NLP Pipeline | NLP Pipeline | Lecture 2 NLP Course](https://www.youtube.com/watch?v=29qyNyNkLHs)
- [Text Preprocessing | NLP Course Lecture 3](https://www.youtube.com/watch?v=6C0sLtw5ctc)
- [Text Representation | NLP Lecture 4 | Bag of Words, Tf-IDF, N-grams, Bi-grams and Uni-grams](https://www.youtube.com/watch?v=vo6gQz5lYRI)
- [Word2vec Complete Tutorial | CBOW and Skip-gram | Game of Thrones Word2vec](https://www.youtube.com/watch?v=DDfLc5AHoJI)
- [Text Classification | NLP Lecture 6 | End to End | Average Word2Vec](https://www.youtube.com/watch?v=Qbd7U9F0QQ8)
- [POS Tagging | Part of Speech Tagging in NLP | Hidden Markov Models in NLP | Viterbi Algorithm in NLP](https://www.youtube.com/watch?v=269IGagoJfs)
- [Duplicate Question Pairs | Quora Question Pairs | NLP Projects | End to End NLP Project | Heroku](https://www.youtube.com/watch?v=1fvQU5yPjFs)

4. 100 Days of Deep Learning (CampusX)

Deep Learning Foundations

- [100 Days of Deep Learning | Course Announcement](https://www.youtube.com/watch?v=2dH_qjc9mFg)
- [What is Deep Learning? Deep Learning Vs Machine Learning | Complete Deep Learning Course](https://www.youtube.com/watch?v=fHF22Wxuyw4)
- [Types of Neural Networks | History of Deep Learning | Applications of Deep Learning](https://www.youtube.com/watch?v=fne_UE7hDn0)
- [What is a Perceptron? Perceptron Vs Neuron | Perceptron Geometric Intuition](https://www.youtube.com/watch?v=X7iIKPoZ0Sw)
- [Perceptron Trick | How to train a Perceptron | Perceptron Part 2](https://www.youtube.com/watch?v=Lu2bruOHN6g)
- [Perceptron Loss Function | Hinge Loss | Binary Cross Entropy | Sigmoid Function](https://www.youtube.com/watch?v=2_gCL5RAkHc)
- [Problem with Perceptron](https://www.youtube.com/watch?v=Jp44b27VnOg)
- [MLP Notation](https://www.youtube.com/watch?v=H0_3SJh4Rqs)
- [Multi Layer Perceptron | MLP Intuition](https://www.youtube.com/watch?v=qw7wFGgNCSU)
- [Forward Propagation | How a neural network predicts output?](https://www.youtube.com/watch?v=7MuiScUkboE)
- [Customer Churn Prediction using ANN | Keras and Tensorflow | Deep Learning Classification](https://www.youtube.com/watch?v=9wmImImmgcI)
- [Handwritten Digit Classification using ANN | MNIST Dataset](https://www.youtube.com/watch?v=3xPT2Pk0Jds)
- [Graduate Admission Prediction using ANN](https://www.youtube.com/watch?v=RCmiPBiA4qg)

Loss Functions, Backpropagation & Optimization

- [Loss Functions in Deep Learning](https://www.youtube.com/watch?v=gb5nm_3jBIo)
- [Backpropagation in Deep Learning | Part 1 | The What?](https://www.youtube.com/watch?v=6M1wWQmcUjQ)
- [Backpropagation Part 2 | The How](https://www.youtube.com/watch?v=ma6hWrU-LaI)
- [Backpropagation Part 3 | The Why](https://www.youtube.com/watch?v=6xO-x8y0YSY)
- [MLP Memoization](https://www.youtube.com/watch?v=rW0eeTXas4k)
- [Gradient Descent in Neural Networks | Batch vs Stochastics vs Mini Batch Gradient Descent](https://www.youtube.com/watch?v=7z6yXpYk7sw)
- [Vanishing Gradient Problem in ANN | Exploding Gradient Problem | Code Example](https://www.youtube.com/watch?v=uCrevbBh0zM)

Advanced Training & Regularization

- [How to Improve the Performance of a Neural Network](https://www.youtube.com/watch?v=Ue_6n1yT_R8)
- [Early Stopping In Neural Networks](https://www.youtube.com/watch?v=Ygvskt5HadI)
- [Data Scaling in Neural Network | Feature Scaling in ANN](https://www.youtube.com/watch?v=mzRO0cVppQ0)
- [Dropout Layer in Deep Learning](https://www.youtube.com/watch?v=gyTlcHVeBjM)
- [Dropout Layers in ANN | Code Example | Regression | Classification](https://www.youtube.com/watch?v=tgIx04ML7-Y)
- [Regularization in Deep Learning | L1/L2/Weight Decay](https://www.youtube.com/watch?v=4xRonrhtkzc)

Activations, Weight Init & BatchNorm

- [Activation Functions in Deep Learning | Sigmoid, Tanh and Relu Activation Function](https://www.youtube.com/watch?v=7LcUkgzx3AY)
- [Relu Variants Explained | Leaky Relu | Parametric Relu | Elu | Selu](https://www.youtube.com/watch?v=2OwWs7Hzr9g)
- [Weight Initialization Techniques | What not to do?](https://www.youtube.com/watch?v=2MSY0HwH5Ss)
- [Xavier/Glorot And He Weight Initialization in Deep Learning](https://www.youtube.com/watch?v=nwVOSgcrbQI)
- [Batch Normalization in Deep Learning | Batch Learning in Keras](https://www.youtube.com/watch?v=2AscwXePInA)

Optimization Algorithms & Hyperparameters

- [Optimizers in Deep Learning | Part 1](https://www.youtube.com/watch?v=iCTTnQJn50E)
- [Exponentially Weighted Moving Average or Exponential Weighted Average](https://www.youtube.com/watch?v=jAqVuYJ8TP8)
- [SGD with Momentum Explained](https://www.youtube.com/watch?v=vVS4csXRlcQ)
- [Nesterov Accelerated Gradient (NAG)](https://www.youtube.com/watch?v=rKG9E6rce1c)
- [AdaGrad Explained](https://www.youtube.com/watch?v=nqL9xYmhEpg)
- [RMSProp Explained](https://www.youtube.com/watch?v=p0wSmKslWi0)
- [Adam Optimizer Explained](https://www.youtube.com/watch?v=N5AynaIXD9g)
- [Keras Tuner | Hyperparameter Tuning a Neural Network](https://www.youtube.com/watch?v=oYnyNLj8RMA)

Convolutional Neural Networks (CNNs)

- [What is Convolutional Neural Network (CNN)?](https://www.youtube.com/watch?v=hDVFXf74P-U)
- [CNN Vs Visual Cortex | The Famous Cat Experiment | History of CNN](https://www.youtube.com/watch?v=aslTGS9ef98)
- [CNN Part 3 | Convolution Operation](https://www.youtube.com/watch?v=cgJx3GvQ5y8)
- [Padding & Strides in CNN](https://www.youtube.com/watch?v=btWE6SsdDZA)

- [Pooling Layer in CNN | MaxPooling in Convolutional Neural Network](https://www.youtube.com/watch?v=DwmGefkowCU)
- [CNN Architecture | LeNet -5 Architecture](https://www.youtube.com/watch?v=ewsvsJQOuTI)
- [Comparing CNN Vs ANN](https://www.youtube.com/watch?v=niE5DRKvD_E)
- [Backpropagation in CNN | Part 1](https://www.youtube.com/watch?v=RvCCFttGFMY)
- [CNN Backpropagation Part 2 | Convolution, Maxpooling and Flatten Layers](https://www.youtube.com/watch?v=OoL83KcqlK4)
- [Building Your Own Neural Net with Keras + TF | MNIST | Full Project](https://www.youtube.com/watch?v=dYjZx8EAqzw)

CNN Advanced

- [Cat Vs Dog Image Classification Project](https://www.youtube.com/watch?v=1xvg6hE1T9s)
- [Data Augmentation in Deep Learning](https://www.youtube.com/watch?v=mw0rnYF9gRY)
- [Pretrained models in CNN | ImageNET Dataset](https://www.youtube.com/watch?v=O-wGNsBNpoo)
- [What does a CNN see?](https://www.youtube.com/watch?v=Sv2jzCeh5gU)
- [What is Transfer Learning?](https://www.youtube.com/watch?v=DVgvLMYbpxY)
- [Keras Functional Model](https://www.youtube.com/watch?v=wuQ6I2h1nGY)

RNNs, LSTMs, Transformers

- [Why RNNs are needed](https://www.youtube.com/watch?v=6rMlQcsFECY)
- [RNN Architecture + Forward Prop](https://www.youtube.com/watch?v=ClNzDjEdSEQ)
- [RNN Sentiment Analysis](https://www.youtube.com/watch?v=I-UQ9F6jGpg)
- [Types of RNN](https://www.youtube.com/watch?v=dNyJSZH9r4g)
- [Backpropagation Through Time](https://www.youtube.com/watch?v=F2f1b7TQArw)
- [Problems with RNN](https://www.youtube.com/watch?v=3lAhQO5njvA)
- [LSTM Part 1](https://www.youtube.com/watch?v=sQxtHFQCmqs)
- [LSTM Part 2](https://www.youtube.com/watch?v=IGXnKqTym3c)
- [LSTM Part 3 – Next Word Prediction](https://www.youtube.com/watch?v=b4vZG8EeldE)
- [GRU](https://www.youtube.com/watch?v=XhdcbDEGHCs)
- [Stacked RNNs/LSTMs/GRUs](https://www.youtube.com/watch?v=fWnbp6QnH8k)
- [Bidirectional RNNs](https://www.youtube.com/watch?v=VgfekfGIIZA)

Transformers & Modern LLMs

- [Epic History of LLMs](https://www.youtube.com/watch?v=H-X2rfloF9Q)
- [Encoder Decoder Architecture](https://www.youtube.com/watch?v=k6skx2rpL7A)
- [Attention Mechanism](https://www.youtube.com/watch?v=mT1vqQ4PzxA)
- [Bahdanau Vs Luong Attention](https://www.youtube.com/watch?v=-4c-7-fO738)
- [Introduction to Transformers](https://www.youtube.com/watch?v=444gUOjGm3U)
- [Self Attention](https://www.youtube.com/watch?v=pSvyOgc6eME)
- [Self Attention Code Example](https://www.youtube.com/watch?v=SHnLpC2CA3c)
- [Scaled Dot Product Attention](https://www.youtube.com/watch?v=Abe69AEPqu8)
- [Self Attention Geometric Intuition](https://www.youtube.com/watch?v=I9bUpOUXBq8)
- [Why is Self Attention called "Self"?](https://www.youtube.com/watch?v=zCu-7vCPYdc)
- [Multi-head Attention](https://www.youtube.com/watch?v=F0kYpFYO1BQ)
- [Positional Encoding](https://www.youtube.com/watch?v=vI6i3hGfft8)
- [Layer Normalization in Transformers](https://www.youtube.com/watch?v=2bORLMh9gLc)
- [Transformer Encoder Architecture](https://www.youtube.com/watch?v=B9hEwKa3mS4)
- [Masked Self Attention | Transformer Decoder](https://www.youtube.com/watch?v=vAGWsN2Co-s)
- [Cross Attention](https://www.youtube.com/watch?v=gnQIGFFKpLk)
- [Transformer Decoder Architecture](https://www.youtube.com/watch?v=wOvizZ5QnOU)
- [Transformer Inference](https://www.youtube.com/watch?v=oKo0pIbofficial)

PyTorch Crash Course (CampusX)

- [PyTorch for Beginners](https://www.youtube.com/watch?v=zc74gK5hT3w)
- [Tensors in PyTorch](https://www.youtube.com/watch?v=R4ZoApYIC5g)
- [Autograd](https://www.youtube.com/watch?v=H87qM9rBXTQ)
- [Training Pipeline](https://www.youtube.com/watch?v=icBZHac2qQs)
- [NN Module](https://www.youtube.com/watch?v=rcpV7O5kSIk)
- [Dataset & DataLoader](https://www.youtube.com/watch?v=EoTU5tR5dq8)
- [Build ANN using PyTorch](https://www.youtube.com/watch?v=c6IuP3BX2CU)

- [GPU Training](https://www.youtube.com/watch?v=OI4Y5YgMQ1M)
- [Optimization](https://www.youtube.com/watch?v=2pWv7GOvuf0)
- [Hyperparameter Tuning with Optuna](https://www.youtube.com/watch?v=A9cnpy9e_TI)
- [Build CNN with PyTorch](https://www.youtube.com/watch?v=5xfWx3xUemQ)
- [Transfer Learning](https://www.youtube.com/watch?v=R9InT1P2q6I)
- [RNN QA System](https://www.youtube.com/watch?v=7UiCf56slAs)
- [Next Word Prediction using LSTM](https://www.youtube.com/watch?v=GSnHPLuYbHM)

5. Neural Networks: Zero to Hero (Andrej Karpathy)

- [The spelled-out intro to neural networks and backpropagation: building micrograd](https://www.youtube.com/watch?v=VMj-3S1tku0)
- [The spelled-out intro to language modeling: building makemore](https://www.youtube.com/watch?v=PaCmpygFfXo)
- [Building makemore Part 2: MLP](https://www.youtube.com/watch?v=TCH_1BHY58I)
- [Building makemore Part 3: Activations & Gradients, BatchNorm](https://www.youtube.com/watch?v=P6sfmUTpUmc)
- [Building makemore Part 4: Becoming a Backprop Ninja](https://www.youtube.com/watch?v=q8SA3rM6ckI)
- [Building makemore Part 5: Building a WaveNet](https://www.youtube.com/watch?v=t3YJ5hKiMQ0)
- [Let's build GPT: from scratch, in code, spelled out.](https://www.youtube.com/watch?v=kCc8FmEb1nY)
- [State of GPT | BRK216HFS](https://www.youtube.com/watch?v=bZQun8Y4L2A)
- [Let's build the GPT Tokenizer](https://www.youtube.com/watch?v=zduSFxRajkE)
- [Let's reproduce GPT-2 (124M)](https://www.youtube.com/watch?v=l8pRSuU81PU)
