PATHAHEAD · FREE ROADMAP

Become an AI/ML Engineer from Scratch

A practical, week-by-week plan that takes you from zero to job-ready in about six months — built around real projects, not just theory.

24	5	4	₹0
weeks · ~10–12 hrs/wk	portfolio projects	phases · zero to deploy	free resources only

Start: 14 Jul 2026 · Finish: 28 Dec 2026 · Adjust the pace to your life — the order matters more than the dates.

THE ONE RULE

Learn → code it → build something

Watching tutorials without writing code is wasted time. Every concept below is paired with something you build. Ship small things often, and put every project on GitHub.

THE ROADMAP

Four phases, twenty-four weeks

0 Foundations

Weeks 1–4 · 14 Jul – 10 Aug

Get comfortable with Python and just enough math.

WEEK 1 · 14–20 JUL

Python basics

Variables, loops, functions, lists & dicts, files, error handling.

WEEK 2 · 21–27 JUL

Python for data

NumPy, pandas, matplotlib. Clean a real CSV, plot charts.

WEEK 3 · 28 JUL–3 AUG

Linear algebra

Vectors, matrices, dot products, gradients — intuition, not proofs.

WEEK 4 · 4–10 AUG

Probability & stats

Mean, variance, distributions, Bayes, correlation vs causation.

1 Core Machine Learning

Weeks 5–12 · 11 Aug – 5 Oct

Understand and apply classic ML with scikit-learn. (Andrew Ng's ML Specialization.)

WEEK 5 · PROJECT ▶

Linear regression

Gradient descent, train/test split. Start the House Price Predictor.

WEEK 6

Classification

Logistic regression, accuracy, precision, recall, F1, confusion matrix.

WEEK 7

Tuning models

Overfitting, bias-variance, regularization, cross-validation, scaling.

WEEK 8

Trees & ensembles

Decision trees, random forests, gradient boosting, feature importance.

WEEK 9

More algorithms

KNN, SVM, Naive Bayes, and GridSearch hyperparameter tuning.

WEEK 10

Unsupervised

K-means clustering and PCA for dimensionality reduction.

WEEK 11

Feature engineering

Missing data, outliers, encoding, full sklearn pipelines.

WEEK 12 · PROJECT ▶

Ship project #1

Finish the predictor end-to-end with a clean GitHub README.

2 Deep Learning

Weeks 13–20 · 6 Oct – 30 Nov

Build neural networks with PyTorch — from MNIST to Transformers.

WEEK 13

Neural net basics

Neurons, activations, loss, backpropagation, optimizers.

WEEK 14

PyTorch

Tensors, autograd, your first trained network on MNIST digits.

WEEK 15 · PROJECT ▶

CNNs part 1

Convolution & pooling. Start the Image Classifier.

WEEK 16

CNNs part 2

Train on a real image dataset, plot learning curves.

WEEK 17

Regularizing

Dropout, batch norm, augmentation, and transfer learning.

WEEK 18

Sequences & NLP

Embeddings, RNN/LSTM basics, text preprocessing.

WEEK 19

Transformers

Attention — the foundation of ChatGPT. Use Hugging Face.

WEEK 20 · PROJECT ▶

Ship project #2

Finish & deploy a demo on Hugging Face Spaces or Streamlit.

3 Engineering, Deployment & GenAI

Weeks 21–24 · 1–28 Dec

Ship models like an engineer — the part that turns "learner" into "hireable".

WEEK 21

Engineering

Git, clean project structure, virtual envs, modular code.

WEEK 22

Deployment

Serve a model with FastAPI, Docker basics, deploy to a free host.

WEEK 23 · PROJECT ▶

LLMs & RAG

Call an LLM API, build document Q&A with embeddings + vector search.

WEEK 24 · CAPSTONE ▶

Capstone + job prep

One polished end-to-end app. Portfolio, resume, start applying.

BUILD A PORTFOLIO

Five projects that get you hired

Projects beat certificates. Do them in order — each builds skills for the next. Put every one on GitHub with a clear README: problem → approach → results → screenshots.

Start here

1 · House Price Predictor

Regression with pandas & scikit-learn. Compare Linear Regression vs Random Forest. RMSE and R^2. (Starter code included in your project folder.)

Classification

2 · Spam / Sentiment Classifier

Text features (TF-IDF), logistic regression, precision/recall. Pick spam detection, movie-review sentiment, or Titanic survival.

Deep learning

3 · Image Classifier

A CNN in PyTorch. Start with MNIST, then a real dataset. Use transfer learning; deploy an upload-an-image demo.

In demand

4 · Document Q&A (RAG)

Upload a PDF, ask questions. Embeddings + vector search + an LLM, wrapped in a Streamlit UI. One of the most requested AI skills today.

Capstone

5 · Deployed ML App

Take any earlier project to production: model served via FastAPI, containerized with Docker, live on a free host. The one you talk about in interviews.

ROLES YOU CAN APPLY FOR

ML Engineer · AI Engineer · Data Scientist · ML Researcher

TYPICAL STARTING SALARY · INDIA

₹6–15 LPA

LEARN IT

Learning resources

Every item links to the real source (clickable in this PDF).

BOOKS

- Hands-On Machine Learning with Scikit-Learn Keras and TensorFlow by Aurelien Geron
- Pattern Recognition and Machine Learning by Christopher Bishop
- Deep Learning by Ian Goodfellow, Yoshua Bengio and Aaron Courville

COURSES

- Machine Learning Specialization by Andrew Ng on Coursera
- Practical Deep Learning for Coders by fast.ai (free)
- Machine Learning by NPTEL (free)
- Deep Learning Specialization by Coursera

YOUTUBE

- 3Blue1Brown
- StatQuest with Josh Starmer
- Two Minute Papers

PRACTICE

- Kaggle
- Hugging Face
- Google Colab

DO THIS TODAY

Your first step (takes 30 minutes)

1

Open Google Colab

colab.research.google.com — free, in your browser, every library pre-installed. Zero setup.

2

Get a GitHub account

Create a free account at github.com. This is where your projects live and where recruiters look.

3

Run Project 1

Load the California Housing dataset, plot a few charts, train your first model. That's it — you've started.

Job-ready checklist: 3–5 solid projects on GitHub (≥1 deployed and live) · can explain your models and tradeoffs in an interview · comfortable with Python, scikit-learn, PyTorch, Git, and one deployment path · a few Kaggle competitions done.

PathAhead — India's premium career guidance platform. This roadmap is a free educational resource; timelines are a guide and everyone learns at a different pace. Third-party resources (Coursera, fast.ai, freeCodeCamp, 3Blue1Brown, Khan Academy, Hugging Face) are referenced for learning only and are not affiliated with PathAhead.