100+ Best Resources (Courses, Books, YouTube Videos & Tutorials) to Learn Machine Learning

Machine Learning is very powerful and popular. Many people are shifting their careers into the Machine learning field. But when it comes to learning machine learning, most of us stuck and don't know where to learn. That's why I thought to collect and combine all the **best resources to learn machine learning online** in this PDF.

Before discussing the resources, I would like to tell you what topics or skills you need to learn for Machine Learning-

Skills Required for Machine Learning–

1. Programming Language

Knowledge of Programming language is compulsory for machine learning. And the most popular programming languages are **Python, R, Java, and C++.** But as a beginner, you can start with Python.

2. Mathematics Skill

Knowledge of **Mathematics** is very important in order to understand how machine learning and its algorithms work. In math, the most important topics are-

- Probability and Statistics
- Linear Algebra

- Calculus

Now, let's have a detailed look at all of them-

a). Probability and Statistics

Probability and statistics are used in- Bayes' Theorem, Probability Distribution, Sampling, and Hypothesis Testing.

b). Linear Algebra

Linear Algebra has two important terms- Matrices and Vectors. They both used widely in Machine Learning. Matrices are used in **Image Recognition**.

c). Calculus

In Calculus, you have **Differential Calculus** and **Integral Calculus.** These terms help you to determine the **probability of events**. For example, finding the posterior probability in the Naive Bayes model.

3. Machine Learning Algorithms

You should have knowledge of Machine Learning Algorithms like-

- **Supervised Learning Algorithms**
    - Logistic Regression.
    - K-Nearest Neighbors(K-NN)
    - Support Vector Machine(SVM)
    - Kernel SVM.
    - Naive Bayes
    - Decision Tree Classification.
    - Random Forest Classification
- **Unsupervised Learning Algorithms**
    - K-Means Clustering
    - Hierarchical Clustering.
    - Probabilistic Clustering
- **Reinforcement Learning Algorithms**
    - Policy Optimization.
    - Q-Learning
    - Learn the Model
    - Given the Model.

4. Machine Learning Frameworks

Machine Learning Frameworks make the life of developers and machine learning engineers a whole lot easier. ML Frameworks remove the complex part of machine learning and make it available for everyone who wants to use it.

These are some widely used Machine Learning Frameworks-

- TensorFlow.
- Theano.
- scikit learn.
- PyTorch.
- Keras.
- DL4J.
- Caffe.
- Microsoft Cognitive Toolkit.

5. Data Engineering Skills

For building a machine learning model, you need data for training and testing. That's why knowledge of data engineering is important. Data Engineering contains 3 basic steps-

- **Data pre-processing-** Data pre-processing step is performed before you process the data. Data pre-processing steps are **cleaning, parsing, correcting, and consolidating** the data.
- **ETL (Extract, Transform, and Load)-** In this step, you need to perform extraction of data from the internet or local server, then transform the data into a suitable format, and after that load the data into your program. That's why you should have knowledge of ETL so that you can perform these steps easily.
- **Knowledge of Database-** You should be familiar with DBMS like SQL, Oracle Database, and No SQL.

6. Deep Learning Algorithms

Deep learning is the subpart of machine learning. And it is much more powerful than machine learning. Deep learning is getting more interest nowadays. That's why you should be familiar with Deep Learning Algorithms.

The most used **Deep Learning Algorithms** are-

1. Feedforward Neural Network.
2. Backpropagation.
3. Convolutional Neural Network.
4. Recurrent Neural Network.
5. Generative Adversarial Networks (GAN).

So, these are some must-have skills for Machine Learning, now let's move to the best resources to learn machine learning online.

For your convenience, I have created separate tables for each resource. So let's start with online courses-

Online Courses

Programming Language (Python & R)-

1. Python for Everybody Specialization– University of Michigan
2. Introduction To Python Programming– Udemy
3. Python Core and Advanced– Udemy
4. Crash Course on Python– *Google*
5. Python for Absolute Beginners!– Udemy
6. Introduction to Python Programming– Udacity
7. Python 3 Programming Specialization– University of Michigan
8. R Programming – Johns Hopkins University
9. Programming for Data Science with R– *Udacity*
10. R Programming A-Z™– *Udemy*

Mathematics-

11. Mathematics for Machine Learning Specialization– Imperial College London
12. Mathematics for Data Science Specialization– Coursera
13. Data Science Math Skills– Duke University
14. Intro to Statistics– Udacity
15. Probability – The Science of Uncertainty and Data– MITx
16. Basic Statistics– University of Amsterdam
17. Probability and Statistics in Data Science using Python– UCSanDiego

18. Introduction to Calculus– The University of Sydney
19. Probability and Statistics– University of London

Machine Learning Algorithms-

20. Machine Learning– Stanford University
21. Machine Learning with Python– IBM
22. Machine Learning A-Z™: Hands-On Python & R In Data Science -Udemy
23. Python for Data Science and Machine Learning Bootcamp– Udemy
24. Intro to Machine Learning with TensorFlow (Udacity)
25. Become a Machine Learning Engineer (Udacity)
26. Advanced Machine Learning Specialization– Coursera

TensorFlow

27. TensorFlow in Practice Specialization– deeplearning.ai
28. Intro to Machine Learning with TensorFlow– Udacity
29. Tensorflow 2.0: Deep Learning and Artificial Intelligence– Udemy
30. TensorFlow: Data and Deployment Specialization– deeplearning.ai
31. Machine Learning with TensorFlow on Google Cloud Platform Specialization– Google Cloud

Data Preprocessing

32. Applied Data Science with Python Specialization by the University of Michigan
33. Exploratory Data Analysis With Python and Pandas (Guided Project)
34. NumPy Tutorial by freeCodeCamp

Deep Learning

35. Deep Learning Specialization (deeplearning.ai)
36. Deep Learning (Udacity)
37. AI & Deep Learning with TensorFlow (Edureka)
38. Deep Learning A-Z™: Hands-On Artificial Neural Networks– Udemy

Text Books

Programming Language (Python & R)

39. Python Crash Course by Eric Matthes
Buy on Amazon or download PDF from here.

40. Head First Python: A Brain-Friendly Guide by Paul Barry
Buy on Amazon or download PDF from here.

41. Learn Python the Hard Way by Zed A. Shaw
Buy on Amazon or download PDF from here.

42. Automate the Boring Stuff with Python by Al Sweigart
Buy on Amazon or download PDF from here.

43. R for Data Science by Hadley Wickham
Buy on Amazon or download PDF from here.

44. Machine Learning with R by Brett Lantz
Buy on Amazon

45. The Book of R: A First Course in Programming and Statistics by Tilman M. Davies
Buy on Amazon or download the PDF here.

Mathematics

46. An Introduction to Statistical Learning by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani
Buy this book on Amazon-An Introduction to Statistical Learning
You can download the pdf version of this book from here.

47. Practical Statistics for Data Scientists by Peter Bruce
Buy this book on Amazon-Practical Statistics for Data Scientists
You can download the pdf version of this book from here.

48. Probability and Statistics for Data Science by Norman Matloff
Buy this book on Amazon-Probability and Statistics for Data Science.

49. Introduction to Probability by Joseph K. Blitzstein, Jessica Hwang
Buy this book on Amazon- Introduction to Probability.
You can download the pdf version of this book from here.

50. Mathematics for Machine Learning by Marc Peter Deisenroth
Buy on Amazon or download PDF from here.

51. Linear Algebra and Optimization for Machine Learning by Charu C. Aggarwal
Buy on Amazon or check the table of content from here.

Machine Learning Algorithms

52. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow by Aurélien Géron
Buy on Amazon or download from here.

53. The Hundred-Page Machine Learning Book by Andriy Burkov
Buy on Amazon or download from here.

54. Machine Learning For Absolute Beginners by Oliver Theobald
Buy on Amazon or download from here.

55. Machine Learning: An Applied Mathematics Introduction by Paul Wilmott
Buy on Amazon

TensorFlow

56. TinyML: Machine Learning with TensorFlow Lite on Arduino and Ultra-Low-Power Microcontrollers by Pete Warden
Buy on Amazon

57. Adopting TensorFlow for Real-World AI by Mr. Naresh R. Jasotani
Buy on Amazon

58. Advanced Deep Learning with TensorFlow 2 and Keras by Rowel Atienza
Buy on Amazon

Deep Learning

59. Deep Learning (Adaptive Computation and Machine Learning series) by Ian Goodfellow
Buy on Amazon or download from here.

60. Deep Learning with Python by Francois Chollet
Buy on Amazon or download from here.

61. Neural Networks and Deep Learning by Charu C. Aggarwal
Buy on Amazon or download from here.

62. Deep Learning: A Practitioner's Approach by Adam Gibson and Josh Patterson's
Buy on Amazon or download from here.

Online Tutorials

Programming Language (Python & R)

63. The Python Tutorial (PYTHON.ORG)
64. Python 3 Tutorial (SOLOLEARN)
65. Python Tutorial- MLTUT
66. LEARNPYTHON.ORG
67. Google's Python Class
68. Python Tutorial (AFTER HOURS PROGRAMMING)
69. Python Tutorial- Tutorials Point
70. Python Tutorial– W3Schools
71. R Tutorial- Tutorials Point
72. R Tutorial- Statmethods

Mathematics

73. Statistics and probability– Khan Academy
74. Probability on Khan Academy
75. Statistics – Probability (TutorialsPoint)
76. Probability Tutorial (Stat Trek)
77. Probability and Statistics (MathisFun)
78. Probability theory (Wikipedia)

Machine Learning Algorithms

79. Machine Learning with Python Tutorial- Tutorials Point
80. Machine Learning Basics– MLTUT
81. Machine Learning Tutorial- Javatpoint
82. Machine Learning– GeeksforGeeks

TensorFlow

83. TensorFlow Core– TensorFlow org
84. TensorFlow Tutorial- Tutorials Point
85. Introduction to Deep Learning with TensorFlow– PythonProgramming

Deep Learning

86. Deep Learning Basics– MLTUT
87. Python Deep Learning Tutorial- Tutorials Point
88. Deep Learning Tutorial– Javatpoint

YouTube Videos

Programming Languages (Python & R)

89. CS DOJO
90. Programming with Mosh
91. Telusko
92. Clever Programmer
93. Corey Schafer
94. R Programming Tutorial– freeCodeCamp.org
95. R Programming Full Course– Simplilearn

Mathematics

96. Statistics for Data Science– Great Learning
97. Mathematics for Machine Learning [Full Course]– Edureka
98. Mathematics For Machine Learning- Simplilearn
99. Mathematics for Machine Learning– My CS

Machine Learning Algorithms

100. Machine Learning with Python– Great Learning
101. Machine Learning Tutorial Python– codebasics
102. Python Machine Learning Tutorial- Programming with Mosh
103. Machine Learning by Krish Naik

TensorFlow

104. TensorFlow 2.0 Complete Course– freeCodeCamp.org
105. TensorFlow Tutorial- Aladdin Persson
106. Coding TensorFlow– TensorFlow

Deep Learning

107. Complete Deep Learning–Krish Naik
108. Deep Learning With Tensorflow 2.0, Keras and Python– codebasics
109. Deep learning Tutorial– Great Learning

I hope these resources will definitely help you to learn and master machine learning.

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