Machine Learning Sequential Learning Resources

Prerequisites and Foundations

Basic Programming

Python Fundamentals:

- https://automatetheboringstuff.com/
- https://docs.python.org/3/tutorial/
- https://www.coursera.org/specializations/python

Development Environment:

- https://jupyter.org/
- https://colab.research.google.com/
- https://www.anaconda.com/

Mathematical Foundations

Linear Algebra

Books:

- https://mml-book.github.io/
- https://www.3blue1brown.com/topics/linear-algebra

Interactive Resources:

- https://www.khanacademy.org/math/linear-algebra

Statistics and Probability

Free Resources:

- https://greenteapress.com/wp/think-stats-2e/
- https://www.khanacademy.org/math/statistics-probability
- https://www.coursera.org/specializations/statistics-with-python

Calculus

Resources:

- https://www.khanacademy.org/math/calculus-1
- https://www.3blue1brown.com/topics/calculus

Python Programming and Tools

Data Science Libraries

NumPy:

- https://numpy.org/doc/stable/user/quickstart.html
- https://numpy.org/doc/stable/user/absolute_beginners.html

Pandas:

- https://pandas.pydata.org/docs/user_guide/index.html
- https://pandas.pydata.org/docs/getting_started/index.html

Matplotlib/Seaborn:

- https://matplotlib.org/stable/tutorials/index.html
- https://seaborn.pydata.org/tutorial.html

GitHub Repositories:

- https://github.com/microsoft/ML-For-Beginners
- https://github.com/ujjwalkarn/Machine-Learning-Tutorials
- https://github.com/ZhiningLiu1998/awesome-machine-learning-resources

Data Handling and Preprocessing

Exploratory Data Analysis

Resources:

- https://www.kaggle.com/learn/data-visualization
- https://towardsdatascience.com/tagged/exploratory-data-analysis

Data Preprocessing

Scikit-learn Documentation:

- https://scikit-learn.org/stable/modules/preprocessing.html
- https://scikit-learn.org/stable/tutorial/index.html

Practical Tutorials:

- https://www.dataquest.io/blog/sci-kit-learn-tutorial/
- https://scikit-learn.org/1.4/tutorial/text_analytics/working_with_text_data.html

Machine Learning Fundamentals

Core Concepts

Andrew Ng's Machine Learning Specialization:

- https://www.coursera.org/specializations/machine-learning-introduction
- https://www.deeplearning.ai/courses/machine-learning-specialization/

Google's Machine Learning Crash Course:

- https://developers.google.com/machine-learning/crash-course

Free Books:

- https://web.stanford.edu/~hastie/ElemStatLearn/ (The Elements of Statistical Learning)

GitHub Resources:

- https://github.com/dair-ai/ML-YouTube-Courses
- https://github.com/mml-book/mml-book.github.io

Supervised Learning

Classification and Regression

Scikit-learn Tutorials:

- https://scikit-learn.org/stable/user_guide.html
- https://scikit-learn.org/stable/tutorial/index.html

Educational Resources:

- https://www.dataschool.io/machine-learning-with-scikit-learn/
- https://inria.github.io/scikit-learn-mooc/

GitHub Repositories:

- https://github.com/scikit-learn/scikit-learn
- https://github.com/ageron/handson-ml2

Unsupervised Learning

Clustering and Dimensionality Reduction

Scikit-learn Clustering:

- https://scikit-learn.org/stable/modules/clustering.html
- https://scikit-learn.org/stable/modules/decomposition.html

Practical Resources:

- https://scikit-learn.org/stable/auto_examples/cluster/plot_kmeans_digits.html

Neural Networks and Deep Learning

Deep Learning Foundations

Fast.ai**:**

- https://course.fast.ai/
- https://www.fast.ai/posts/2022-07-21-dl-coders-22.html

Books:

- http://neuralnetworksanddeeplearning.com/
- https://www.deeplearningbook.org/

PyTorch

Official Tutorials:

- https://pytorch.org/tutorials/
- https://docs.pytorch.org/tutorials/beginner/deep_learning_60min_blitz.html

Learn PyTorch:

- https://www.learnpytorch.io/
- https://github.com/yunjey/pytorch-tutorial

TensorFlow/Keras

Official Resources:

- https://www.tensorflow.org/tutorials
- https://www.tensorflow.org/learn

Deep Learning Specialization:

- https://www.coursera.org/specializations/deep-learning

Advanced Deep Learning Topics

Computer Vision

Resources:

- http://cs231n.stanford.edu/
- https://opencv.org/university/free-courses/

GitHub Repositories:

- https://github.com/jbhuang0604/awesome-computer-vision

Natural Language Processing

Hugging Face:

- https://huggingface.co/learn/nlp-course/chapter1/1
- https://github.com/huggingface/course

Stanford CS224n:

- http://web.stanford.edu/class/cs224n/

GitHub Resources:

- https://github.com/keon/awesome-nlp

Transformers and LLMs

Courses:

- https://www.coursera.org/learn/attention-models-in-nlp
- https://www.coursera.org/learn/packt-natural-language-processing-transformers-with-hugging-face-ydvmi

Papers:

- https://arxiv.org/abs/1706.03762 (Attention Is All You Need)
- https://arxiv.org/abs/1810.04805 (BERT)

Specialized Areas

Reinforcement Learning

Books:

- http://incompleteideas.net/book/the-book.html (Sutton & Barto)

OpenAI Resources:

- https://spinningup.openai.com/

GitHub Repositories:

- https://github.com/dennybritz/reinforcement-learning
- https://github.com/openai/spinningup
- https://github.com/azminewasi/Curated-Reinforcement-Learning-Resources

Generative AI

Papers:

- https://arxiv.org/abs/1406.2661 (Generative Adversarial Networks)
- https://arxiv.org/abs/2005.14165 (GPT-3)

MLOps and Production

MLOps Fundamentals

Google Cloud:

- https://cloud.google.com/architecture/mlops-continuous-delivery-and-automation-pipelines-in-machine-learning
- https://www.cloudskillsboost.google/course_templates/158

Microsoft:

- https://learn.microsoft.com/en-us/training/paths/introduction-machine-learn-operations/

Coursera:

- https://www.coursera.org/learn/mlops-fundamentals

GitHub Resources:

- https://github.com/EthicalML/awesome-production-machine-learning

Foundational Papers

Historical Papers

- https://arxiv.org/abs/1706.03762 (Attention Is All You Need - Transformers)
- https://arxiv.org/abs/1512.03385 (ResNet)
- https://arxiv.org/abs/1406.2661 (GANs)
- https://arxiv.org/abs/1810.04805 (BERT)

Paper Discovery

- https://arxiv.org/list/cs.LG/recent
- https://paperswithcode.com/
- https://arxiv.org/list/stat.ML/recent

Continuous Learning Resources

Blogs and Publications

- https://ai.googleblog.com/
- https://openai.com/blog/
- https://deepmind.com/blog/
- https://machinelearningmastery.com/
- https://towardsdatascience.com/
- https://www.kdnuggets.com/
- https://distill.pub/

GitHub Repository Collections

- https://github.com/josephmisiti/awesome-machine-learning
- https://github.com/ujjwalkarn/Machine-Learning-Tutorials
- https://github.com/microsoft/ML-For-Beginners
- https://github.com/dair-ai/ML-YouTube-Courses
- https://github.com/ZhiningLiu1998/awesome-machine-learning-resources

Academic Conferences

- https://nips.cc/ (NeurIPS)
- https://icml.cc/ (ICML)
- https://iclr.cc/ (ICLR)

Datasets and Competitions

- https://www.kaggle.com/datasets
- https://archive.ics.uci.edu/ml/index.php
- https://huggingface.co/datasets

Free Courses and MOOCs

Coursera:

- https://www.coursera.org/specializations/machine-learning-introduction
- https://www.coursera.org/specializations/deep-learning
- https://www.coursera.org/specializations/natural-language-processing

edX:

- https://www.edx.org/course/introduction-to-machine-learning

Fast.ai**:**

- https://course.fast.ai/

Google:

- https://developers.google.com/machine-learning/crash-course

Tools and Platforms

Development Environments

- https://jupyter.org/
- https://colab.research.google.com/
- https://www.kaggle.com/code

Cloud Platforms

- https://cloud.google.com/ai-platform
- https://aws.amazon.com/sagemaker/
- https://azure.microsoft.com/en-us/services/machine-learning/

Experiment Tracking

- https://mlflow.org/
- https://wandb.ai/
- https://neptune.ai/

Model Deployment

- https://www.tensorflow.org/tfx
- https://pytorch.org/serve/
- https://www.seldon.io/

Community and Forums

Discussion Forums

- https://www.reddit.com/r/MachineLearning/
- https://www.kaggle.com/discussions
- https://stackoverflow.com/questions/tagged/machine-learning
- https://community.deeplearning.ai/

Professional Networks

- https://www.linkedin.com/groups/54257/ (Machine Learning)
- https://discord.gg/machine-learning

This resource list provides direct links to educational materials, official documentation, GitHub repositories, research papers, and community resources organized sequentially for effective machine learning education.