Date: 17/10/2024

Link:

Python for Social Networks: <https://youtube.com/playlist?list=PL2VXyKi-KpYsjoY2rx9NiWJyfmmD79H97&si=FUslbQmmRce-5dOU>

Social Network Analysis Machine Learning: <https://youtu.be/EU9Xxz23Tjo?si=DoPyZQDGOuVx1mQl>

Machine Learning Tutorial:

<https://youtu.be/kz184QIO4ZQ?si=aDov-u3Zw1_ruYFU>

<https://medium.com/edureka/machine-learning-tutorial-f2883412fba1>

<https://youtu.be/lBHGPrvXTTM?si=n2KH4Iy4MP7PjkLQ>

Bangla:

<https://youtu.be/WOY724bqU9E?si=1Hs9Mxppl4CKqzoZ>

<https://youtu.be/4Yxo2C8RxQo?si=cO57UW1kVf4ghBvy>

Certificate Course:

<https://courses.analyticsvidhya.com/courses/take/Machine-Learning-Certification-Course-for-Beginners/lessons/26302933-overview-of-machine-learning-data-science>

ChatGpt:

To complete a Machine Learning (ML) course effectively, especially if you're new to the field, I recommend breaking it down into manageable steps. Here’s a structured guide to help you through the process:

**Step 1: Understand the Basics of Machine Learning**

Start with the foundational concepts:

**- What is ML?\***

Understand the basic definition and the difference between ML, AI, and data science.

- **Types of ML:** Learn the types of machine learning:

- **Supervised Learning:** Classification and regression tasks.

-**Unsupervised Learning:** Clustering and association tasks.

**-Reinforcement Learning:** Decision-making and optimization tasks.

-**Key Terminology:** Familiarize yourself with terms like dataset, features, labels, models, training, and testing.

**Resources:**

- [Google's Machine Learning Crash Course](https://developers.google.com/machine-learning/crash-course)

- [Coursera - Machine Learning by Andrew Ng](https://www.coursera.org/learn/machine-learning)

**Step 2: Learn the Mathematics Behind ML**

Mathematics is essential for understanding how ML algorithms work. Focus on:

- **Linear Algebra:** Vectors, matrices, and matrix operations.

- **Probability and Statistics:** Distributions, Bayes’ theorem, and hypothesis testing.

-**Calculus:** Derivatives, gradients, and optimization techniques like gradient descent.

**Resources:**

- [3Blue1Brown - The Essence of Linear Algebra (YouTube)](https://www.youtube.com/playlist?list=PLZHQObOWTQDNU6R1\_67000Dx\_ZCJB-3pi)

- [Khan Academy - Probability and Statistics](https://www.khanacademy.org/math/statistics-probability)

**Step 3: Understand ML Algorithms**

Dive into specific machine learning algorithms. Focus on:

**- Supervised Learning Algorithms:**

- Linear Regression, Logistic Regression

- Decision Trees, Random Forests

- Support Vector Machines (SVM)

- k-Nearest Neighbors (k-NN)

- **Unsupervised Learning Algorithms:**

- k-Means Clustering, Hierarchical Clustering

- Principal Component Analysis (PCA)

**Resources:**

- [Hands-On Machine Learning with Scikit-Learn and TensorFlow](https://www.oreilly.com/library/view/hands-on-machine-learning/9781492032632/)

**Step 4: Learn Python for ML**

Python is widely used for machine learning. Learn how to use:

-**Libraries:** Numpy, Pandas (data manipulation), Matplotlib, Seaborn (visualization), Scikit-learn (ML algorithms).

**-Tools:** Jupyter Notebooks (for experimenting), Anaconda (for managing packages).

**Resources:**

- [Python for Data Science Handbook](https://jakevdp.github.io/PythonDataScienceHandbook/)

- [Kaggle Learn - Python and Data Science](https://www.kaggle.com/learn)

**Step 5: Practice with Datasets**

Hands-on practice is key to mastering ML. Work on small projects using real datasets:

**-Kaggle Datasets:** Start exploring datasets like the Titanic dataset (classification), Boston Housing dataset (regression), etc.

- **Projects:** Build models to predict outcomes (classification, regression) or group data (clustering).

**Resources:**

- [Kaggle Competitions](https://www.kaggle.com/competitions)

- [UCI Machine Learning Repository](https://archive.ics.uci.edu/ml/index.php)

**Step 6: Study Deep Learning (Optional)**

Once you're comfortable with basic ML algorithms, explore neural networks and deep learning:

- **Neural Networks:** Learn about perceptrons, backpropagation, and optimization.

- **Deep Learning Frameworks:** TensorFlow, Keras, PyTorch.

**Resources:**

- [Deep Learning Specialization by Andrew Ng (Coursera)](https://www.coursera.org/specializations/deep-learning)

**Step 7: Understand Model Evaluation and Optimization**

Learn how to:

- Evaluate models using techniques like cross-validation, accuracy, precision, recall, and F1-score.

- Optimize models using techniques like hyperparameter tuning, regularization, and ensembling.

**Resources:**

- [Scikit-learn Documentation-Model Evaluation](https://scikit-learn.org/stable/model\_evaluation.html)

**Step 8: Thesis Integration**

As your thesis is focused on ML, apply your knowledge to solve a research problem. Identify a relevant dataset and research objective that aligns with your thesis topic.

Thesis tips:

- Choose an ML problem (classification, regression, etc.) that aligns with your domain.

- Explore research papers to see how ML is applied in your specific area.

Resources:

- [Google Scholar](https://scholar.google.com)

By following this structured path, you can gradually build the knowledge and skills needed for your ML course and thesis. Let me know if you need specific resources or guidance on any step!

**Question about Social Network Clustering:**

* How can we efficiently cluster large-scale dynamic social networks where relationships are constantly changing?
* What is the best way to cluster heterogeneous social networks, which may contain multiple types of nodes and relationships (e.g., combining users, pages, posts)?
* How can we improve existing density-based clustering algorithms like DBSCAN to handle high-dimensional social data more effectively?
* How do privacy-preserving clustering algorithms perform compared to traditional clustering methods in social networks?