Machine Learning

Introduction. ML History

Aleksandr Petiushko

ML Research

Content

Content

Content

Intro

About the lecturer[1]

- Aleksandr Petiushko, PhD in theoretical CS (2016)
- Lecturer in Lomonosov MSU / MIPT for Machine Learning, Computer Vision, Deep Learning Theory, Python for an ML Researcher since 2019
- Former Huawei Chief Scientist (Scientific Expert), AIRI Director of Key Research Programs (Leading Scientific Researcher)
- Currently at Nuro, leading the ML Research

[1] Homepage: `https://petiushko.info/`

Intro

Time to introduce yourselves: what are your hobbies, motivation in ML, etc.: please go into "**Module 1 Students Introduction**" thread

Sofia Plagiarism Policy

- It covers parts "*sourced from AI*"
  - Please read the "**Sofia Plagiarism Policy**" thread
  - **First offense**: students need to rewrite assignment
  - **Second offense**: students fail the course
  - **Third offense**: students are to be withdrawn from their program

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  - It can produce very different information in comparison to the source used to ask question (e.g., book chapter)

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- Only the answers with some non-trivial arguments that:
  - either contradict the initial post,
  - or add some non-obvious missing things to the initial message

  will be considered as graded ones

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- Preliminary grading scale:

Grade	Percent accumulated
A	90-100 %
B	75-89 %
C	60-74 %

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- It means that if you're **7 days late** than no need to submit: you'll get **0 score** anyway.

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Unless:

- A student has a serious medical condition, and this condition is validated by a hospital or licensed California physician (in English)
- The Student contacts in time Student Services (student.services@sofia.edu) and describes the situation and provides all the needed proofs
- The student notifies in time our chair (Donna Dulo) and Professor about the situation with the confirmation from Student Services

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- Hopefully we could touch on both a little

Github

- Course page: `https://github.com/fatheral/sofia-ml-2024`
- The professor's lectures will be uploaded there

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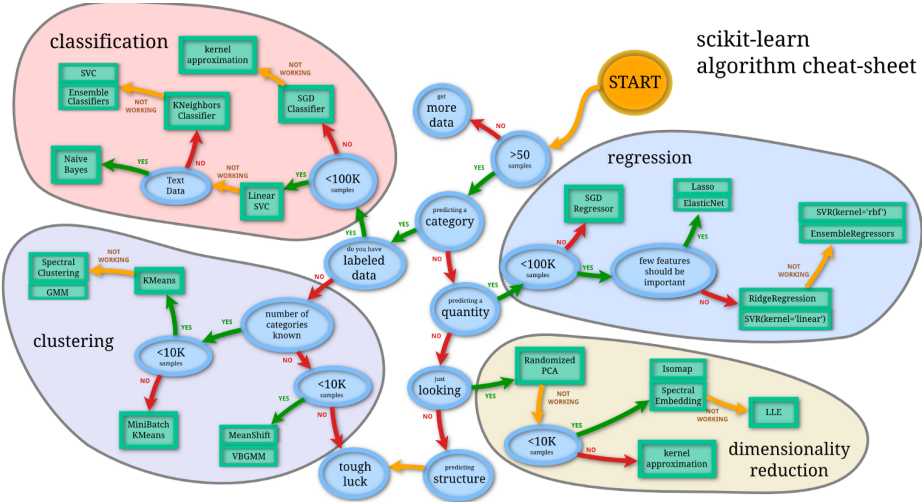
- (**Weak**) Algorithm which is able to be trained using the input data in order to do tasks afterward — instead of human

Scikit-Learn[2] Roadmap



[2] https://scikit-learn.org/stable/tutorial/machine_learning_map/

(Tentative) future content

Theoretic part

- Quality metrics
  - Precision / Recall, TPR / FPR, ROC, AUC, Cross-Validation, ...

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Practice part

- Data processing and analysis by Python
  - Scikit-Learn, Numpy, ...

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In 1997 Tom M. Mitchell introduced more formal definition of a machine learning algorithm.

Formal definition

A **computer program** is said **to learn** from examples E for some set of problems T and a quality metric P if its performance on problems from T, as measured by P, is improved by using examples E.

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- **1901**: Karl Pearson invented the Principal Component Analysis (PCA) — a master method for data dimensionality reduction.
- **1906**: Andrey Andreyevich Markov develops the apparatus of Markov chains, which in **1913** he uses to study the text “Eugene Onegin”. Markov chains are used to generate and recognize signals.

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- **1997**: The Deep Blue computer beat world chess champion Garry Kasparov.

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- **2022**: OpenAI, a (not so) non-profit research company, provided the breakthrough in LLMs: ChatGPT.

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Definitions

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  - Action generation based on interaction with the environment

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4. Read History and evolution of machine learning: A timeline and the Timeline of Machine Learning pages

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4. ML History is intriguing!

Thank you!