



Personalized Machine Learning

Intro & Organisation

Rodrigo Alves

24.09.2024

What is Machine Learning?

1

Intro & Organisation

Personalized Machine Learning

Machine Learning News



machine learning



 Nature

Challenges and opportunities in quantum machine learning

At the intersection of machine learning and quantum computing, quantum machine learning has the potential of accelerating data...

2 days ago



 Analytics Insight

Speaking with Animals? Yes, Machine Learning is Making i...

Machine Learning and Artificial Intelligence have helped us decode ancient languages, and now researchers are turning the same tech...

2 days ago



 Quanta Magazine

AI Algorithm Foresees Chaotic Tipping Points

A custom-built machine learning algorithm excels at the formidable task of predicting when a complex system is about to switch to a wil...

2 days ago



 MIT Technology Review

An AI that can design new proteins could help unlock new ... materials

The machine-learning tool could help researchers discover entirely new proteins not yet known to science.

2 days ago



2

Intro & Organisation

Personalized Machine Learning

Machine Learning is Everywhere

One can find **very funny** applications:

1. Harry Potter and the Portrait that Looked Like a Large Pile of Ash.
2. Generate photos of **new people**.
3. Impressive **94%** on the prediction of the Academy Awards Winners.
4. Making a robot that makes you laugh.

What is Machine Learning?

“Machine learning is an application of AI that enables systems to learn and improve from experience **without being explicitly** programmed.”

— Arthur Samuel, AI pioneer

“A computer programme is said to learn from experience E with respect to some class of tasks T and performance measure P , if its performance at tasks in T , as measured by P , improves with experience E .”

— Tom Mitchell, CMU

“Machine learning (ML) is a field of enquiry devoted to understanding and building methods that ‘learn’, that is, methods that **leverage data** to improve performance on some set of tasks.”

— Wikipedia

What is Personalized Machine Learning?

PML News

6 Intro & Organisation Personalized Machine Learning

Google

personalized machine learning

< All Images Books News More Tools

About 16,900 results (0.43 seconds)

Techopedia
AI-Powered Personalization: How Machine Learning is Transforming Customer Experience
AI-powered personalization involves using artificial intelligence and machine learning to analyze customers' data, understand their...
Jul 6, 2023

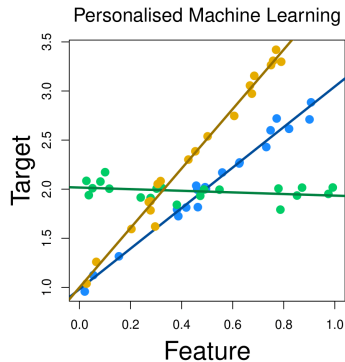
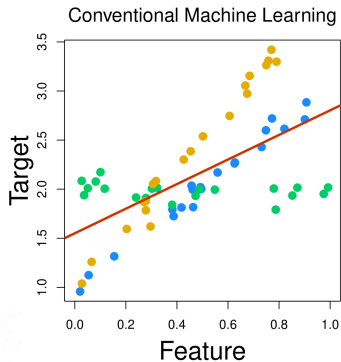
HealthAnalytics
Deep Learning Tool May Support Personalized Cancer Care
Johns Hopkins researchers have developed a deep learning method to predict cancer-related protein fragments that trigger tumor cell-killing...
1 month ago

Medium
The AI Revolution: How Machine Learning is Changing the Face of Marketing
Are you ready to meet your new marketing superhero? Say hello to Artificial Intelligence (AI)! This game-changing technology is transforming...
1 month ago

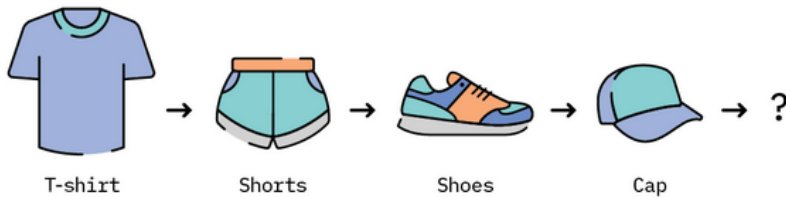
Mirage News
Machine-Learning Method Advances Personalized Cancer Therapy
Deep-learning technology developed by a team of Johns Hopkins engineers and cancer researchers can accurately predict cancer-related protein...
1 month ago

Nature
Deep learning-assisted radiomics facilitates multimodal prognostication for personalized treatment strategies in low ...
Determining the optimal course of treatment for low grade glioma (LGG) patients is challenging and frequently reliant on subjective judgment...

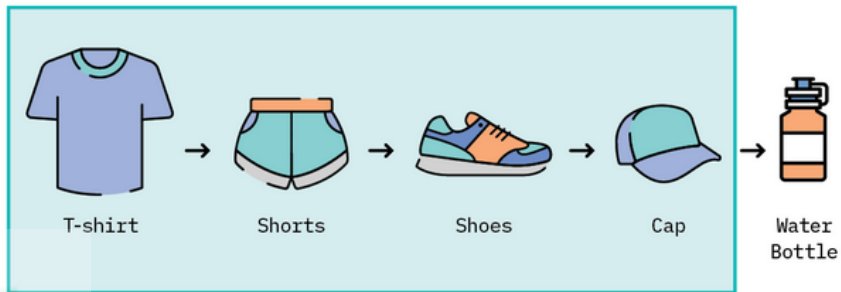
ML × PML



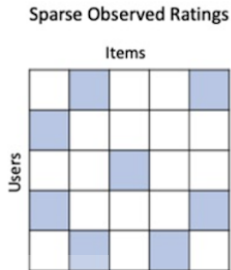
A Gentle Example...



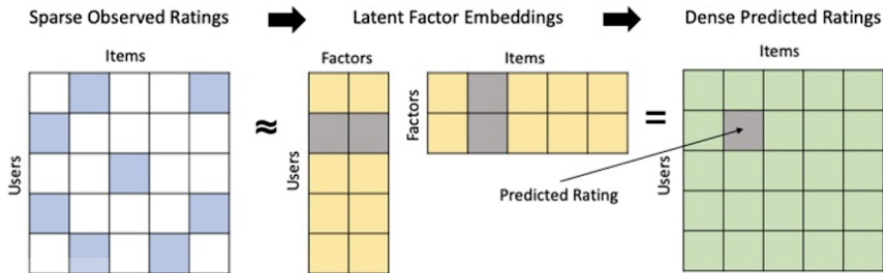
A Gentle Example...



...and a Possible Modelling.



...and a Possible Modelling.



Source: https://storage.googleapis.com/gweb-cloudblog-publish/images/f1-collab_filtering.max-900x900.png

What Personalized Machine Learning is About?

Application

Recommender Systems

Optimisation

Mathematics and Algorithms

Model

Matrix Factorization

Theory

Theoretical Guarantees

Assessment

- Courses.fit
- To write the Exam you need to get minimum of 35 points (maximum is 70 points).
- **Tutorial Homework (Maximum 10 points):** There will be a total of four homework assignments distributed throughout the semester. Each assignment carries a maximum score of 5 points.
- **Semestral Project (Maximum 60 points):** The semestral project is an individual undertaking. Detailed project guidelines are provided below.

It is not an easy course! Therefore, you need to learn properly. PML is multidisciplinary and performing the activities is crucial to the learning path.

Exam

- The exam will be oral.
- Maximum 30 points (To be approved, you need to get at least 15 points on the final exam)
- You will receive two topics for discussion:
 1. a question related to your semestral project (Max. 10 points);
 2. a topic based on the content covered in lectures and tutorials (Max. 20 points).
- You will have 20 minutes for preparation before the oral exam begins. The oral exam itself will follow the preparation period.

Certainly, the course material is sufficient for **studying** for and being **approved** on the exam. However, do not expect memorisable questions. For example, if the lecture covers the derivative of $f(x) = x^3$, it is reasonable that the exam could cover the derivative of $g(x) = 4x^2$. In machine learning terms, you will only have access to the **training** and **validation** sets, but not for the **test** set.

Learning Materials

- Our course is basic with many other materials available.
- Lecture and tutorial materials are all you need to finish this course.
- [Mathematics for Machine Learning](#) is an excellent basis book.
- The book [Personalized Machine Learning](#) is a new one on the subject.
- Documentation of [python library scikit-learn](#) is also good resource.
- [Courses.fit](#)

Background

- The python (or other ML language) skills is a must.
- It is assumed you know basics of ML, probability and statistics.
- It's an advantage if you have already heard of some of the techniques.
- Knowledge of Linear Algebra (most of the methods works with matrices) and Analysis (Machine Learning = Optimisation $\simeq$ Gradient Descent).

Typical Week

- Materials will be found on [courses.fit](https://courses.fit.edu)
- **Lectures:** Tue 16:15-17:45 (**Room: T9:301**)
- **Tutorials:** Tue 18:00-19:30 (**Room: T9:348**)

If you could bring a laptop would be beneficial for the learning goals (both lecture and tutorials).

Communication

- Rodrigo Augusto da Silva Alves
- rodrigo.alves@fit.cvut.cz
- Room: TH:A-1354 **(Please, make an appointment before)**
- Materials will be updated in the website

If you are about to start your master thesis I would be happy to mentoring your research in some of my projects or if you have a good idea in my research area.



Obrigado :) - Faculty of Information Technology