

Machine Learning Vs Human Brain



Goals of today's event

Motivations:

- Scientific event with a subject transverse to the 4 departments
- Clear trend in our fields since already many years
- Already several use of ML in our researches

Goals:

- Inform about activities done @ IPHC
- Starting point to sharing expertise?
- Network ?
- Common interests – Structuration ?



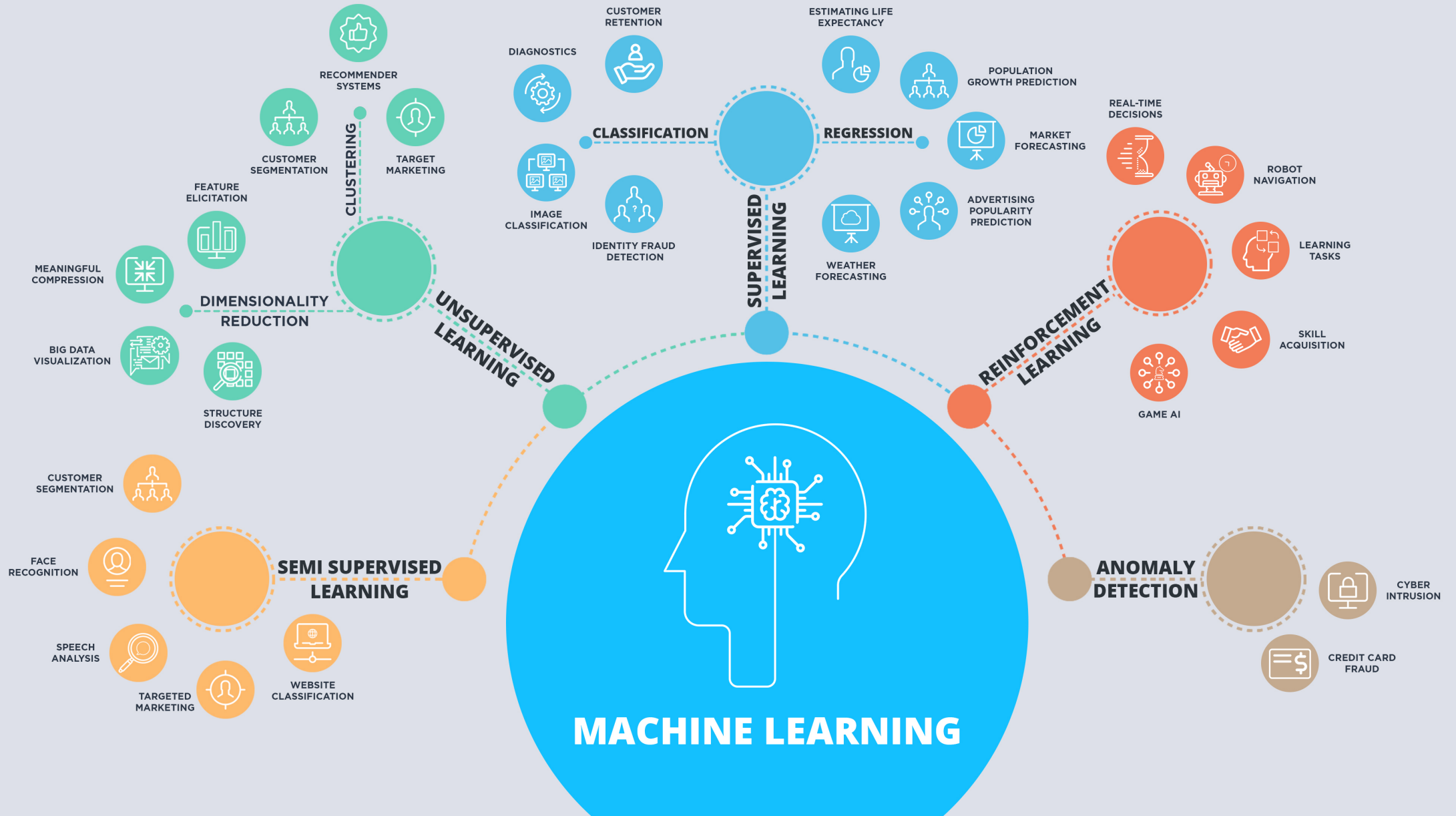
Morning's session

To be discussed during the round table

Possible items for discussion

- **Discussion concerning this morning's presentation**
- **User feedback**
 - Advices
 - Encountered difficulties
 - ...
- **Feedback from IT group**
 - Hardware
 - Software
 - Data storage
 - ...
- **Do we envisage next steps ?**
 - Seminars (subject, speaker, ...)
 - Tutorials
 - Workshop centred around a given topic
 - Internal exchanges
 - Mailing list
 - Dedicated webpage
 - Mutualisation of resources
 - Code sharing
 - ...

Class of problems solved by ML algorithms



ML implementation

Answer: finding a (free / open source / maintained) implementation !

- [\(Google\) Tensorflow](#) (2015)/[Keras](#)
 - Fast-growing easy-to-use python lib (but also in C++, ...)
 - Allows applications of deep-learning models
 - Interface to Tensorflow, Theano backends → GPU support
- [Scikit-learn](#) (2007)
 - Python lib that implements many (non-deep) techniques
 - A lot of data preprocessing & statistics tools
- [TMVA](#) (used in subatomic physics – ROOT based)

But also:

- [Torch](#) / [PyTorch](#)
- [Caffee](#) (C++/python)
- [Accord.net](#) (C++)
- [R](#)
- ...

Can be discussed
this afternoon



What's next ?



Hardware

Answer: where to run the ML training ?

- **Use our laptop:**
 - several ML-analyses can be done on (from few min to few hours)
 - Multi-threading
- **Use dedicated GPU(s)**
 - reasonable dataset – large computing time
 - Several algorithms profit a lot from GPU parallelization
 - From few 100's to few 1000's euros
- **Use server/computing center**
 - large data / complex models
 - Tier2
 - Mesocentre
 - CC-in2p3
 - CERN
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Can be discussed
this afternoon



What's next ?



Networks & training

Networks

- ML collaborations @ IN2P3
- IML (LHC ML working group)
- ...

Training

- Master “Big data and ML” @ unistra
- [IN2P3 school of statistics](#)
- Ecole doctorale (ED 182)
- MOOC
- ...

Can be discussed
this afternoon

