

Deep Learning

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Deep (machine) learning : a set of standard hierarchical predictive approaches (neural networks, block structure models, hierarchical factor models..) used in a new environment of data and computational power.

- A big data framework
- The online learning issue, i.e. the updating in real time
- The role of human

The big data framework :

The basic databases are enriched by external (behavioural) databases (especially the social networks)

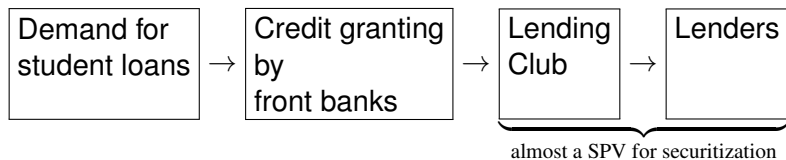
Examples for crowdlending platforms :

Lending Club (US) linked to the Google network,
Dianrong (China) linked to Alibaba (sesame credit scoring) and to Weibo (the Chinese twitter).

Some points to discuss :

- i) The quality of data :
How to clean the data, to adjust for self-reporting, self-selectivity ?
- ii) What is the added value of these external behavioural data ?
Are they really informative ? Are they really profitable ? At the firm level, for the whole economy ?
- iii) The asymmetry of information.
between the individuals and the firms using these techniques, but also more complicated questions.

The business model of Lending Club.



The online learning

The underlying statistical models are efficient in a static environment (a picture, facial recognition)

They are less efficient in a dynamic stable environment (a movie), and poorly efficient in a dynamically unstable or endogenous environment.

How to account for the future introduction of new products whose characteristics are not yet completely defined ?

Can we avoid the use of structural models to account for substitutions, preferences... ?

The joint role of human and machine

The algorithms underlying machine learning are based on models (parametric or nonparametric) that reflect the views of the programmer and can transport his/her potential errors.

- i) How to compare the different deep learning approaches without deeply entering in the black-box ?
- ii) How to check the robustness of a deep learning approach, especially when source "parameters" in the algorithm are modified by hand ?
- iii) What is the role of human, when the system provides unreasonable predictions, as in a flashcrash, or in a systemic risk crisis ?