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Michal Valko deciphers machine learning

Michal Valko - *© Inria / Photo A. Wrona*

Can machines learn for themselves? INRIA researcher Michal Valko is convinced of it. It's an idea he is passing on to his students in the prestigious MVA Master's course run by ENS Cachan.

Michal Valko's research is aimed at creating computer programs capable of adapting to their users or their environment. Since 2011, Valko has been a member of the Sequel* project-team (associated with Centrale Lille, and Lille 3 University*) of Inria Lille - Nord Europe. To achieve this, Michal Valko designs learning algorithms capable of operating autonomously, in which human intervention is reduced to a minimum. These algorithms are designed to create "machines capable of learning" – computers, firmware, or robots – to react on the basis of their acquired experience. *" A machine needs time if it is to become intelligent"* , Michal Valko considers, *"So it has to have help, and its learning process requires close supervision. My work consists in finding the best possible balance between the need for learning and the need for the system to operate efficiently "* .

> *"A machine needs time before it can become intelligent, so it needs help, through supervision of its learning process"*

From intelligence on the web

To perfect his algorithms, Michal Valko has relied on adaptive learning. This is the method used by online sales sites whose algorithms progressively incorporate the buying practices of cybernauts. As an example, someone who tends to buy particular clothing brands might also enjoy a particular type of movie. This trains the system into make suggestions for relevant purchases. Such intelligent algorithms are conquering new domains, of which the most promising are the MOOC (Massive Open Online Courses). "*These learning machines can improve individual tutoring and interactivity in online teaching based on the learners' responses* ", asserts Michal Valko.

The challenge of teaching

Consequently, there is nothing surprising in the fact that Michal Valko's expertise is being closely monitored by major corporations such as Intel, Technicolor, and Microsoft. The academic world is not lagging behind; this researcher has been asked to provide a series of courses by ENS Cachan on the subject of machine learning, as part of an MVA master's degree (see the box). "*Michal is supplementing our training on inference issues for relational data modeled by graphs,* " explains Nicolas Vayatis, director of the Master's course. "*This subject is growing exponentially due to the emergence of new generations of intelligent applications destined, for example, for the Internet or for biology. France currently has very few specialists of international standing in this field. We are therefore delighted to have Michal joining us!* "

From their first year, Michal Valko's courses were praised by his fifty or so students. "*You can expect increasing success due to the quality of teaching and up-to-the-minute knowledge of the subject* ", is Nicolas Vayatis' analysis. This is a challenge that Michal Valko is eager to meet: "*There is no equivalent course anywhere in the world. So much remains to be done. It is very exciting and gratifying to teach such motivated students. In any case, I spend a lot of time after class replying to all sorts of questions!* "

MVA* Master's: an international reputation

The arrival of Michal Valko reinforces even further the international reputation of the prestigious MVA Master's (Master Program in Computer Vision and Machine Learning) run by ENS Cachan. The course is highly selective, accepting only 30% of candidates, i.e. around 80 students annually, most of whom have trained as engineers at France's most prestigious technical universities, the "grandes écoles" and at the finest universities elsewhere in the world. The reputation of the Master's degree course is based on the quality of the faculty, all of whom are researchers with an international reputation whose teaching is based on the concrete application of math tools.

"*The MVA Master's favors symbiosis between teaching and research, causing the students to constantly raise questions,* " explains the course director, Nicolas Vayatis. "*There are still no works of reference for the subjects being taught. These teacher-researchers therefore have to construct everything themselves. But in doing so, they gain direct benefits. Students on the MVA Master's course constitute a powerful reservoir of future doctoral candidates.* "

* within UMR 9189 CNRS-Centrale Lille-Lille1 University, CRIStAL.

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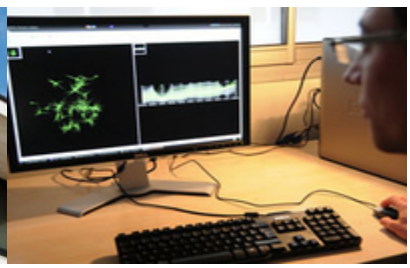

List of associate teams

For more information

Michal Valko

- Web site of Michal Valko
- Web site of Sequel project-team

MVA Master's degree of ENS Cachan

- Web site of Nicolas Vayatis
- Web site of Master MVA
- Course description : « Graphs in Machine Learning »

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