Panel on :
CAUSALITY AND LEARNING

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This panel has the goal of stimulating a discussion on the very nature of the knowledge that has been the focus of Machine Learning up to now.

The panelists shall think about questions of the kind reported below and will give their (I expect and hope controversial) answers at the panel. Everyone who believes he/she has something to say is welcome to do so.

Question 1 : **Do we really need to learn "why" knowledge and not only "how" knowledge ? If yes, why ?**

In philosophy of science there is a distinction between descriptive knowledge and explanatory knowledge. Descriptive knowledge aims mostly at predicting future outcome on the basis of the past history, whereas explanatory knowledge aims at understanding, and hence mastering, phenomena. How does machine learning locate itself today?

Question 2 : **What is the role you think causality could play in learning? Does there exist a "deep" knowledge which does not make any reference to causality? What definition of causal relation would you be glad to see universally accepted?**

This point involves a wider issue, such as to define what does "deepness" mean in knowledge. Moreover, are causes only "physical" causes? What about teleological causes, probabilistic causes, functional causes? What about mathematical equations?

Question 3 : **Is a causal theory nothing else than a special case of domain theory, deductively exploitable as in EBL, or are other reasoning mechanisms, such as abduction, unavoidable?**

{Can abductive reasoning allow something really new to be learned? Is there something which can be learned by abduction and which cannot be learned by deduction only?

Question 4 : **Can you suggest a concrete way of exploiting causality (or, more in general, deep knowledge) in machine learning ?**