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The role of domain knowledge experts in the era of big data

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The significant increase in volume and complexity of data resulting from technological development is a common challenge faced by many scientific disciplines. More sensitive detectors and large scale experiments are currently overwhelming researchers who turn to automatic machine learning algorithms in order to filter, order, or pre-select potentially interesting subsets of the original data for further scrutiny. In this scenario, algorithms need to be carefully designed to select scientifically interesting/useful examples, thus optimizing the distribution of human efforts in scanning a large data set.

In this talk I will show a few examples of such adaptive learning environments, where expert feedback is sequentially incorporated into the learning algorithm. Using examples from astronomy, I will describe how we can achieve optimal classification results with minimum labeling efforts and discuss the role played by the domain knowledge experts in the era of data driven scientific discoveries.

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