Cut Pursuit: fast algorithms to learn piecewise constant functions on general weighted graphs

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In this talk, I will present working-set/column generation algorithms to efficiently solve smooth problems penalized respectively by the total variation on a general weighted graph, or by its L0 counterpart, the Mumford Shah total level-set boundary size. The proposed algorithms leverage computationally the structure of the piecewise constant structure of the solution and achieve state-of-the-art performance in terms of speed when the piecewise constant solutions have a small number of distinct level-sets; this is typically the case when the total level-set boundary size is small, which is encouraged by the two forms of penalization mentioned.