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Séminaire ISIR

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Jeudi 24 janvier 2013
A 15h00

Campus Jussieu, 4 place Jussieu, Paris
Salle de réunion H20, Pyramide

Titre : Dopaminergic control of the exploration-exploitation trade-off via the basal ganglia

Abstract :

We continuously face the dilemma of choosing between actions that gather new information or actions that exploit existing knowledge. This 'exploration-exploitation' trade-off depends on the environment: stability favours exploiting knowledge to maximise gains; volatility favours exploring new options and discovering new outcomes. Many lines of evidence point to the basal ganglia as the central controller of action selection – but how might their operation be controlled to favour exploration or exploitation? In this talk I discuss our hypothesis that the level of tonic dopamine in the striatum, the basal ganglia's input nucleus, sets the exploration-exploitation trade-off. Using computational models of the basal ganglia, I illustrate two orthogonal ways in which basal ganglia output can probabilistically represent action selection. I will then show that the actions of dopamine within the striatum alter both representations to favour exploration or exploitation dependent on the level of dopamine. Finally I will show that this hypothesis predicts that changing tonic dopamine can appear to affect learning while only directly altering performance.

Sous la co-tutelle de