Monte Carlo methods: How random sampling helps computation

with Andrew Lam

Abstract: Monte Carlo methods, whose name derive from the Monte Carlo Casino in Monaco, utilize repeated random sampling to compute numerical results, often for optimization, numerical integration and generating draws from a probability distribution. The basic idea is to assign multiple values to an uncertain variable to achieve multiple results and then averaging to obtain an estimate. By repeating the experiment many times, the accuracy of the estimate improves. In this project we will explore the basics behind Monte Carlo simulations, and see how they can be combined with Markov chains and random walks to produce highly efficient techniques to estimate statistical properties in high dimensions where standard computations become infeasible.

References:

- Reference 1
- Reference 2
- Reference 3
- Reference 4