Sampling for Signal Reconstruction *vs* Numerical Integration: Theory and Practice

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Overview

Recent trends such as the commoditization of sensors and inexpensive storage devices have caused an explosion in the amount of data produced across various application domains. e.g. trillions of pictures, taken using billions of smartphones, are uploaded each year. For information retrieval in any real application, it is unimaginable that the relevant algorithms will operate exhaustively on all the data. The obvious solution is to selectively apply algorithms on a portion, or sample, of the data. Unfortunately, sampling decisions are underpinned by challenging theoretical analyses of the sampling strategies.

While it is impossible to construct general sampling strategies that are both efficient (leading to low error) and agnostic to their application (effective across applications), there are two broad categories of applications for which sampling is commonly performed. The first class of problems involves hypothesizing a function for which some values of the function may be sampled. This problem is also known as function regression (in statistics), signal reconstruction (in signal processing) or interpolation (in image processing). Another problem for which sampling is commonly used is numerical integration (quadrature, cubature, etc.). This course will cover the fundamentals of sampling for reconstruction and integration, as well as recent theoretical analyses and results in both categories. In addition, to benefit practitioners, specific case studies will be presented in detail while explaining these concepts. The case studies will span the fields of computer graphics and image processing.

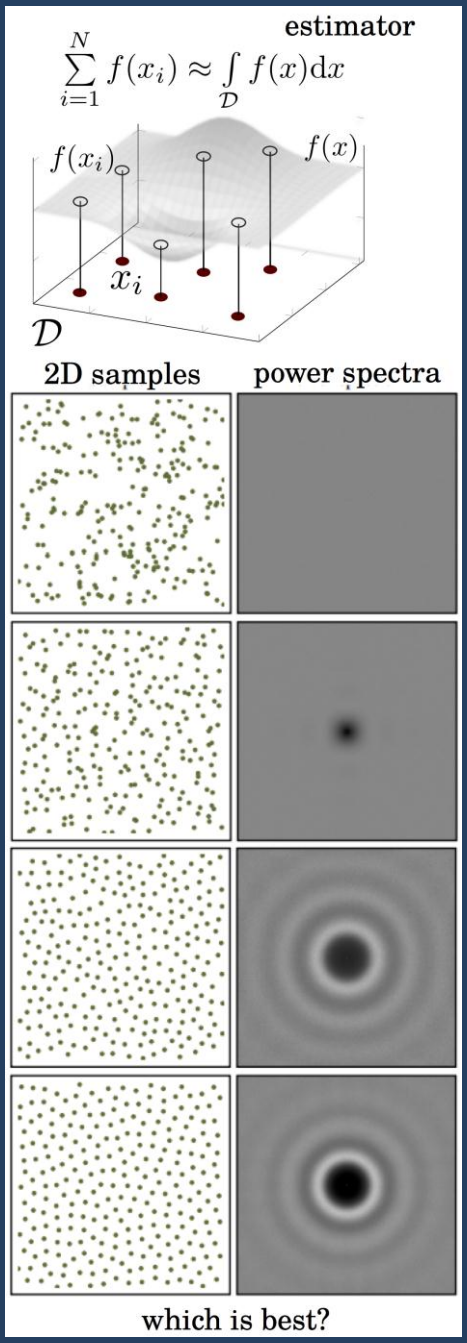
Modules	**A: Lectures : Aug 27 - Aug 31, 2018** **B: Tutorials/Labs : Aug 27 - Aug 31, 2018** All lectures and lab sessions will be held at IISc Bangalore. Number of participants is limited to **50.**
Target Audience	➢ Practitioners and developers in the fields of computer graphics, image processing, and computer vision. Particularly, developers or researchers from special effects companies who are building or enhancing large-scale Monte Carlo rendering software. ➢ Students at all levels (BTech/MSc/MTech/PhD) ➢ Researchers and developers interested in approximate and efficient optimization. ➢ Faculty from academic and technical institutions
Fees	The participation fees for taking the course is as follows: **Participants from abroad: USD 500** **Industry : INR 15,000 + 18% GST** **Indian Academia / Govt. Research Organizations: INR 10,000 + 18% GST** **Students: INR 2,000 + 18% GST** The above fee includes all instructional material, use of computing lab for tutorials and assignments, and working lunch on days of the course. A limited amount of accommodation on campus is available, and will be provided on request, subject to availability and payment of applicable charges.

The Faculty

Kartic Subr is a Royal Society University Research Fellow and Senior Lecturer at the University of Edinburgh, UK. His research interests include Monte Carlo sampling for computer graphics applications, robotics and acoustics. http://homepages.inf.ed.ac.uk/ksubr/

Course Coordinator

Vijay Natarajan is an associate professor in the Department of Computer Science and Automation at IISc, Bangalore. His research interests include scientific visualization, computational geometry, and computational topology. http://www.csa.iisc.ac.in/~vijayn/



Course Coordinator

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http://iisc.online/shortterm/home.html