中央研究院 資訊科學研究所
Institute of Information Science, Academia Sinica

Distinguished Lecture Series

Knowledge Transport Over Visual Data

Friday, December 21, 2018 10:00am

Auditorium 106,
Institute of Information Science, Academia Sinica

Prof. Leonidas Guibas

Abstract

This talk examines the interplay of two types of networks that can transfer information and knowledge over visual or geometric data, such 2D images, 3D scans or models, etc. On the one hand we have deep neural networks, which we think of as vertical networks, as they transfer information across different levels of abstraction over the same data, from low level features to higher level semantic abstractions. On the other we can consider horizontal networks where information is transported between the same levels of abstraction, but over different yet related data sets. Such networks can be built using functional maps, which are linear operators transferring knowledge-encoding functions between connected data sets. We briefly discuss some of the issues involved on the construction of both types of networks, especially for irregular 3D representations, and examine the latent spaces that arise in the process. We argue that in the end we want both types of networks, both vertical and horizontal maps, to "play well" with each other, giving rise to commutative map diagrams that enforce structure-preserving abstractions and make deep nets more functorial. We demonstrate these ideas in the context of image and shape classification and segmentation, as well as in 3D reconstruction.

Biography

Leonidas Guibas obtained his Ph.D. from Stanford University under the supervision of Donald Knuth. His main subsequent employers were Xerox PARC, DEC/SRC, MIT, and Stanford. He is currently the Paul Pigott Professor of Computer Science (and by courtesy, Electrical Engineering) at Stanford University and heads the Geometric Computation group in the Computer Science Department of Stanford University. He is acting director of the Artificial Intelligence Laboratory and member of the Computer Graphics Laboratory, the Institute for Computational and Mathematical Engineering (iCME) and the Bio-X program. Professor Guibas is a member of the US National Academy of Engineering and the American Academy of Arts and Sciences, an ACM Fellow, an IEEE Fellow and winner of the ACM Allen Newell award and the ICCV Helmholtz prize.

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