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David L. Dowe (Ed.)

Algorithmic Probability and Friends

Bayesian Prediction and Artificial Intelligence

Papers from the Ray Solomonoff 85th Memorial Conference
Melbourne, VIC, Australia, November 30 – December 2, 2011

Volume Editor

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Cover illustration: Ray often made abstract drawings on his pages of notes.
The cover image is from 1970.
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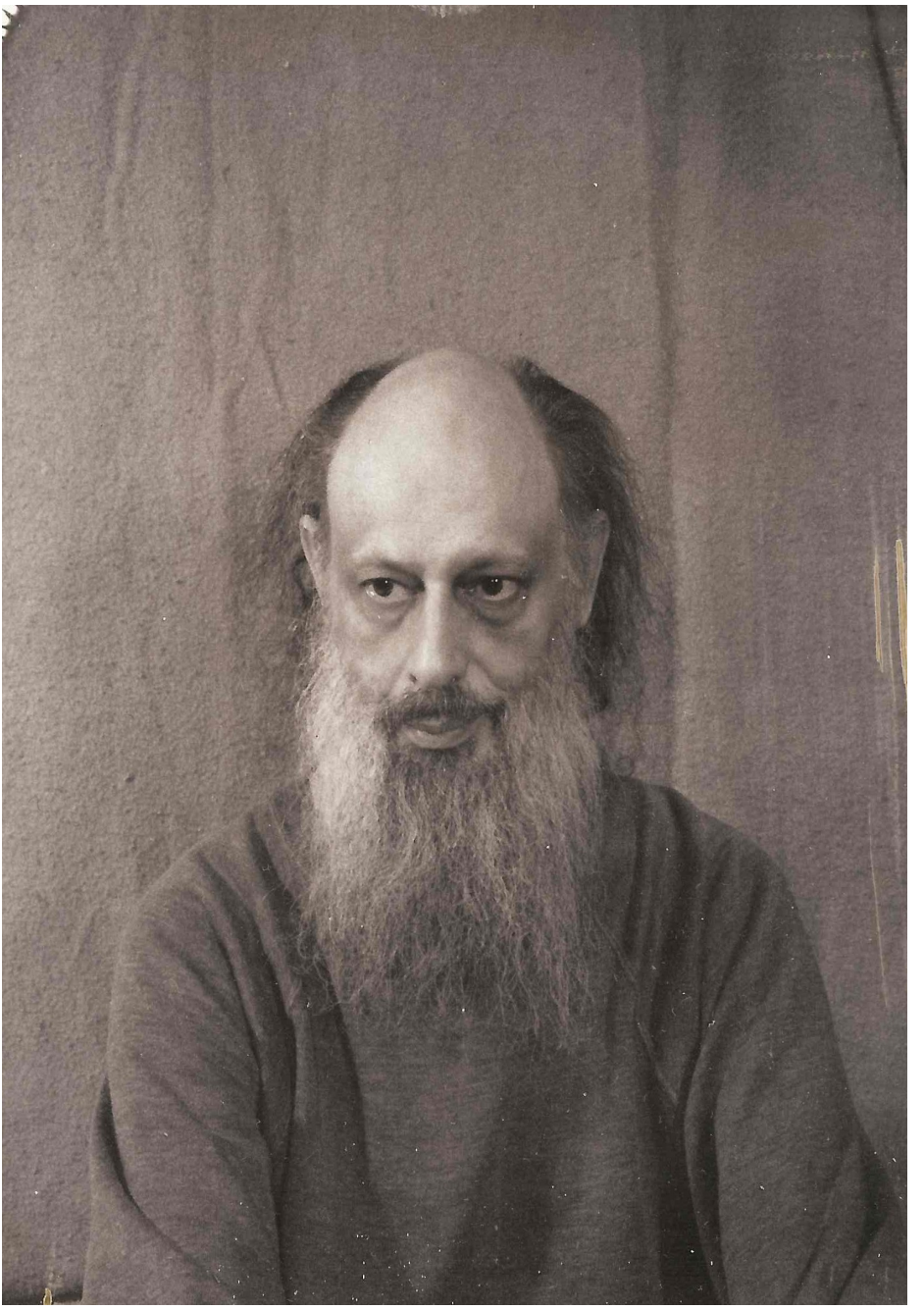

Picture of Ray taken by Grace on March 18, 1984, to accompany the 1985 article, “The Time Scale of Artificial Intelligence”

Preface

The Ray Solomonoff 85th memorial conference was held from Wednesday 30th November to Friday 2nd December 2011, to honour the work and life of Ray J. Solomonoff. Ray was not just a pioneer in computer science, artificial intelligence and machine learning, he was a visionary whose work is still today increasingly impacting on the philosophy of science. He was well aware of the human and societal implications of his work, and he will probably one day also be seen as a pioneer in statistics, econometrics and (the relatively new terms) knowledge discovery, data mining, terabyte science, data science, big data, and data management and processing, etc.

The conference was to honour Ray's 85th birthday in 2011 but, after a full life well lived (and pioneering influential research), sadly, Ray died in December 2009. The conference was held at Monash University's Clayton campus in Melbourne, Australia.

With a strong multi-disciplinary and international Program Committee including 2 Turing Award winners (and a correspondingly strong set of reviewers), there were 40 submissions (in a variety of areas of Solomonoff's work), each of which was reviewed at least twice and of which 30 were accepted as long papers and 1 as a short paper. These were accompanied by invited (talks and) papers by none less than Grace Solomonoff, Prof. Leonid Levin (Boston University, U.S.A.) and Prof. Ming Li (University of Waterloo, Canada).

There were over 40 conference delegates from countries including Australia, Brazil, Canada, China and England, Finland, France, Germany, Japan, Latvia, New Zealand, Poland, Sweden, Turkey and U.S.A., with the list of paper authors and co-authors also including Kuwait and Malaysia. (Other papers were submitted from at least two other countries.) Here and elsewhere, we thank these contributors, the sponsors [Air Force Office of Scientific Research, Asian Office of Aerospace Research & Development, Grant number FA2386-11-1-1020 AFOSR and AOARD; Faculty of Information Technology, Monash University, Australia; National ICT Australia (NICTA), Australia], the publishers (Springer) and other contributors.

Electronic computers were involved in the conference in terms of (e.g.) electronic type-setting, electronic presentations and (in some papers) rapid (faster than human) computer simulation of statistical and machine learning experiments. In the spirit of Solomonoff's work, one wonders if, when and how computers might have an increasing - and, ultimately, super-human - involvement and influence on such activities. No matter how mathematical, philosophical or otherwise, and no matter how overtly or subtly, this theme of genuine machine intelligence underlies almost all (if not all) the papers in this volume. Please enjoy the various angles and threads of this discussion throughout the conference

proceedings, honouring a true pioneer who led by example, taught us so much, and gave good direction for the work now before you and work to follow.

In choosing text for the front cover (title, inter-title and sub-title), various (combinations of) terms were considered - including Universal Turing Machine (UTM). For an idea of some of the other terms and notions considered, see the back cover and also the titles - and even the contents - of the contributed papers. In addition to the front cover figure, see Ray's famous equation at `http://world.std.com/~rjs`, together with the link there to Ray's doodles (and perhaps also the use of parts of two of Ray's doodles by RJD to give the figure at `www.csse.monash.edu.au/~dld/RaySolomonoffsVision.html` or `www.dowe.org/RaySolomonoffsVision.html`). As well as the inside photo of Ray, see other photos of Ray in some of the contributed papers in the volume, and also photos of Ray at or linked to from `http://world.std.com/~rjs`.

From Ray's inaugural Kolmogorov lecture in 2003 (see end of sec. 3 of Ray's corresponding 2003 paper), following the directions Ray has given us should largely be "a never ending source of joy in discovery!". And, among other things, our work to follow (into the future) perhaps (starting now) includes the devoted thought and discussion which Ray advocated in 1967 that we have regarding the problems of the realization of artificial intelligence – before they arise.

May 2013 David L. Dowe

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