STEFAN AEBERHARD

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MILESTONES

Date and Place of Birth	Bern, Switzerland, 5 January 1968
Secondary Education	Humboldtianum Bern (private) 1984-198
Immigration	Moves to Australia in 1988, obtains Australian Permanent Residency in 1996 (special skills category)

EDUCATION

Ph.D. (1998)	Research topics in statistical and non-statistical classification methods for complex data, dimensionality reducing transforms, fast down-dating formulae, adaptive wavelets. Much of the research focused on spectral data, 1D (Nuclear Magnetic Resonance data) and 2D (Image processing) mainly applied to face and object recognition. Thesis title: *Classification in High Dimensional Settings*. Undertaken at James Cook University, Townsville. Advisors: Olivier de Vel and Danny Coomans.
B.Sc (Hons)	Comparative analysis of classifiers for large data, improvements to the performance of Regularized Discriminant Analysis.

AWARDS

The Hunter Medal in Computer Science 1990
The Australian Computer Society Prize 1990

RESEARCH AT JCU 1990 - 1998

Regularized Classifiers:	De Vel, Coomans, Friedman, 1990. Investigated the effect of allowing for negative regularization parameters in RDA.
Graph Layout:	G.Gupta 1991. On reducing the edge crossings by spherical layouts.
Algebra:	D. Coomans, 1992. Fast down/up-dating formulae for leave-one-out evaluation of QDA/LDA performance based variable selection.
Pattern Recognition:	O. de Vel, D. Coomans. Several research assistancies, 1992-1998.
General Stoch. Automata:	O. de Vel and B. Litow, 1993, Image Compression using weighted automata.
NP Completeness:	B. Litow, 1994. Graphical representation of known NP complete problems.
Wavelet transform:	D. Coomans, 1995-1997, adaptive wavelets for signal analysis and image compression.
Image processing:	O. de Vel, D. Coomans, 1996-1998. Real time face and Object recognition using many straight line samples.

COMMERCIAL SOFTWARE 1998-2002 (Sole Trader)

ID Card Manufacturing:	A program to make and print ID Cards**,** Stuart Prison, Townsville 1994, 1996.
Clients Statistics:	Automating the collection of statistics for ATSIC in Townsville, 1995.
Invoicing and Inventory:	IORE**,** A comprehensive program to keep track of stock, sales, print invoices and compile statistics, in use since 1996 in a Wine wholesale business, Thun Switzerland.
Quality Assurance:	Assessment software for the mining industry, John Owen, Townsville, 1998-2000.
AVON:	An adaptation of IORE for AVON Ladies**,** 2001-2002.

PROCESS CONTROL EMPLOYMENT

Hose Maker: Simple database within a Lab-windows hose-making robot control program, Process Control Engineers, Townsville. Ref Errol Young (Director), ph: +61 7 4779 9566, 1998-1999.

Banana Harvester: PC software controlling a six dimensional robotic hydraulic arm. James Cook University, Process Control Engineers, Townsville and Boogan Implement Company, Innisfail. Ref. John Camuglia (Director) , ph: +61 7 4064 2300. phase 1, 1999-2002.

PROCESS CONTROL CONTRACT WORK

Banana Harvester: A new algorithm for controlling a six dimensional robotic hydraulic arm, both the PC and PLC programming. Stereo vision based distance measure to recognize the banana bag and its exact location. AI software to co-ordinate the harvest process. Boogan Implement Company, Innisfail. Ref. John Camuglia (Director) , ph: +61 7 4064 2300. phase 2, 2002-2003.

COMMERCIAL SOFTWARE after 2002

In 2003 the company *Pyramid Intelligent Applications Pty Ltd* (PIA) was founded by Dr. Stefan Aeberhard (Managing Director) and Dr. Danny Coomans. Since then all development and research activity has been undertaken as part of PIA commercial activities.

TIGRA *Text, Images & Graphics.* Stunning 2D Graphics technology which is used for all in house graphics work, for all software interfaces and graphic output, especially statistical results in the FIDO package. TIGRA itself is a stand alone vector graphics program with all the basics and some very special features.

PLAM *Plant Maker.* A program which allows generating randomized versions of given plant models for use in graphics. Uses TIGRA technology for making the plant models.

FIDO *Finding Interesting Data Organization.* A development system for researchers, handles spectral and other data, provides a GUI to specify data processing and is grid enabled for transparent use of distributed hardware. This software has been a key component in an important, current and successful joint DPI/JCU project.

3D Modeling This robotics software library is a generic 3D modeling package that allows calculating collisions, intersections and unions of stationary or moving objects or object

parts. This Pyramid library is currently revolutionizing the furniture fabrication software market.

SELECTED PUBLICATIONS

(1) S. Aeberhard, O. de Vel, and D. Coomans. Discriminant Analysis in High Dimensional settings. Proceedings 16th international Biometrics Conference, IBC92, Hamilton, New Zealand.
(2) S. Aeberhard, O. de Vel, and D. Coomans. Comparative Analysis of Statistical Pattern Recognition Methods in High Dimensional Settings. Pattern Recognition, 27:1065-1077, 1994.
(3) S. Aeberhard, O. de Vel, and D. Coomans. Improvements ot the classification performance of Regularized Discriminant Analysis. Journal of Chemometrics, 7, pp. 99-115, 1993.
(4) S. Aeberhard, O. de Vel, and D. Coomans. Fast Variable selection. Proc. interface93, The symposium on the interface: Computer Science and Statistics, San Diego April 1993.
(5) S. Aeberhard. Classification in High Dimensional Settings. PhD thesis, Dept. of Computer Science, James Cook University, 1998.
(6) S. Aeberhard. Pattern Classification in High Dimensional Settings. Honours thesis, Dept. of Computer Science, James Cook University, 1992.
(7) O.de Vel and S. Aeberhard, Line-Based Pattern Recognition under Varying Pose. PAMI, 21, No.10, pp.1081-1088, 1999.
(8) S.Aeberhard. The Banana Harvester Technical Reports I-III, 2001, 2002, 2003. For Boogan Implement Co. Innisfail, ref. John Camuglia, ph: +61 7 4064 2300.
(9) S. Aeberhard, O. de Vel, and D. Coomans. New Fast Algorithms for Error Rate Based Stepwise Variable Selection in Discriminant Analysis, SIAM, to appear.
(10) S. Aeberhard, D. Coomans and O. de Vel. An Empirical Study of Adaptive Wavelets, Technical Report, Department of Computer Science, James Cook University, 1998.