Karthikesh Raju

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Objective

Obtain a position that provides opportunities to

- Develop, explore and enhance areas related to wireless access technologies
- Work with and in standardization of these technologies
- Collaborate and work on projects in the areas of expertise, and in other diverse projects
- Continue the ongoing pursuit of knowledge
- Enhance critical thinking for development of innovative solutions

Education

Helsinki University of Technology, Finland

Ph.D Candidate, Computer Sc, February 2001 (expected graduation date: Oct 2005, under review)

- Dissertation Topic: "BSS aided Interference Cancellation for CDMA Systems "
- Advisor: Prof. Erkki Oja
- Major: Information Science
- Minor: Signal Processing

Universität Ulm, Ulm, Germany

M.Sc., Communication Technology, May 2000

Bharathiar University, Coimbatore, India

B.E., Electronics & Communication, July 1997

Honors and Awards

Nokia Scholarship - 2001, 2002

Emil Aaltosen Scholarship, 2003

Universität Ulm: Best Comm.Tech Student, 1999

Bharathiar University: Gold Medal, 1997

Indian Institute of Technology, Chennai: Summer Research Fellowship, 1996 [1]

Experience

Helsinki University of Technology, Dept. of Comp. Sc., Finland

Graduate Student **February 2001 - present**

Ph.D research into Blind Source Separation for Interference Cancellation, Ph.D level course work. Other tasks include guide a student during his graduate thesis (M.Sc. thesis) and assisting a course - Support Vector Machines

Summary of the work

- Developed algorithms based on independent component analysis
- Combined ICA with traditional methods like (MRC) for improving interference cancelation

[1] Awarded by the Jawaharlal Nehru Centre for Advance Scientific Research, Bangalore, India

- Developed switching strategies for ICA based detection techniques - effectively making them "semi-blind"
- Developed algorithms based on denoising methods for effective separation of interferences in a "blind" manner
- Extending and improving semi-blind and blind algorithms using "prior" information

DaimlerChrysler Research Centre, Transportation Telematics, Ulm, Germany

Researcher **June 2000 - February 2001**

Worked on Adhoc protocols. Studied suitable protocols for use in Vehicular environments *Summer Research Student* **August 1998 - October 1998**

Developed regression algorithms for automated lane detection, and wavelet based image analysis for the Signal Processing research division.

Summary of the work
- Analysis of the suitability of adhoc protocols for vehicular environments
- Simulation of several adhoc protocols
- Developed regression algorithms for automated lane detection
- Wavelet based image analysis for detection of mines
- Developed GUI driven toolkit for wavelet based image edge detection

Universität Ulm, Dept. of Information Technology, Ulm, Germany

Research Assistant **April 1998 - June 2000**

Worked on the analysis of genetic algorithms for multiuser detection. Thesis for the Masters degree was done at Helsinki Univ. of Technology on Bayesian Priors for Independent Component Analysis

Summary of the work
- Started a project on the use of genetic algorithms for multiuser detection
- Analysis of various methods for utilization of genetic algorithms
- Co-developed a C++ toolbox for using genetic algorithms

DaimlerChrysler Research Centre, Bangalore, India

Junior Scientist **July 1997 - March 1998**

Analysis and testing of a DGPS based ground station

Summary of the work
- Part of a team in the analysis of DGPS algorithms for a ground station
- Testing of the application developed by the then Daimler-Benz Aerospace AG

Indian Institute of Technology, Dept. of Computer Sc., Chennai, India

Summer Research Fellowship **June 1996 - August 1996**

Application of Hopfield networks for optimization problems

Summary of the work
- Developed an overview of neural networks
- Mini tasks included developing optimization algorithms using Hopfield networks
- Image denoising using Hopfield networks

Journal Publications

Raju. K, Ristaniemi. T, Karhunen. J and Oja. E, *Jammer Cancellation in DS-CDMA Array Systems using Independent Component Analysis*, IEEE Transactions on Wireless Communications, in press

Hyvärinen. A and Raju. K, *Imposing sparsity on the mixing matrix in Independent Component Analysis*, Neurocomputing, 49:151-162, 2002

Significant Conference Proceedings

Raju. K, Huovinen. T, and Ristaniemi. T, *Blind Interference Cancellation Scheme for DS-CDMA Systems*, IEEE International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting, Washington DC, July 3-8, 2005 to appear (invited paper)

Raju. K and Särelä, *A Denoising Source Separation based approach to Interference Cancellation for DS-CDMA Array Systems*, 38th Asilomar Conference on Signals, Systems and Computers, Pacific Grove, Nov 7-10, 2004, 1111-1114

Raju. K, Ristaniemi. T and Karhunen. J, *Semi-Blind Interference Suppression on Coherent Multipath Environments*, 1st IEEE Symposium on Control, Communications and Signal Processing, Hammamet, March 21-24, 2004, 283-286

Raju. K and Ristaniemi. T, *Exploiting Independence to Cancel Interferences due to Adjacent Cells in a DS-CDMA System*, 14th IEEE International Symp. on Personal, Indoor, Mobile Radio Communications, Beijing, Sept 7-10, 2003, 3:2130-2134

Ristaniemi. T, Raju. K, Karhunen. J and Oja. E, *Jammer Cancellation in DS-CDMA Array Systems: Pre and Post Switching of ICA and RAKE*, IEEE International Symp. on Neural Networks for Signal Processing, Martingy, Switzerland, September 4-6, 2002, 495-504

Raju. K and Ristaniemi. T, *ICA-RAKE-Switch for Jammer Cancellation in DS-CDMA Array Systems*, IEEE International Symp. on Spread Spectrum Techniques and Applications, Prague, September 2-5, 2002, 638-642

Raju. K, Ristaniemi. T, Karhunen. J, Oja. E, *Suppression of Bit-Pulsed Jamming Using Independent Component Analysis*, IEEE International Symp. on Circuits and Systems, Phoenix, May 26-29, 2002, I-189/I-192

Ristaniemi. T, Raju. K, Karhunen. J and Oja. E, *Jammer Mitigation in DS-CDMA Array Systems using Independent Component Analysis*, IEEE International Conference on Communications, New York City, April 28 - May 2, 2002, 232-236

Hyvärinen. A and Raju. K, *Sparsifying Priors for use in the mixing matrix of ICA of Images*, 2nd International Workshop on Independent Component Analysis and Blind Source Separation, Helsinki, 2000, 472-477

Raju. K, Tiech. W. G, and Lindner. J, *Genetic Algorithms - A promising approach for hard optimization problems*, 3rd Workshop on Communication Techniques, Schloss Reissensberg, July 7-9, 1999

Others

Raju. K, *Feasibility Study of Adhoc Protocols for Vehicular Environments*, Internal Document, Transportation Telematics, DaimlerChrysler Research Centre, Ulm

Skills

- Languages: English, Tamil, Hindi, intermediate German, some familiarity with Finnish
- Computer Languages: Matlab, C++, Python, HTML
- Operating Systems: Linux/Unix, Windows and Macintosh

International Presentations

- WITSP 2004, Adelaide, Australia, 2004
- Asilomar 2004, Pacific Grove, USA, 2004
- ISCCSP 2004, Hammamet, Tunisia, 2004
- PIMRC 2003, Beijing, China, 2003
- ICA 2003, Nara, Japan, 2003
- ISSSTA 2002, Prague, Czech Republic, 2002
- ISCAS 2002, Phoenix, USA, 2002
- ICA Winter School, Vietre Sul Mare, Italy, 2002
- Communications Techniques Workshop, Schloss Reisensburg, Germany, 1999

References

1. Prof. Erkki Oja, Director, Neural Network Research Centre, Helsinki Univ. of Technology, Finland
2. Prof. Tapani Ristaniemi, Institute of Communications Eng., Tampere University of Technology, Tampere, Finland