Harish Barathvajasankar

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OBJECTIVE

To obtain a summer internship in the field of Computer Science and Engineering

EDUCATION

Master of Computer and Information Sciences	University of Minnesota, Twin Cities		Exp April 2006
Bachelor of Engineering (B.E.) Computer Science & Engg	Sri Venkateswara College of Engineering, Sriperumbudur. University of Madras	84.74%	April 2004

RESEARCH EXPERIENCE

- Research Assistant to Prof. Karen Donohue, Department of Operations and Management Sciences, Carlson School of Management — Fall 2004
- Research Trainee Under Prof.N.Venkateswaran, Waran Research Foundation, India. http://www.warfindia.org — August 2002 – August 2004

SOFTWARE SKILLS

LANGUAGES	BASIC, C, C++ (with STL), LaTeX, Lex, Yacc, Visual Basic, VC++, Java
DATABASE	SQL , Oracle, MS Access
OPERATING SYSTEM	Linux, Unix, Windows 9x, 2xxx, NT, Solaris
WEB DESIGNING	HTML, DHTML, XML, ASP, JavaScript, CSS, Flash
ALP	8085, 8086
TECHNICAL TOOLS	Verilog HDL, VHDL, Simplescalar, Neuron, Retsoft, Model Sim, Labfit, NlReg, Matlab
SOFTWARE	Adobe Photoshop, 3DS MAX, Smart Draw, Sigma Plot, MS Office Suite

UNDERGRADUATE RESEARCH THESIS

Evolving a Super Computing Architecture for modeling Cortex: Towards A Novel Perspective in Color Information Encoding – The thesis involves the proposal of a new information encoding scheme for both encoding and decoding of the color visual stimulus in the human retina and brain. The thesis further proposes a novel super-computing architecture for modeling the visual cortex based on the Memory in Processor Super Computing paradigm.

PUBLICATIONS (CO-AUTHORED)

- **yNAM For Massive Neuronal Assembly Modeling: Part-I, Processing Elements**, The 6th International Conference on Computational Intelligence and Natural Computing, 2003.
- **yNAM For Massive Neuronal Assembly Modeling: Part-II, The Array Architectures**, The 6th International Conference on Computational Intelligence and Natural Computing, 2003.
- **A Novel Perspective into the Neuronal Encoding along the Retinal Pathway Employing Time-Frequency Transformation: PART I FOR OBJECT**, Brain Inspired Cognitive Systems, 2004.
- **A Novel Perspective into the Neuronal Encoding along the Retinal Pathway Employing Time-Frequency Transformation: PART II FOR COLOR**, Brain Inspired Cognitive Systems, 2004.

RESEARCH REPORTS (CO-AUTHORED)

- An Integrated Process for Simulating the Retinal Pathway on the Special Purpose Neuronal Assembly Model Array Processor, WRR-CH-03.
- DNA Based Evolvable Instruction Set Architecture Arithmetic Unit, WRR-CH-04.
- An Innovative Approach towards Arithmetic and Control in DNA Paradigm, WRR-CH-05.

THEORY ORIENTED PROJECTS

- **Conceptual Evolution of DNA Processor: Computation and Control** – April 2004 – 8 Months – Development and simulation of data parallel algorithms using the basic operations of DNA. The application of the methodology is in data parallel computations. The main focus is on the simulation of the matrix multiplication and inner product operations using the methodology and further, implementation of FSMs.

SYSTEMS ORIENTED PROJECTS

- **Exploiting Value Temporal Locality in Physical Register Files – A Performance Analysis** – (Fall 2004 - Term Project) – A comparative analysis of the various schemes that are available to exploit value temporal locality in physical register and reduce the pressure on the physical register file through simple register sharing and physical register reuse. This project involves the performance analysis of the schemes using Simplescalar simulation tool.
- **A survey on Interoperability of data in databases** – (Fall 2004 – term project proposal) – A comprehensive survey on the various issues in the interoperability of data across various autonomous and federated databases. It is further proposed to investigate the performance issues of these databases.
- **NAML – Neuron Assembly Modeling Language** – (5 months) – A novel object oriented language for modeling the neuronal assemblies on a special purpose NAM processor model. Language Constructs include neuron modeling specific instructions. This language is still under development at Waran Research Foundation, India, and has been proposed to include vision processing constructs.
- **NMC – Neuron Modeling Compiler** – (5 months) - This compiler generates instructions based on NAM Instruction Set Architecture from the intermediate code generated for the NAML program. Optimization and software pipelining are yet to be included in the compiler.
- **kDSP1010: A Low Power DSP Architecture Design** – (3 Months) - A complete timing and functional simulation of fully parallel adder and multiplier that fits into DSP processor. The functional simulation involved the testing of the FFT algorithm on the functional units.
- **CCSL – Combinational Circuits Simulation Library –** (3 months) - A complete library of combinational circuits. The whole project has been modularized to facilitate for inclusion in future architectures simulated using HDLs. The library can be imported into any module written in Verilog HDL.

APPLICATION ORIENTED PROJECTS

- **Web based Negotiation System** – An online negotiation system for analyzing the behavior of buyers and suppliers in a transaction environment. This is a part of Prof. Karen Donohue's research project.
- **SAFNET - Statistical Analyzer For dominant harmonic analysis of Neuronal Encoding in TFD –** (3 Months) - This analyzer comprises of Harmonic Mean Calculator, Standard deviation Engine and Dominant Harmonic Extractor modules. The modules are application specific and are used to extract the dominant harmonics in the frequency spectrum. The extraction is based on statistical analysis using probabilistic values.
- **GTFA – Gabor Time – Frequency analyzer** - (2 months) – A set of procedures that facilitate gabor analysis on any signal that is being input to the tool. The whole design is procedural and implemented in Matlab
- **rDNAmac –** (6 Months) - An object oriented library in C++ for simulating the DNA operations. Developed as a part of the theory project listed. Further work involves the implementation of the LU decomposition and DSP algorithms in DNA.

MINI PROJECTS & CODING EXPERIENCE

- Design of an assembler for the 8085 instruction set supporting named variables, equivalences and labels
- Design of a simple restricted SQL query parser supporting creation of simple databases and conditional queries
- Developed a suite to model OS Scheduling Algorithms and File Allocation Strategies
- Interactive Payroll System and Online Quiz using Oracle Backend and VB frontend
- Retina Simulation – Simulated the human retina using the Retsoft 4.0
- Codesigner of http://www.warfindia.org and administered from August 2003 – August 2004

AWARDS

- Certificate of merit for standing second in the department of Computer Science and Engineering in October 2002 Semester Examinations conducted by University of Madras.
- Intel HiPC Scholarship for attending 10th International Conference on High Performance Computing 2003
- Best Undergraduate Project Award – Department of Computer Science & Engineering, 2003-2004.
- Bharat Petroleum Scholarship for Higher Studies – 2004