SWETHA KRISHNAN

7361, Department of Computer Sciences
1210 W Dayton St
Madison, WI 53706

Work Phone : (608)-262-2252
Cellphone : (608)-346-3669
E-mail : swetha@cs.wisc.edu

Objective	**A professional full-time opportunity in Operating Systems/Networking or related domains of Computer Sciences.**

Education

- **Masters in Computer Sciences**
  University of Wisconsin-Madison.
  Current GPA : **3.875/4.00** *Expected: May 2007*

- **B.E. (Hons.), Computer Science.**
  Birla Institute of Technology and Science (BITS), Pilani, India.
  Overall CGPA : **9.81/10.00**
  Rank In Computer Science Department: **3rd** out of 150 students. *Completed: June 2005*

- **Indian School Certificate (ISC) Examination (Class 12**)
  D.B.M.S English School, Jamshedpur, India.
  Overall Percentage : **95.25%** *Completed: June 2001*

- **Indian Certificate of Secondary Education (Class 10)**
  D.B.M.S English School, Jamshedpur.
  Overall Percentage : **92%** *Completed: June 1999*

Relevant Courses

University of Wisconsin-Madison –

- *Completed :* CS 736 Advanced Operating Systems , CS 764 Topics in Database Management Systems, CS 740 Advanced Computer Networks , CS 752 Advanced Computer Architecture , CS 799 Master's Research
- *Currently Doing: :* CS 547 Computer System Modeling Fundamentals , CS 706 Analysis of Software Artifacts, CS 799 Master's Research.

Academic Awards and Achievements

- Was selected for and participated in the **Google Workshop for Women Engineers 2006**, being one among about 190 students chosen from universities across the United States.
- Was honored with the **ALL INDIA TALENT SCHOLARSHIP (A.I.T.S**) AWARD, 1993 conferred by the International Children's Excellence Fund (INCEF), a child body of **UNICEF**. Received the award from **the Honorable Prime Minister of India**, Shri H.D. Deve Gowda, at a special function at the capital.
- Recipient of the **BITS Merit Scholarship** (awarded to the top 10 students of the entire undergraduate batch of about 900 students) for 5 semesters at BITS, Pilani.

Publication

- T S B Sudarshan, Pavankiran, Swetha Krishnan and G Raghurama, **"Fuzzy Logic Approach for Replacement Policy in Web Caching"**, Proceedings of **2nd IEEE Indian International Conference on Artificial Intelligence**, Pune, India, Dec 2005.

Technological Skills

- **Programming Languages:** C, Java, C++, Visual Basic 6.0, UNIX Network Programming, UNIX Shell Programming, SQL, Oracle PL/SQL, Assembly Language Programming on the 8086/80X86 processors.
- **Platforms :** Linux, Windows 9x/NT/2000/XP, Microsoft Compact .NET Framework.
- **Packages Used :** ORACLE-9I, Network Simulator NS-2, Simplescalar, MATLAB, Veriwell Simulator, OpenNetCF Smart Device Framework.
- **Microprocessor :** 8086 Architecture and Assembly, MIPS.

Professional Experience	• **Summer internship** at **Amazon Inc.**, Seattle, USA from 22nd May to 25th August, 2006.
	• **1-semester Internship (Co-op),** at **Hewlett-Packard Labs, Bangalore,** India from 6th January 2005 to 17th June 2005.
	• **Summer internship** at the **Bhabha Atomic Research Center,** Mumbai, India from 21st May 2003 to 14th July 2003.
	• **Research Assistant** with the ADSL (ADvanced Systems Laboratory) group at the University of Wisconsin-Madison during Fall 2006 (current).
	• **Teaching Assistant** for the course *CS 310 Problem Solving using Computers* during Fall 2005 and Spring 2006 at the University of Wisconsin-Madison.

Projects Summary	• **Factorization of Device Driver Code between Kernel and User spaces (Jan-May 2006)**
	This was done as the course project for my graduate Operating Systems course. We proposed a new scheme for device driver implementation that gains on robustness of the system without sacrificing driver performance. Currently, drivers are implemented as kernel code, which poses stability problems since bugs in the drivers cause kernel crashes. Our approach was to "factorize" the driver – retain the performance critical code in the kernel and move the less performance sensitive code to the user space. In our split driver, work that needs to be done fast such as device I/O and interrupt handling is retained in the kernel space. Work that is less frequent and can afford to be done slower such as driver configuration or statistics collection is moved to the user space. Thus we reduce the likelihood of driver bugs affecting the kernel. We implemented this scheme on PCnet32 network driver for Linux.
	• **Binary-Encoded Attribute Pairing for Database Compression (Jan – May 2006)**
	This work was done as a Database Systems course project. We introduced and evaluated a new compression scheme for relational databases for optimizing storage space. The scheme uses bitwise encoding based on distinct attribute values to represent the data in the columns (attributes) of our database. The scheme further encodes the resulting columns 'in pairs' at each stage of our compression. We also explored various ways to pair columns by exploiting properties that exist for the relation, such as primary key, number of distinct values of an attribute, and functional dependencies. Our results indicate that even without prior knowledge , of the data distribution, the compression achieved is superior to that of standard compression utilities such as Gzip and Zip.
	• **Event Tracker : A service that monitors timely occurrence of events (May–Aug 2006)**
	I worked on this project during my summer internship with Amazon.com. I developed a tool to provide monitoring of events based on their scheduled times and estimated durations. An event is a process whose execution or failure to execute in a timely manner should be associated with a resulting action such as an alarm (say an e-mail or a page using the company's alarming system). The Event Tracker service stores information about registered events and automatically tracks their expected completion time. If events occur before or after anticipated times beyond stated thresholds, the Event Tracker would trigger various alarms as configured for the event type. This tool also provides a centralized means of querying for event information to be displayed on dashboards with useful statistics. With this tool, processes can be monitored even if the host goes down or the cron job meant to start the process fails.
	• **Simulation of an RFID Platform on Network Simulator NS-2** (Aug – Dec 2005)
	This was done as the course project for my Advanced Computer Networks Course (CS 740) at UW, Madison. We did a study of Radio Frequency Identification(RFID) Systems and various challenging problems in this domain like Redundant Reader Elimination , RFID Privacy and Load Balancing. We found the lack of a robust, publicly available simulator for the RFID platform for working on these problems. So we developed an RFID System emulation using the wireless extensions of NS-2 as a base and revamping it to work according to the RFID Protocol Standards as specified by EPC Global. We also tested the robustness of our platform by implementing a Load Balancing Scheme for distributing

load on RFID Readers to optimize power consumption.

- **Implementation of Virtual Load Store Queues on Sim-Alpha** (Aug- Dec 2005)
This project was a part of my Advanced Computer Architecture Course. We worked on a 'debunking' attempt, on a paper 'Using Virtual Load/Store Queues (VLSQs) to Reduce the Negative Effects of Reordered Memory Instructions' and investigated our suspicion of the unbalanced baseline processor configuration chosen by the authors. The paper proposes VLSQ – a virtual window within the physical load/store queue- as a method to overcome the wastage of energy caused by aggressive out-of-order execution. We implemented the VLSQ scheme on sim-alpha architecture simulator and tested it on the given as well as on more balanced processor configurations. The results of our simulations showed that while the overall conclusion arrived at in the paper still holds true, the numbers are slightly less optimistic than projected, compared to those with a more balanced baseline.

- **Digital Multimedia Broadcasting – Printcast** (Jan – June 2005)
This project was a part of my Co-op work at HP Labs, India. It was based on a system called "Printcast" through which print content that is closely associated with the audio-video of the television program can be simulcasted over the broadcast channel and received and printed by TV viewers. My work involved developing methods with which non-print content such as ring-tones, URLs and feedback forms can be sent along with the A/V TV signal , rather than print content. The non-print data is received by the Printcast Decoder and transmitted wirelessly, using the Bluetooth protocol , to hand-held devices such as Pocket PCs and mobile phones.

- **Application of Soft Computing Techniques to Cache Replacement Algorithms for Caching on the World Wide Web. (**Jan - April 2004)
I took up this project on web caching in the second semester of my third year. It aimed at devising a novel method for cache replacement for Proxy Caching using Fuzzy Logic, and assessing its suitability with respect to traditional methods. The performance analysis gave an insight into inferences about the conditions under which the Fuzzy Method supersedes the existing conventional replacement techniques like LFU, LRU and SLRU. Additionally, I also did a study of Genetic Algorithm based techniques for cache replacement. I also co-authored a research paper on this work, which was accepted at IICAI 2005 Conference.

- **Multi-Resolution Image Analysis and Compression Using Wavelets** (May –July 2003)
This project was undertaken during my Practice School I (summer internship) at Bhabha Atomic Research Center (BARC), Mumbai. It involved a study of Wavelets and their application to Multi-Resolution Analysis (MRA) and Image Compression. The project involved 2 modules-a) implementation of an efficient algorithm for construction of "Image Pyramids" and b)performing Image Compression (as well as original image reconstruction) by applying the "Discrete Wavelet Transformation", and using the earlier module. We also experimented with different kinds of thresholding and quantization, including a self-devised fan-in strategy, applied to the image after its decomposition into 'tiles' by MRA. We also performed texture analysis by applying wavelet techniques to texture images .

- **Survivable Networks : Active and Backup Path Computation** (Aug – Dec 2004)
This project dealt with the important issue of restoration in networks, specifically, the provision of survivable multicast sessions. It investigated methods to compute active and backup paths to overcome single-link and single-node failures in Mesh Networks, with maximum sharing of backup paths to minimize bandwidth reservation on each link. We adopted a segment-disjoint restoration path computation approach, in favor of link-disjoint or arc disjoint algorithms to achieve minimum reserved bandwidth.