

KARTIK SANKARAN

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CAREER OBJECTIVE

To undertake a challenging career in research in academia or industry in the area of Computer Science

SUMMARY

- **Research Interests** : Networks, Operating Systems, Embedded Systems and Threading
- Published a research paper "*PB Scheduling in Multi-Core Real Time Embedded Systems*", which won **first prize** and a grant to my college PESIT to set up a Multi-Core research lab, in the **Intel Threading Champion Competition 2009**
- Doing **Multi-Core research** under the guidance of Prof. Zubair (Old Dominion University, USA), in parallelization of the Sagot Algorithm (**Repeated Motif Problem using Suffix Trees**)
- Involved in setting up a **Freescalab** at PESIT, under the guidance of Dr. Kris Kumar, including hands-on experience of programming two microcontrollers (**HCS12X and Coldfire**)
- Projects :
 1. Written a simple many-to-one **User Thread Library** for Linux 2.6
 2. Developed a **3D graphics editor** using OpenGL for Windows XP/Vista
 3. Writing a trial 32-bit protected mode **Operating System** for Intel 80386
- Achievements :
 1. Secured **Distinction Awards** from PESIT in each semester for scoring First Class with Distinction
 2. Awarded the **Prof. MRD Scholarship** based on the aggregate of the first four semesters
 3. Secured the **249th rank (out of 87,000 students)** in the Karnataka state **Common Entrance Test (CET)** for entry to Engineering study
- Other Accomplishments :
 1. **Conducted a Training Session** on the HCS12X Microcontroller for the staff of the CS department, PESIT
 2. Successfully completed the **Placement Process Re-Engineering (PPR) Course** covering Standard C++

EDUCATION

Course	Institution	Year of Completion	Specialization	Aggregate Marks Obtained
Bachelor of Engineering	PES Institute of Technology, Bangalore, India (affiliated to Visveswaraya Technological University, Belgaum)	Sept 2006 – to date	Computer Science and Engineering	Semester Wise: 1 st – 90.32% (Third Rank*) 2 nd – 89.29% 3 rd – 84.11% 4 th – 88.11% (First Rank*) 5 th – 76.44% 6 th – 73.55% Aggregate (1 st to 6 th semester) : 83.63%
XII Standard (Central Board of Secondary Education)	National Public School, Rajajinagar, Bangalore, India	March 2006	Mathematics, Computer Science, Physics, Chemistry	95.0% (Third Rank in School)
X Standard (Central Board of Secondary Education)		March 2004	Mathematics, Science	94.4% (Among the Top 10 ranks in School)
* In the Computer Science Department, PESIT				

- ❖ Awarded the **Prof. MRD Scholarship** based on the aggregate of the first four semesters
- ❖ Secured **Distinction Awards** from PESIT in each semester for scoring First Class with Distinction

TECHNICAL EXPOSURE

LANGUAGES	
C	Also learned how C is <u>interfaced</u> with 8086 <u>assembly</u> code
Standard C++	Comfortable with <u>exception</u> handling and <u>template</u> classes
Java 2	Studied Java2 in detail, however have not written large Java programs. Currently learning Java 5
OPERATING SYSTEMS	
Windows	Have used Windows 95, XP and Vista, and have studied <u>Windows Programming</u> (native APIs - I/O, menus, toolbars, dialog boxes)
Linux	Comfortable with the command line interface and basic commands. Have done <u>UNIX System Programming</u>
SOFTWARES	
Emacs	Used this editor frequently for writing programs

I have inculcated **good programming practices**, especially writing on-source documentation. Finding and fixing runtime errors in my classmates' projects has given me a large amount of **debugging practice** (C and C++ programs).

SPECIAL INTERESTS –

OPERATING SYSTEMS

- Have studied **Intel (80386) Protected Mode Concepts**
- Currently studying the **Linux (2.6) Kernel Internals** in detail (have so far done Virtual Memory, Structure of the Process Address Space, Dynamic Loading, Kernel Memory Allocation)
- Have **conducted experiments** on my old computer – making a bootable floppy and a bootable CD to run any binary image on booting.
- Have started writing a **simple 32 bit protected mode Operating System** using Standard C++

MICROCONTROLLERS

I am currently involved in setting up a **Freescale Lab** at PESIT, under the guidance of Dr. Kris Kumar. This involves learning about two microcontrollers (**HCS12X and Coldfire**), and hands-on experience of programming them using the Student Learning Kits provided by Freescale.

NETWORKS

I had an opportunity to visit Cisco Systems and see the routers and hardware. I am currently studying the implementation details of TCP/IP.

PROJECTS

3D GRAPHICS EDITOR

I developed an editor that can be used to create and edit coloured 3D scenes. I used the **OpenGL Graphics API** for drawing the 3D scenes and the **Win32 native APIs** for I/O and creating windows, menus, toolbars and dialog boxes.

The project helped me gain experience in writing code using multiple source files (I created around 30 headers and 30 source files). I was able to understand the concepts and pitfalls of using multiple source files (circular dependencies, multiple declarations one definition rule, private and public headers, importance of makefiles). I used the C++ STL containers frequently in the code.

Duration: Jan 2009 to May 2009 (6th semester)

Guide: Prof. Manjunath C R (CS Department)

Language: Standard C++ (Microsoft Visual C++ Express Edition 2008 IDE)

Platform: Windows XP, Vista

THREADING LIBRARY

I wrote a simple **user thread library** to demonstrate the 'many-to-one' model. Using this library, a programmer can write threaded programs, with some limitations – threads should not perform signal handling and cannot use interval timers. This project helped me understand the multithreading models, context switching and inline assembly.

Duration: 16th September to 18th September 2009

Language: Standard C++

Platform: Linux 2.6

RESEARCH

INTEL THREADING CHAMPION COMPETITION –

Team of A K Kamesh, Namratha M S, Anusha K and myself submitted a research paper titled *"PB Scheduling in Multi-Core Real Time Embedded Systems"*.

We **won the First Prize** and a **grant to our college to set up a Multi-core Research Lab**.

In this paper, we have adapted the Primary-Backup technique for use in a Multicore-Multiprocessor Real-Time Embedded System, to handle the situation where multiple cores of a processor can fail at the same time.

Duration: March 2009 to July 2009

Guide: Prof. D Krupesha, CS Department

MULTI-CORE RESEARCH –

Team of Namratha M S, Anusha K, A K Kamesh, Mukunda N S and myself are studying the Sagot Algorithm (**Repeated Motif Problem using Suffix Trees**), under the guidance of Prof. Zubair (Old Dominion University, USA).

We are currently writing a sequential implementation of this algorithm. We will then investigate methods to parallelize the algorithm. Our goal is to find repeated patterns in a huge DNA sequence efficiently using multiple multi-core processors. Once the Intel research lab is set up at PESIT, we will implement our ideas using the Intel Multi-core processors.

Duration: October 2009 to date

Guide: Prof. Zubair (Old Dominion University, USA)

TECHNICAL COURSES

- I underwent a **Training Session on the Freescale HCS12X Microcontroller** in October 2008 (fifth semester)
- I was enrolled in the **Placement Process Re-Engineering (PPR) Course**. The course covered Standard C++ concepts. The classes were spread over the fifth and sixth semester. Our instructor, Mr. Vijayan, shared his programming experience with us and gave us C++ design tips that are not generally found in books.

SOFT SKILLS

- ❖ **Good oral and communication skills**
 - I have given a number of class seminars during the BE course (on varied technical topics)
 - I conducted a Training session for the staff of the CS Department on the HCS12X Microcontroller (on 26th January 2009)
- ❖ Learnt **Basic German Language** during the first and second semesters. I will be augmenting this with German audio lessons from the internet.
- ❖ Attended the **Total Student Development Program (TSDP)** during the first and second semesters. It consisted of a number of modules covering various soft skill areas – Attitude, Teamwork, Group Discussion and the like.

CO-CURRICULAR ACTIVITIES

Won **Second Prize** in the **Graphics Programming** and **Code Alteration** Contests during the Atma Trisha 2008 Fest held at PESIT.

OTHER INTERESTS

Reading Books, Making Cardboard Boomerangs

PERSONAL DETAILS

Name: Kartik Sankaran

Date of Birth: 7th September 1988

Sex: Male

Age: 21

Nationality: Indian

Father's Name: S V Sankaran

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