

Ankit Mathur

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WORK INTERESTS	Systems Programming including Operating Systems, Real-Time Systems, Distributed Systems and Networks	
EDUCATION	Indian Institute of Technology Delhi, New Delhi July 2000 – <ul style="list-style-type: none">• Bachelor Of Technology in Computer Science and Engineering• SGPA 9.29/10 in the 7th semester.• CGPA 8.12/10 after 7 semesters. St. Thomas School, Ranchi <ul style="list-style-type: none">• Scored 94% marks in ICSE Class X examination (1998). DAV JVM, Ranchi <ul style="list-style-type: none">• Scored 85% marks in CBSE Class XII examination (2000).	
AWARDS AND ACHIEVEMENTS	B.Tech Project (Extensions to RtKer, a Uni-Processor Real-Time OS, for Multi-Processor Leon) one of the eight projects selected for the Intel Student Research Contest 2003-04 from India (Only one from IIT Delhi). National Talent Search Examination (NTSE) Scholar Gold Medalist at the Indian National Physics Olympiad. (2000)	
WORK EXPERIENCE	Non-Intrusive Methods for Dependency Analysis in e-Business Applications (Summer 2003) I did this project during my practical training at IBM India Research Lab. This was part of the Server monitoring software by Tivoli (a subsidiary of IBM). The system I designed uses non-intrusive techniques to detect dependencies amongst server applications and provide early-warning and corrective measures to balance system load. I used non-intrusive techniques to get compatibility with proprietary server platforms and database applications. System Administration of Departmental Cluster (2002 -) The Computer Science Department cluster consists of Web, mail, NIS, NFS servers along with 100 clients and more than 500 users. I work as part of a team of System Administrators for the maintenance, customization and upgradation of the departmental machines.	
COMPUTER SKILLS	<ul style="list-style-type: none">• Programming Languages: C,C++, SML, Pascal, Prolog, Java, Perl• Assembly Languages: x86, MIPS• Operating Systems: Linux, Windows• Others: LaTeX, OSkit, Matlab, HTML, Bochs (x86 emulator), SUIF, LEDA• XILINX FPGA design software, MS Office Tools, Lotus Smart Suite	

PROJECTS

Extensions to RtKer for Multi-Processor Leon (Under Prof. M. Balakrishnan)

This is my B.Tech project current in progress at the Embedded Systems Group. It involves porting RtKer, a Real-Time Uni-Processor Operating System, to Multi-Processor Leon, a soft-core processor based on SPARC architecture which has been extended to a Multi-Processor configuration at IIT-Delhi. Further, we propose to study the effect of application-specific scheduling and asymmetric processor configurations on performance. Finally, we intend to give a framework by which an application designer can generate his own application-specific scheduler. The project has been selected by Intel for the Intel Student Research Contest.

Vision-based Surveillance System using Embedded Linux (Under Prof. Subhashis Banerjee)

This was my Mini Project. We did a study of the various possibilities for embedding applications using Linux, and then developed a version with a small footprint that was suitable for embedded systems. To this end, we used and experimented with softwares like BusyBox, Newlib, LibC, Linux, etc. Further, we developed a Vision-based application that learned its surroundings, and using techniques like background subtraction, could detect the presence of an intruder and identify features like position, height, etc. We speeded up the application by coding large parts of the application using MMX instructions and embedded it using our miniature version of Linux.

Audit module for File Security in Linux (Under Prof. Subhashis Banerjee)

This was made as an open project for the Operating Systems Course, and submitted in the IBM Linux Challenge. We implemented a module for Linux that trapped System Calls involving opening, reading, and writing of files. Thus, we could block/monitor/restrict accesses to various files. The restrictions to file access were based on policies chosen by the administrator. Our implementation allowed user-based and file-based policy configuration. A proc file-system based interface to the module facilitated setting access policies. Extensions like password-based protection were identified.

Generation of Panoramic Images (Under Prof. Subhashis Banerjee)

This was a project done in the summers of 2002. It involved developing implementations for generating panoramic images. Implementations were done for both videos and image sequences. Tracking techniques were used to detect the relative motion between image sequences. The results of tracking were used to compute the homography for aligning images. This was used to stitch together the different frames into a single image. Finally corrections such as blending were used to improve the quality of the generated panorama.

A MIPS-based processor on Xilinx FPGA (Under Prof. M. Balakrishnan)

This was done as an open project in the Digital Hardware Design (Lab) course under Prof. M. Balakrishnan. We were able to develop a subset of the MIPS instruction set on an FPGA. The implementation was based on the Multi-Cycle MIPS processor. We were able to run various programs on the processor such as the timer program, the factorial program, etc.

Other Course Projects

- A Software Simulator for MIPS Processor.
- A User-level Threads Library, and a Toy OS using Flux-Oskit.
- Online Generation of Stereo Panoramic Images in Real-Time.
- Behavioral Synthesis with Compiler Optimizations of a system from a simple C program.
- A Secure Chat Application using Diffie-Hellman Protocol for key generation.

ELECTIVE COURSES

Advanced Computer Networks
Numerical and Scientific Computing
File Systems
Optimization Methods
Synthesis of Digital Systems

Computer Vision
Digital Image Processing
Architecture of Large Systems
Graph Theory