

Curriculum Vitae

Mukul Kumar
3rd year undergraduate student
Department of CSE
IIT Guwahati, India

k.mukul@iitg.ernet.in
Room No 315,
Kameng Hostel B2,
IIT Guwahati Assam, India
Ph. No. : +91-9954248857

Research Interests

- Database Management and Systems
- Computer Network
- Network Security
- Distributed System
- Cryptography

Proficiency & Skill Set

Programming Languages:

C, C++, Java 2, Visual Basic, FORTRAN 77,
Pascal, Haskell 98, ML, Lisp, SQL,
80x86 assembly programming (16 & 32 bit; DOS, Win32 & Linux)

Scripting Languages:

Tcl/Tk, Ruby, VBScript,
Perl (including CGI), Python, PHP,
JavaScript, JSP, HTML, XML,
Shell Scripting(DOS & UNIX/Linux Bash).

Systems & Networks Programming:

UNIX/Linux Programming (System Calls)
Win32 Programming (System API & MFC)
UNIX/Linux Socket API Programming
WINSOCK 2 API Programming

Hardware Platforms:

IBM-PC (x86) & Pentiums

Operating Systems:

MS-DOS (6.22)
MS Windows (98, ME, CE, 2000, XP, 2003)
UNIX (HP-UX, Solaris)
Linux (Debian, Red Hat, Caldera)

Software & Tools:

MySQL (Linux), SQL*Plus(Linux), MS Access 2002,
Oracle 10g, Tomcat Server, Auto CAD,

MATLAB, ns-nam, Rational Rose (& UML), VHDL,
Xilinx Simulator, CircuitMaker, Tex & LaTeX.

Hardware Knowledge:

Digital electronic circuits (SSIs,MSIs & LSIs),
Elementary Analog Components like op-amps,
Transistors, FETs, Timers, BJTs.

Research Training

<i>Title</i>	RFID Security & Privacy
<i>Organization</i>	Indian Institute Of Technology Guwahati
<i>Guide</i>	Prof. Sukumar Nandi
<i>Description</i>	We worked mainly on <u>authorization, authentication and encryption</u> . Authorization of readers to tags can be achieved by requiring a password from the reader before a tag can communicate to it. Authentication of tags to reader for anti-counterfeiting for example using an algorithm or unique signature feature of a tag. Data communicating between a reader and a tag must be encrypted to protect the data.
<i>Responsibilities</i>	<ul style="list-style-type: none"> ✓ Analyzing the existing algorithms. ✓ Find the most suitable encryption algorithm. ✓ Optimization of complex algorithms which are used in Smart Card (16bit processor) in such a way so that they can be implemented into 8 bit processor. ✓ Making the test bed for simulating designed protocol. ✓ Analyzing the possible faults use for different attacks and try to prevent them.

<i>Title</i>	Speech Recognition HTK development (mainly Hcopy)
<i>Technology Used</i>	HMM (Hidden Markov Model), C, C++
<i>Organization</i>	Indian Institute of Technology Guwahati
<i>Guide</i>	Dr. P.K. Das
<i>Description</i>	This project was a team work in which HTK developing using HMM for making it use full for common user. My work was related to main toolkit HCOPY . The purpose of Hcopy is copying one or more data files to a designated output file, optionally converting the data into a parameterized form. While the source files can be in any supported format, the output format is always HTK. By default, the whole of the source file is copied to the target but options exist to only copy a specified segment. Hence, this program is used to convert data files of other formats to the HTK format, to concatenate or segment data files, and to parameterize the result.
<i>Responsibilities</i>	<ul style="list-style-type: none"> ✓ To Document the whole code for common user purpose. ✓ To make changes in code so that the way of taking input can change such that there will not have any further requirement of knowing typical process for user mainly for blind people

Academic Projects

1. R & D AUTOMATION SOFTWARE FOR IIT GUWAHATI (Team Project)

Guide : Dr. P.K. Das, Prof., Dept of CSE, IIT Guwahati

Description : Software Developed using Evolutionary Prototype Model to automate Research & Development Department at IIT Guwahati

Responsibilities

- Analyzing user requirements through a comprehensive user survey on the target group (R & D Staff of IIT Guwahati).
- Front end consisting of efficient and formal web interface for varied users like administrator, Dean, PI (prime investigator), Department Head developed using Java Server Programming.
- Back-end used Oracle Database in conjunction with Apache server with JDBC connectivity to implement the system in an open network.
- Validating the design solutions by conducting user testing on prototypes.

2. HOSTEL MANAGEMENT DATABASE USING ORACLE 10g

Guide : Dr. J.K. Deka, Prof., Dept of CSE, IIT Guwahati

Abstract : A database which maintains records of current and past occupancy of hostels of IIT Guwahati. Give lease of rooms and create invoice for each occupied room. Application for room leasing should be processed and clashes resolved.

Tools & Language Used : Oracle 10g, JSP, Apache web server

Duration : 8 weeks

3. DEVELOPEMENT OF PintOS

Guide : Dr. Gautam Barua, Prof., Dept of CSE, IIT Guwahati.

Abstract : Taken as part of Operating Systems course, it consisted of getting familiar with operating systems requirements and gradually enhancing an educational OS kernel (PINTOS) running on a Intel hardware using qemu as simulator. The enhancements included:

- Solving Multi Threading classical problems
- Implementing real world thread synchronization problems
- Memory management including paging, multiprogramming and Virtual Memory
- System Calls like Fork, Exec, Read, Write, Join etc
- File system handling.

Duration : 10 weeks (approx)

4. FINDING A MINIMUM ENCLOSING POLYGON WITH SPECIFIED ANGLES FOR ANOTHER POLYGON

Abstract : To devise a linear time algorithm to find minimum enclosure of a given polygon with another polygon of specified interior angles. Started with taking simple cases like rectangle as an enclosure and then developed a code to find the area of non overlapping portion between given polygon and the enclosure. The area was minimized by rotating the enclosure with some angle. The result found out was that at least one edge of given polygon should be flushed with one edge of the enclosing polygon.

Guide : Dr. S.V.Rao, Asst. Prof., Dept of CSE, IIT Guwahati

5. 4-BIT CENTRAL PROCESSING UNIT

Abstract : This was developed as a lab assignment of Computer Organization and Architecture lab. The CPU has processing power of 4-bit and an address space of 8-bit. CPU's control unit was micro programmed and can implement basic functions like *LOAD, STORE, ADD, SUBTRACT, AND, OR, NOT, CALL, RETURN, SET, JUMP, JA (JUMP ABOVE), HALT.* 74LS181 was used as 4-bit ALU, RAM chip 2114 as memory and M2716 EPROM as control memory.

Guide : Dr.S.B.Nair, Assoc. Prof, Dept of CSE, IIT Guwahati.
Dr. J.K. Deka, Prof., Dept of CSE, IIT Guwahati.

6. GRAPHICAL VIEWING OF MOLECULES DATABASE & MOLECULE SEARCHING

Abstract : A database of molecules in XML with details of no. & type of atoms their co-ordinates and radii is given. A front-end graphical view of molecule is implemented. Hierarchical searching of database is done.

Tools & Language Used : C, OpenGL library, XML

Duration : 5 weeks (approx)

Guide : Dr. S.V.Rao, Asst. Prof., Dept of CSE, IIT Guwahati

7. MEDIA STREAMING ON LAN USING JAVA

Abstract : A media file from a computer is streamed on LAN. Other computer on LAN catch the stream and play the media file. On one node target ip and port number for streaming and file to stream is entered while on other node source ip and port is entered.

Tools & Language Used : JAVA, JMF(java media framework)

Duration : 6 weeks

Guide : Dr. P.K.Das, Asst. Prof., Dept of CSE, IIT Guwahati.

Analog Circuits Projects

- **Programmable Gain Amplifier(PGA)** : Study and Design of Programmable Gain Amplifier Using Analog Switch CD4066
- **Automatic Gain Control Circuit (AGC)** : Design of an A.G.C circuit to control the abrupt change in volume of Radio and Television when we tune in different stations.
- **Frequency multiplier** : Study of Phase Locked Loop (PLL) built using NE565 and Design of Frequency Multiplier Using the PLL

Theoretical Background

Departmental Courses:

- * C Language Programming (ANSI C)
- * Systems Programming (UNIX/Linux)
- * Data Structures and Algorithm Analysis (Java and C++)
- * Software Engineering (Using Various Languages & Tools)
- * Digital Logic and Circuit Design
- * Computer Architecture and Organization (RISC & CISC)
- * Discrete Mathematics & Graph Theory
- * Algorithms (Java & C++)
- * Formal Languages and Automata Theory
- * Operating Systems (using Nach-OS)
- * Data Communications
- * Database Management Systems (Relational Databases)

Courses to be completed (till April, 2007 as a part of 6th semester)

- Compilers Design
- Computer Networks
- Theory of Computation
- Computer Graphics (OpenGL)

Other Courses

- * Modern Biology
- * Electrical Sciences (I & II).
- * Advanced Calculus, Real & Complex Analysis, Partial Differential Equations (First & Second Order), Probability & Random Variables.
- * Engineering Mechanics and Engineering Drawing.
- * Mechanics, Relativity, Optics & Electrodynamics, Solid State Physics.
- * Physical, Inorganic and Organic Chemistry, Biochemistry.
- * Micro & Macro Economics, Psychology, Theory of Economic Development (Developing Countries)

Laboratory Courses

- * Computer Architecture Lab (Hardware).
- * Basic Electronics Lab.
- * Physics Laboratory Course (Mechanics, Optics & Electrodynamics)
- * Physical, Inorganic & Organic Chemistry Labs.

Managerial Experience

Techniche	
Event Organizing	In Techniche 2006, a well known tech fest of IIT Guwahati, I successfully organized the event ACCESS DENIED which is one of the most popular events of Techniche. In Techniche 2005, I successfully organized the event OPEN SOFTWARE which is another very important event.
Infrastructure	In Techniche 2004 I worked in the infrastructure committee & gained a very good experience of team work.

Other Extracurricular Activities	
Batch Representative-Manthan	Co-ordinate the Batch “B-Tech 2004” of 200 students for the Intra-IIT Cultural festival “Manthan-2005” with the Batch eventually winning the Second Position.
Hostel Sport Secretary	Held the post of Sport Secretary of Manas Hostel for the term 2004-2005.

Personal Details	
Name	Mukul Kumar
Date of Birth	3 rd September 1984
Sex	Male
Father’s Name	Mr. Mithan Singh
Nationality	Indian
Permanent Address	Vill. – Kunda, Post – Garina, Dist. – Meerut U.P. India 250401
Temporary Address	Room No 315, B2, Kameng Hostel, IIT Guwahati, Guwahati – 781039, Assam, India
Email	k.mukul@iitg.ernet.in mukul_bhati@yahoo.co.in
Phone	+91 9954248857

Reference:

Prof. Sukumar Nandi
H.O.D., Department of
Computer Science, IIT Guwahati
Email: sukumar@iitg.ernet.in
Phone: +91 361 2582357