ABHIJEET MISRA

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Work Experience *(VirtualWire Technologies – IIT-Delhi India Startup [www.virtualwire.in]) (May '07 –Aug '09)*

Microcontroller based Tactical Control Device (Jan '07 – Sept '07)

Developed a System with Master (Rabbit2000) - Slave (AVR ATMega16) arrangement of two micro-controllers to control an Electro mechanical assembly. The functionality of this project is to avoid human intervention to align two distant antennas operating at 5Ghz radio frequency whenever there is a mismatch in the direction to which they are pointing.

Software Development

- **State Machine** for the Master and the Slave.
- **Simulation** of the Algorithm in **MATLAB**
- APIs on Master Side
  1) **Intelligent**, Time-Bound **Fault Resistant** Algorithm.
  2) **Packet based Communication** between master and slave.
  3) Keypad Control, Display Panel and Log generation.
  4) **Socket based** communication between two units using pre-built libraries (TCP/IP).
- APIs for Slave Side
  1) **Stepper Motor Control** (Half Mode, PWM) and ADC control

Hardware Development

Testing

- Communication APIs and Front Panel Inputs and Outputs with development boards and Daughter Cards.
- Application code with Electro-Mechanical Assemblies
- Two such systems over a distance of 30 Km to setup a link within the specified time frame.

JPEG2000 Implementation (Oct '07 – Feb '08)

Design and implementation of wavelet based **JPEG2000** standard in **C++** using Wavelet Transform, Quantization and Arithmetic Coding. The functionality of the project is to develop an ideal high compression rate imaging standard for high definition pictures.

Software Development

- Lossless and high compression ratio standard using **Wavelet Transform**.
- Development of binary **MQ coder (Arithmetic Coding).**
- Development of JPEG2000 standard based image compression algorithm.
- Testing of image standard using True HD 1080p images.

Wireless Mesh Network Development (Mar '08 – Oct '08)

Designed and Developed a Wireless Mesh Network based Network and MAC layer solution operating in the Ultra Wideband Space. The Mesh Network is **ultra-high speed** (8Gbps) and **fault-tolerant** and can include nodes on an ad-hoc basis. Simulation of stack was done on **Mobility Framework** running on **OMNeT++** (a discrete event simulator). Programming language was C++.

Software Development

- Adaptive **TDMA** based **MAC** layer with provision for additional slots given in real time to more demanding nodes.
- Fault-tolerant and latency intensive **Network Layer** based on Parent-Child-Grandchild principle.
- Development of **802.11g**-MSP interface for testing and simulating the stack.
- Development of **scheduler** to handle the beacon and packet transmission tasks of incoming, outgoing, and forwarding packets.

Hardware Development

- Porting the stack on **TI MSP-430** microcontroller.
- Successful execution of algorithm on Mesh Network comprising of 8 nodes.

Hardware Design of HDMI Transmitter/Receiver Board (Nov'08 – Apr'09)

I am responsible for the design of an HDMI Transmitter/Receiver boards which would communicate wirelessly in the Ultra Wideband space, thus eliminating the need for wires between a typical HDTV and an HD content player.

Design Responsibilities

- Designing the hardware connection with HDMI of the FPFA, ADC, DAC, EEPROM, microcontroller, etc.
- Designing the hierarchical PCB layout of the HDMI boards on ORCAD.
- Designing the Power Supply for each component and simulating each supply on PSpice to predict circuit performance.

Project Wide Responsibilities

Testing (H/W(using emulators, daughter boards and development boards) and S/W (simulations in Linux, simulators for MSP, AVR)

Documentation (LLD,HLD, User Manuals, Design Documents)

PCB Design (schematic level in Orcad), Verification and Signal Analysis, Power Supply Design and Simulation in PSpice

Education

Examination	Institution	Year Passed	Percentage
Master of Science (Embedded Systems)	TU Delft, The Netherlands	2011	N.A.
Bacherlor of Engineering (Information Technology)	Manipal Institute of Technology, Manipal University, India	2006	3.3/4.0
ISC 12^{th}	St. Francis' College, Lucknow, India	2001	76.2%
ICSE 10^{th}	St. Francis' College, Lucknow, India	1999	86.6%

Technical Skills

LANGUAGES
Ruby, C/C++, Assembly(8086,8051), Java, Javascript, jQuery

SOFTWARE
Rails, AVR Studio, Keil, ORCAD, PSpice, Matlab, OMNet++, Mobility Framework, Linux Device Driver, MSP IAR Embedded Workbench

HARDWARE
STK500, RCM2200module, AVR ISP Dongle, Fingerprint Verification Module, MSP JTAG

PROJECT MANAGEMENT TOOLS
PivotalTracker, FogBugz

Undergraduate Projects

Project	Description
Full-time internship at VirtualWire Technologies, Delhi, India	• Developed AVR based Network Monitoring System to communicate with different devices on TCP/IP, I2C, SPI and UART. • Developed the interfaces to communicate with these devices • Developed the scheduler to handle all the hard real-time requests.
Obstacle avoiding miniature vehivle	• Developed an obstacle avoiding remote controlled vehicle. • Interfaced the RF module with an Intel 8051 microcontroller. • Designed the PCB layout of the prototype.
Digital Frequency Meter	• Developed a Digital Frequency Meter based on the Intel 8051 microcontroller. • Interfaced the controller with a LCD to display frequency • Assembly language was used for the development.