Pavani Jella

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OBJECTIVE

To gain experience in the area of **signal integrity** and **high speed digital/ PCB design**.

PROFILE

Graduate Research Assistant, UMR *(Feb'03 – May'04)*

- Thesis: Implemented a line detection algorithm to extract pigment network structures from Melanoma lesions using MATLAB and image processing techniques.
  Separated Malignant Melanoma from Clarks nevi (benign), both being skin cancer types using ROC curves. Performed subjective and quantitative analysis to find that intensity images perform better when compared to few other grayscale images for feature extraction.
- Designed 4 and 6 layer **PCBs** to meet FCC requirements.
- High frequency RC filter model was designed and simulated in **PSPICE** and **Hyper Lynx**. The filter model was built and its response was checked and verified using the **network analyzer**.
- Identified the type and value of an unknown **SMT component** using frequency-domain and time-domain techniques.
- Developed a Built-In-Logic-Block-Observer (BILBO) that is free of stuck-at-faults and tested by performing pre and post layout simulations using **Mentor Graphics tools**.
- Designed and synthesized **Micro RISC** computer in **VHDL** and **Leonardo Synthesis** tool.
- Developed **VHDL** applications for various arithmetic operations such as finding floating point square root.
- Simulated various TCP protocols using NS-simulator.
- Compared various "Adaptive Equalization Schemes" for wireless communications in terms of their rate of convergence using **C++**, DSP TMS320C541 and Code Composer Studio for TMS320C541.

WORK EXPERIENCE

Research Analyst, Stoecker and Associates, Rolla, MO *(May'04 – Current)*

- Assisting in the development of a computer-aided diagnostic tool for early recognition of skin cancer type called Malignant Melanoma. The tool aids in the extraction of characteristic features associated with Malignant Melanoma like border irregularity, pigment network, regression and granularity etc. The current project also aims to publish two articles for the journal – 'Skin Research and Technology'.

Graduate Teaching Assistant, Department of Electrical Engineering, UMR *(Feb'03 – May'04)*

- Taught undergraduate laboratory courses on Linear Systems-I and Circuit Analysis-II.

Electronics Lab Supervisor, Basic Engineering, UMR *(Feb'03 -- May'03)*

- Responsible for setup and maintenance of electronic equipment and student safety during lab sessions.

Student Assistant, Department of Chemistry, UMR *(Oct'02 -- Dec'02)*

- Assisted in manufacturing synthetic paint cans.

Student Assistant, Department of ECE, Osmania University, India *(Aug'01 – Sep'01)*

- Responsible for developing course material for short term course on Advanced **VHDL.**

COMPUTER BACKGROUND

- LANGUAGES: **VHDL, Verilog HDL, C, C++,** TCL Scripting, 8085/86, TMS320C50, TMS320C541.
- OPERATING SYSTEMS: Windows (98, NT, XP), **UNIX**, MS-DOS.
- PACKAGES: **MATLAB 6.1**, FLASH, Dream Weaver, MS Office.
- NETWORKING PROTOCOLS: TCP/IP.

TOOLS

- MENTOR GRAPHICS: **Design Architect, IC Station, Leonardo Synthesis Tool (EDA Tools).**
- SIMULATORS : **Accusim, Quicksim-II, Esim (ELDO), Hyper Lynx 7.0, PSPICE.**
- Code Composer Studio (TMS320C541), CVIP Tools, XBORDER, WINSHOW.

EDUCATION

M.S. in Electrical Engineering *(Aug'02 – May'04)*
University of Missouri - Rolla
Major GPA: 3.75/4.0

B.S. in ECE *(Aug'98 – May'02)*
Osmania University
Cum. GPA: 3.54/4.0

RELATED COURSEWORK

- **VLSI Design**
- **Digital Logic**
- **VHDL**
- **Advanced Computer Architecture**
- High Speed Networks
- Network Security
- **High Speed Digital Design**
- **Grounding & Shielding**
- **Signal Integrity**

HONORS/ MEMBERSHIPS

- State Rank holder in Mathematics Olympiad contest.
- Responsible for funding **75%** of my college education.
- Student Member, IEEE.
- Member, IEEE Women in Engineering (WIE).

VISA Status: F-1 Student OPT Period: 06/04/2004 – 06/03/2005

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PROFILE DESCRIPTION

Teaching: Was employed at UMR as Graduate Teaching assistant.

Linear Systems Laboratory – I:

The laboratory that accompanies Linear Systems-I is computer-based. It is designed to provide the student with an introduction to and experience with using the MATLAB High-Performance Numeric Computation and Visualization Software. The laboratory experiments introduce the basic MATLAB concepts including software package operations, data entry, and available functions, programming, plotting techniques and guide the student in the utilization of **MATLAB 6.1** to illustrate and perform linear systems analysis for continuous-time systems.

Circuit Analysis Laboratory – II:

The circuit analysis laboratory is designed to provide a practical approach to circuit analysis. The student gets hands on experience on oscilloscopes, signal generators, multimeters (analog and digital), transformers, DC and AC power supplies etc. PSPICE is used for simulation.

Thesis: Pigment network extraction and salient point analysis in dermoscopic images using **MATLAB 6.1, C++.**

The research investigated techniques to identify pigment network and branched streaks in dermoscopic images, these features being associated with malignant melanoma. The approaches studied, explore various line/edge detection algorithms, for finding the mesh in pigment and branched network.

The results obtained after implementation of line extraction algorithm were used to separate Malignant Melanoma from Clarks nevi (benign) using a receiver operating characteristic curve. Also, a subjective as well as a quantitative analysis was performed to determine that Intensity images perform best in terms of pigment network extraction.

High Speed Digital Design Projects: Designed 4 and 6 layer **PCB**s to meet FCC requirements.

High frequency RC filter model was designed and simulated in PSPICE and Hyper Lynx. The filter model was built and its response was checked and verified using the network analyzer.

Identified the type and value of an unknown SMT component using frequency-domain and time-domain techniques.

Detailed analysis on various approximations made in the Transmission Line Theory used in high-speed digital design,

VLSI Project: Improved the performance of an already existing design for 4-bit Built-In-Logic-Block-Observer, by modifying its logic. BILBO architecture combines test pattern generation and response compression into a single unit. The circuit was implemented at transistor level using Design Architect. The functionality check was performed using **Quicksim-II**. IC layout was generated using **IC station**: **DRC, LVS** and back annotation constitute the procedure. **Pre** and **Post layout simulations** were performed on **Accusim**, **Esim (ELDO)** to verify the operation of the circuit.

VHDL Projects: Designed and developed 4-bit RISC Computer using **VHDL**. Synthesized the VHDL code using the **Leonardo Synthesis** tool. The 4-bit micro computer can carry out basic arithmetic operation and logical operations. The main modules in the computer include arithmetic logic unit (ALU), program memory, data memory and decoding logic. The ALU is capable of performing seven basic operations, which if executed in a systematic way can perform complex tasks. 4-bit two's complement multiplication was implemented.

Developed application using VHDL to implement complex floating point square root operation and to GCD of two unsigned numbers.

Networks Project: Tahoe and Reno, variations to TCP protocols were compared based on their percentage line utilization, queue lengths and packet losses. The simulation was performed on NS-simulator. TCL scripting was used to implement the protocols.

Senior Project: Compared various "Adaptive Equalization Schemes" for wireless communications in terms of their rate of convergence using **C++**, DSP TMS320C541 and Code Composer Studio for TMS320C541. In this project, the Least Mean Squares (LMS), Kalman Recursive Least Squares (KLMS), Gradient Lattice and Square root least squares algorithms were compared. The adaptive algorithms were developed in **C++** and were programmed onto TMS320C540 DSP using Code Composer Studio tool.

REFERENCES

Dr. Randy H. Moss, Professor
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Dr. Todd H. Hubing, Professor
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VISA Status: F-1 Student OPT Period: 06/04/2004 – 06/03/2005