Srujan Kusumba
1801, East 12th Street, Apt # 607, Cleveland, OHIO, 44114
Phone: (216)-526-0449
E-mail:s.kusumba@gmail.com

Objective

To obtain a challenging employment opportunity that utilizes my research experience and technical knowledge in the fields of Embedded Control Systems

Professional Experience Summary

- 2+ years of hands on experience of firmware design, development and troubleshooting C/C++, assembly for embedded system applications (DSP & Microcontrollers)
- 2+ years of hardware experience, debugging skills using multimeters, oscilloscopes, logic analyzers and frequency generators
- Well versed with design and implementation of various low-level data communication protocols such as RS-232, SPI and I2C
- Design and development experience for power inverters and converters
- Experience working with data analytical software such as Matlab, Simulink, LabView, ANSOFT, PSPICE, MAPLE and MATHCAD
- Knowledge of different control and estimation techniques such as PID, H-infinity and Kalman Filtering
- Highly motivated, friendly, easy to work with, and a team player

Software Skills

Development Tools: MPLAB, Matlab, Simulink, ANSOFT, PSPICE, MAPLE and MATHCAD
Languages: C, C++, PASCAL and FORTRAN
Operating Systems: Windows, RTOS (VxWorks), Linux and DOS
Assembly language: MPASM, 6502, FORTH and Intel 8086
Embedded Targets & Hardware: Microchip's dsPIC30F6010, PIC16F877, **Intel's** 808X microprocessors, **Motorola's** 6502 microprocessor, In-circuit debuggers & emulators

Work Experience

August2002- Present, **Embedded Control Systems Research Lab, Cleveland, OH**
Position: Embedded Controls Research Assistant
Project: Dynamometer Proportional Load Control

- Project involves design, testing and simulation of a Dynamometer from low-cost components for low power applications
- Dynamometer system is intended to be used as a test instrument to test the speed and torque capabilities of a motor & controller combination
- A DSP board, **Motor Control Development Board (MC1)** from Microchip is the micro-controller used to implement PID control algorithm to control the motor
- Developed C-code and assembly code for the **dsPIC30F6010** and hardware assembly is done in the project
- Hardware for the controller cabinet, motors is built and is also tested. Mathematical model was developed for the dynamometer motor and prime mover combination and simulation using **MATLAB** were performed
- Transformed Forth and 6502 program into C for Microchip's dsPIC30F6010

Software Environment: MPLAB, ANSI C, MPASM Assembler, Forth, 6502 and Matlab in Windows2000

January 2004-May 2004, **Department of Electrical & Computer Engineering, Cleveland, OH**
Position: Embedded Systems Teaching Assistant

- Job Duties involve assisting and grading of the Embedded Systems course for both Undergraduate & Graduate students
- Lab work involves developing software & firmware for Microchip's microcontroller **PIC16F877**
- The course emphasizes on software development and also interfaces with hardware to do some useful projects

Software Environment: MPLAB, MPASM for PIC16F877 microcontroller in Windows

August 2002- January 2004, **Department of Electrical and Computer Engineering, Cleveland, OH**
Position: Electronics Lab Teaching Assistant

- Job Duties involve teaching, assisting and grading of the Electronics & Electronic Devices Laboratory course for the undergraduate students
- The Electronics Devices Lab comprises of basic electronic devices testing and developing some useful circuits, **PSPICE** simulations for those circuits are also done
- Testing of electronic circuits involves extensive use of multimeters, oscilloscopes, logic analyzers and frequency generators

Software Environment: PSPICE, LabView and Microsoft Word

May 2002 – August 2002, **Summer Intern, Westlake, Cleveland, OH**
Position: Junior Design Engineer
Project: Design of Inverter for Photovoltaic Applications

- A prototype of inverter for low power applications up to 1.5kW has been designed, tested and cost evaluation was made and supported by PSPICE simulations
- This dedicated inverter converts energy from DC fuel cells to AC power to be mostly used for domestic utility applications
- The configuration is achieved using high frequency DC Push-Pull converter at the input side followed by full-bridge PWM inverter and a low-pass filter at the output side
- PWM signal to drive the gates of the full bridge inverter is generated using Texas Instruments DSP **TMS320LC2406A**
- This Project was done for Mr. Vijay Suri that helped him to develop a Solar Product for Domestic Applications

Software Environment: PSPICE, DSP/BIOS II Real-Time Kernel, Matlab and Maple

Projects

Dynamometer Proportional Load Control (dSPIC30F6010)

- Dynamometer system is intended to be used as a test instrument to test the speed and torque capabilities of a motor & controller combination
- Dynamometer system has two major component assemblies. The first is a 1.5HP DC motor fastened to MUT (Motor Under Test) shaft. The second major component assembly is the Dynamometer Controller Cabinet
- A single board DSPIC Motor Control Development Board from Microchip is the micro controller used to control the motor
- Developing C-code, assembly (**Microchips C30C compiler**) for the micro controller and hardware assembly is done in the project

Stepper Motor Control Using Microcontroller (PIC16F877)

- Project deals with estimation and control of speed for the stepper motor using a micro controller **(PIC16F877)**
- Kalman filter is used to estimate the speed of the rotor which is implemented in the PIC
- Speed of the motor is controlled by feeding back to the motor by comparing it with a reference speed and this was done using the potentiometer on the PIC16F877

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Design of Inverter for Photovoltaic Applications
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Computer Aided Design of DC Machine
- Project involved study of operation of DC machine (Motor, Generator) and generating a DC machine model using **C Language**
- This Computer Aided Design eliminates the tedious and time consuming hand calculations there by releasing the designer from numerical drudgery to enable him to grapple with physical and logical ideas and thereby accelerating the design process
- Project was done as a partial fulfillment for B.Tech, Kakatiya University, India

Analyses of a Half Bridge PulseWidthModulator with Uni-Polar voltage switching
- Project involved the design and analyses of Half Bridge Single Phase Pulse Width Modulator with Uni-Polar voltage switching for R-L Load Using **PSPICE**
- Project involves the study of a Half Bridge Inverter Circuit using Uni-Polar Pulse Width Modulation as the switching Scheme
- The Simulations were shown and an analysis was done for the PulseWidthModulator using PSPICE

Stability Analyses of an Induction Motor under no Load Conditions
- Project involves the study of an Induction Motor under no load conditions when an additional resistance is added in series with the stator windings
- A complete Induction Motor dynamic model was developed and stability was analyzed by simulations in **MATLAB**

Education

Master of Science in Electrical and Computer Engineering — August 2001- Dec 2004
Cleveland State University, Cleveland, OH

Bachelor of Technology in Electrical and Electronics Engineering — June 1997- May 2001
Kakatiya Institute of Technology and Sciences, India

Additional Skills
- Selected for paper presentation in PRODIGY-2K held by KREC, Surathkal on Economic Load Dispatch for Piecewise Quadratic Function using Hopfield Neural Networks
- Logistic Support for website of Friends of India (Indian Students Association, CSU) http://www.csuohio.edu/friendsofIndia/index1.html
- Lab Secretary Embedded Control Systems Research Lab http://academic.csuohio.edu/embedded/