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LinkedIn

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Work Experience

2014.6 - 2015.4 Sr. DSP engineer of Harman, Suzhou, China P.R.

- Responsible for development of vehicle audio amplifiers for Europe and North America markets.
- Development and maintenance of Audio Framework.
- Cost-down design of amplifiers via novel control algorithm for high-efficient power supply.
- Porting and application of Active Noise Cancellation for engine order sound reduction.
- Feature application design for amplifiers, for instance, chime beeps etc.
- Bug shooting of existing amplifier software.
- Documentation of HW/SW design of amplifier products.
- Work with system engineers for feature validation and integration.

2010.10 - 2014.3 Research and development engineer of Acosense AB, Göteborg, Sweden

- Lead the development of active acoustic spectroscopic sensors for fluid measurement.
- Determine the specifications for the sensor system.
- Design of signal capture/conditioning hardware as well as processor circuitry.
- Design and implementation of data capture firmware for the FPGA.
- Design and implementation of signal processing software for the Linux server.
- Implement part of the machine learning code for the Linux server.
- SCADA interface and networking software design between sensor terminal and the Linux server.

Education

- 2008.9 - 2010.9 M.Sc. Integrated Electronic System Design, Chalmers University, Sweden.
- 2005.9 - 2008.6 M.Sc. Control Science and Engineering, Central South University, China.
- 2001.9 - 2005.6 B.Sc. Automatic Control, Central South University, China.

Project Experience

Audio Framework 2014 - 2015

Audio Framework is the software "Skeleton" defined for any amplifier products on how the audio data are routed and processed. Together with signal processing building blocks as the "muscle", the core functionality of an amplifier emerges. My achievement is, for the first time, a systematic description of the working mechanism of the "skeleton" and "muscle" has been formed within the company. The resultant document is extremely useful for both novice and experienced amplifier design engineers.

Active Noise Cancellation 2014 - 2015

Active Noise Cancellation is a widely used technique to suppress unwanted noise in an optimal sense via dynamic algorithms. The main purpose is to reduce engine sound orders for quieter cabinet in passenger cars. My achievement is build of the application document and simulation tool for cross-amplifier porting.

Novel Control of Tracking Power Supply 2014 - 2015

Control of tracking power supply often requires high precision DAC chip for rail indication. My achievement here is the elimination of the DAC chip but utilizing the digital port alone of the DSP chip for rail indication. Cost down is achieved thanks to this novel method of power rail control in H-class PSU.

Chime Control via Block Based Processing 2014 - 2015

Chime or beep sounds are often implemented in the rear stages of a fixed point DSP for short time latency in sample-based fashion. Sometimes however, minimal hardware change criterion implies an implementation on block based DSP such as *SHARCTM*. The achievement here is such pilot implementation, showing acceptable latency in practice.

Generation II of *ACOspectorTM* 2012 - 2014

Update of generation I of this non-invasive measurement instrument. Improved FPGA design with fine PCB layout. Update of the firmware and software design mainly focuses on system reliability and security. Better signal processing algorithm has also been devised and employed.

Generation I of *ACOspectorTM* 2010 - 2012

Lead the development of the industrial fluid property measurement sensor based on active acoustic spectroscopy measurement. Products have been deployed among pulp and paper, chemical factories in Sweden. Some information can be found in www.acosense.com. The concept is based on IoT and cloud computing — compact, robust and low-cost sensor terminal group paired with one centralized server for data processing in star-topology network. Machine learning running in the backbone builds regression models for fluid property estimation. Hence multiple measurement points can be monitored non-invasively at extremely

low cost for modern data-driven factories. As the system designer and developer, my contribution: the path finder of such promising measurement method for the cloud computing age.

Matrix Power Converter Design and Implementation 2007 - 2008

Matrix power converter has the merit of higher energy density compared to traditional back-to-back rectifier-inverter topology. Nevertheless the synchronized control of all semiconductor switchers poses harder control problem against the old. In this National Science Foundation project, theory of matrix converters has been studied and a prototype has been engineered. The novel prototype is based on four-leg structure thus allows for more intuitive implementation in a carrier-modulation style.

Technical Skills

Modelling and simulation using Matlab/Simulink.

Digital/Statistical signal processing.

Proficient in C/C++.

GCC tool chain for Linux platform.

Microsoft Visual Studio for Windows platform.

Applied knowledge in machine learning (Regression analysis).

Hardware description (VHDL) and verification (Testbench based).

Basic knowledge of digital communication.

Shell/Perl scripting language.

Embedded system design and development based upon FPGA/DSP/MCU.

Circuit simulation and analysis with SPICE tools.

Schematic capture, simple PCB layout (Altium Designer/Eagle PCB) and soldering.

Hands-on experience of workbench tools: oscilloscopes, function generator, spectrum analyzer UPV/UPL, AP etc.

Knowledge of EMI/EMC concept and test procedures for product design.

Professional documentation with \LaTeX and Microsoft Office.

Knowledge of Agile Development.

Publications

Xia Lixun, Liao Bin, "Hardware Platform For Active Acoustic Spectroscopy Sensors", Chalmers University of Technology, 2010.

Su Mei, Xia Lixun, Sun Yao, et al "Carrier modulation of four-leg matrix converter based on FPGA", Electrical Machines and Systems, 2008. ICEMS 2008. IEEE International Conference on. pp.1247-1250.

Yao Sun, Mei Su, Lixun Xia, et al "Randomized carrier modulation for four-leg matrix converter based on optimal Markov chain", Industrial Technology, 2008. ICIT 2008. IEEE International Conference on. pp.1-6.

Hengsi Qin, Mei Su, Lixun Xia, et al "A novel controller design method for power converters", IEEE 11th Workshop on Control and Modeling for Power Electronics, 2008. COMPEL 2008. IEEE International Conference on.

Social Services

Translation of the 6.334 *Power Electronics* of Open Courseware(OCW) Project for China Open Resources for Education(CORE).

MSc. Courses in Chalmers Univ.

DAT091.Introduction to Electronic System Design

MCC090.CMOS VLSI Design

DAT105.Computer Architecture

EDA222.Real time systems

DAT095.Electronic system design

DAT110.EDA Design Methods

MVE135.Probability and Random Process With Applications

SSY121.Introduction to Communication Engineering

SSY125.Digital Communication

SSY130.Applied Signal Processing

TDA956.Hardware Description and Verification

EDA092.Operating System

ENMo60.Power Electronic Converters

TIN092.Algorithms

BSc. Courses in Central South Univ.

C Programming Language
Engineering Mathematics
Complex Analysis and Integral Transform
Physics and Experiments
Mathematical Experiment and Modelling
Circuit Theory
Analog Circuits
Digital Circuits
Machinery Tool Education
Electronics Design Project
Electronic Rotating Machinery and Driving
Control Theory
Computer Architecture and Assembly Language
Modern Measurement Technology
Process Control and Instruments
Fluid Dynamics
Computer Control
Power Electronics
Multi-media Technology
PLC and Applications
Micro-Controller Unit Technology
Driving System Control
Computer Simulation
Digital Signal Processing
Intelligent Control

MSc. Courses in Central South Univ.

Modern Control Theories

Power Electronics

Matrix Analysis

Functional Analysis and Optimization

System Identification

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