Wael A. Deabes

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OBJECTIVE

Seeking a challenging Control and Instrumentation Electrical Engineering position where I can demonstrate outstanding skills, knowledge and attributes to meet organizational as well as individual goals.

EDUCATION

- **Tennessee Technological University, Cookeville, TN, USA** *(Aug. 05 - **May 09 Expected**)*
  Ph.D. in Electrical Engineering: *(GPA 4.0/4.0)*
  Emphasis: Control, Modeling, Instrumentation, and Embedded System Design
  Research topic: **"Intelligent Sensor Fusion System for Monitoring and Control the Lost Foam Casting Process"**
- **Mansoura University, Mansoura city, Egypt** *(Aug.1999 -Jan. 03)*
  - **M.sc. Degree in Control Engineering:** *(GPA 4.0/4.0)*
    Research topic: **"Fuzzy Adaptive Control through Sliding Motion Phenomena"**
  - **B.sc. in Electrical Engineering:** *(GPA 3.8/4.0)* *(Aug.1995 -June 1999)*
    Major in Systems and Computer Engineering.

WORK & PROJECTS EXPERIENCE

1. **Co. Op. in Center for Manufacturing Research, TTU** *(Jan. 09-Present)*
   R&D engineer working in project *"In Situ Real Time Monitoring and Control of Mold Making and Filling Processes"* (in collaboration with ORNL, GM, Meuller …).
2. **Center for Manufacturing Research, TTU** *(Aug. 05-Dec. 09)*
   Research Assistant on Projects Funded by Department of Energy (DOE) and a Consortium of companies including GM, Lodge, MCT, Foseco. Some of the projects that I worked in are listed below:
   - Control and Modeling of Counter Gravity Machine:
     I. Designed real time gain scheduling PID intelligent control system for the counter gravity machine, the controller's code was implemented through *LabVIEW real time PID control module, and Visual Basic,* the hardware model consists of *vacuum pump, pneumatic valves, and pressure and level sensors.*
     II. Worked as a team member on the development of dynamic model for a counter gravity machine used in counter gravity casting process, *Matlab system Identification Toolbox* were used to identify the model parameters, and the nonlinear response of the machine was tested through *Simulink* model*.*
   - Real Time ECT Tomography System:
     Developed a real time ECT tomography system for monitoring and control the flow of the molten metal inside the foam pattern in the LFC process using sensors fusion algorithms, finite elements analysis, and intelligent control techniques. The codes were written by *Matlab Neural and Fuzzy control Toolboxes* and *LabVIEW RT model*, while the solution of the forward problem is calculated by *ANSYS FEA software*.
     I. Created a hardware model to simulate the LFC application attached to the ECT sensor, the electronic circuits of the sensors and the multiplexer were designed using *DipTRACE PCB layout software ,*the multiplexer was interfaced with the PC through *NI GPIB DAQs'* and all the sensors data were collected wirelessly by *MOTES technology and Ethernet Communication Protocols.*
     II. Created a finite element model to simulate the response of the ECT sensors by changing characteristic of the molten metal in the imaging area during the casting process, *ANSYS Finite Element Analysis FEA Package* was used to build the model*.*
     III. Developed a standalone wireless system using FPGA embedded systems to measure and display the images of the motion of the molten metal during the casting process, the system was implemented on *ALTERA FPGA board using SOPC Builder, NIOS II Processor, Quartus II software, and LabVIEW FPGA Module.*
     IV. Designed and simulated a multi frequencies capacitance analog electronic circuit to capture the data in the ECT systems, the response and performance of the circuit is simulated by *Pspice, LTSpice and Multisim circuit's simulation software packages.*
   - Measurement of Metal Fill Time:
     Designed a real time system for the measurement of the metal fill time in casting applications. The system is comprised of an integrated hardware and software components including: capacitive sensors, wireless sensor network, signal conditioning, signal processing algorithms for data filtering and a graphical user interface. It utilizes *LabVIEW signal processing toolbox.*
   - Online Monitoring of Molds:
     I. Played a key role in developing and installing online real time inspection instrumentation in LODGE Manufacturing for characterization of sand molds using a capacitive based device with focus on the implementation of the software using *LabVIEW RT model interfaced with GPIB control, Matlab statistical toolbox.*

II. Participated in the design of a real time control system based on the mold inspection sensor for controlling the pouring machine to reduce the amount of the metal scarp, the controller was developed *using Allen Bradley PLC, LabVIEW and NI DAQs'.*

- Evaluation of the Surface Quality of Foam Patterns:
  Designed an image processing based comprehensive system for evaluation of the surface quality of foam patterns. The system included image capture, image processing, data analysis and graphical user interface. It was developed using *Matlab and LabVIEW Image processing toolboxes.*

- Leadership Roles in Managing and Disseminating Results:
  I. Coordinated and supervised students in Research Experience for Undergraduate (REU) project 2006, 07&08 at TTU. Designed experiments, assigned responsibilities to each team, analyzed the systems and the results.
  II. Published and presented fourteen research papers at International journals and conferences of electrical control Power Engineering and prepared proposals for funded research.
  III. Prepared weekly and quarterly reports for submission to office of Manufacturing Center of Research (CMR).
  IV. Teaching, as a main instructor, Fundamentals of Electric Circuits course (ECE3810) for seventy students at ECE department TTU *(Fall 08).*

3. **Computer& Systems Department, Mansoura University, Egypt** *(June 1999-Aug. 05)*
   Research and Teaching Assistant

   - Developed a distributed control system for industrial automation: A comprehensive real-time control system using different controller environments such as PLC, microchip microcontroller and PC is designed to simulate the mixing process used in the chemical industry.
   - Design, installation, test, and maintenance for the HC12 and Microship microcontroller systems and Programmable Logic Controllers PLC (SEMENS, Allen Bradley).
   - Studied the effect of fuzzy tuning technique on Sliding mode control to enhance robustness and sliding performance in a class of non-linear control systems *(Matlab/Simulaink).*
   - Implementation of Fuzzy Adaptive Control through sliding motion phenomena for a DC motor and two, six-degree-of-freedom robotic manipulator *(Matlab/Simulaink).*
   - Expertise in process control systems theory, applications and technology knowledge.
   - DCS configuration and maintenance.
   - Taught ten courses such as Automatic Control Systems, Digital Control Systems, Integrated Circuits, Concepts of Digital Design, Microprocessors and Systems, Linear Systems, State Space Analysis, Phase Plane Analysis, Programmable logic controllers (PLC) and sequential control, Operating Systems Design, C++ &C Programming Language.

TRAINING EXPERIENCE

- Invited speaker, LabVIEW workshop for the graduate student in the ECE department, TTU *(Aug. 08).*
- Attend LabVIEW workshop for using NI MATRIXx, NI DIAdem, NI FPGA module *(Knoxville, Apr. 07).*
- Attend a workshop on "Crossbow Wireles Sensor Network Basic Training on Embedded Sensor Nodes" for three days at Crossbow Technology, Inc. *(Aug. 06).*
- Attend Programmable Logic Controllers PLC workshop for five days in MIT department, TTU *(Sept. 06).*
- ***Agiba Petroleum Co. and GUPCO (Gulf of Suez Petroleum co.)*** *(Summer 97, 98)*
  During this time I had training on:
  - Performing the corrective and preventive maintenance schedules for DCS, PLC, field and local panel Instruments.
  - Maintenance and trouble shooting of DCS, several PLCs and shut down Systems.
  - Working with automated instruments such as Flow Meters, Level Sensors, Pressure Switch, Vacuum Sensors, Temperature Controllers, Contractor/Relays, Coupling Relays, Circuit Breaker, Limit-Switches, Photo Sensors and Vision Control Software.

SOFTWARE SKILLS

- **Software Packages:** LabVIEW, Matlab/Simulink, ANSYS, Maxwell, PLC Ladder Logic (RSLogix), C/C++, and Visual Basic.
- **Others**: Verilog, VHDL, PSpice, LT-Spice, Multisim, DipTRACE PCB layout software, Microsoft Office (Word, Excel, PowerPoint, & Visio), and Latex.

ACTIVITIES/ HONORS

- NSBE BCA Scholarship.
- Ron & Glenn Birtwistle Mem. Scholarship.
- FEF Tennessee Tech. chapter outstanding academic achievement scholarship.
- Member of the Institute of Electrical and Electronics Engineers (IEEE) and American Foundry Society (AFS).
- Invited speaker," A Fuzzy-Based Reconstruction Algorithm for Estimating Metal Fill Profile", ECE department, Tennessee Technological University, Feb. 2008.
- Distinguished student excellence prize in every year of the five years of the B.S. Study.

REFERENCES: Available on request.