Cole Gulino

Curriculum Vitae

PERSONAL DETAILS

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EDUCATION

B.E. Electrical Engineering (Expected) 2011-2015

Louisiana State University ; Overall GPA: 3.826 ; Electrical Engineering GPA: 4.0

RELEVANT COURSEWORK

HONORS: Analytic Geometry and Calculus I MATH 1551

Analytic geometry, limits, derivatives, integrals.

HONORS: Analytic Geometry and Calculus II MATH 1553

Techniques of integration, parameter equations, polar coordinates, infinite series, vectors in low dimensions; introduction to differential equations and partial derivatives.

Multidimensional Calculus MATH 2057

Three-dimensional analytic geometry, partial derivatives, multiple integrals.

Elementary Differential Equations and Linear Algebra MATH 2090

Introduction to first order differential equations, linear differential equations with constant coefficients, and systems of differential equations; vector spaces, linear transformations, matrices, determinants, linear dependence, bases, systems of equations, eigenvalues, eigenvectors, and Laplace transforms.

Probability MATH 3355

Introduction to probability, emphasizing concrete problems and applications; random variables, expectation, conditional probability, law of large numbers, central limit theorem and stochastic processes.

Computer Science I with C++ CSC 1253

Fundamentals of algorithm development, program design and structured programming using an object-oriented language. Programming Languages Used: C++.

Computer Science II with C++ CSC 1254

Develops solutions to problems using an object-oriented approach and emphasizes the concepts of recursion; dynamic memory; data structures (lists, stacks, queues, trees); exception handling. Programming Languages Used: C++.

Discrete Structures CSC 2259

Set algebra including mappings and relations; algebraic structures including semigroups and groups; elements of the theory of directed and undirected graphs; Boolean algebra and propositional logic; these structures applied to various areas of computer science.

Cloud Fundamentals and Web Programming CSC 2610

Characteristics, theory and fundamentals of cloud computing and related technologies; cloud types, services and architectures; principles of application protocols and collaborative web platforms; applications in the areas of mobile and social computing; lightweight programming models; socket programming.

Advanced Data Structures and Algorithm Analysis CSC 3102

Description and utilization of formal ADT representations, especially those on lists, sets and graphs; time and space analysis of recursive and nonrecursive algorithms, including graph and sorting algorithms; algorithm design techniques.

Digital Logic I EE 2720

Boolean algebra; logic gates; minimization methods; analysis and synthesis of combinational logic networks; design examples.

Digital Logic II EE 2730

Analysis and design of sequential circuits; practical impact of design choices.

Digital Logic Laboratory EE 2731

Familiarization with conventional logic gates and flip-flops; design and testing of various combinational and sequential circuits. Programming languages used: Verilog.

Tools in Electrical and Computer Engineering EE 2810

Contemporary tools in the area of electrical and computer engineering. Programming Languages Used: SPICE, MATLAB, Simulink

Introduction to Digital Signal Processing EE 3160

Digital processing of continuous-time signals; Discrete-time Fourier transform; z-transform, signals and systems in the transform domains; Digital filter design techniques; Discrete Fourier transform and FFT algorithm.

Signals and Systems EE 3610
Methods of analysis of continuous time signals and systems.

Communications in Computing EE 3710
Theoretical and practical factors in designing computer communications networks; communication principles and codes; network topology and architecture; protocol layers; security; current and advanced applications.

Microprocessor Systems EE 3752
Theory and design of microprocessors; seminconductor technologies, architectures, assembly language, software development, input/output design, applications, and interfacing. Programming Languages Used: ARMv7 Assembly Language. IDE Used: Kiel.

Computer Organization EE 3755
Structure and organization of computer systems; instruction sets; arithmetic; data path and control design. Programming Languages Used: Verilog.

VLSI Design EE 4242
Design and implementation of logic gates for application-specific integrated circuits; system design methodology using CMOS technology. Programming Languages Used: SPICE. Programs Used: L-Edit.

Applied Electromagnetic: RF Systems EE 4350
Analysis and design of RF systems, transmission lines, impedance matching networks, RF filter design, antennas, high speed circuits, single and multi-port networks, RF modeling. Programming Languages Used: MATLAB.

Neural Computing EE 4745
Neural networks and automata; network architecture; learning models; applications to signal processing, vision, speech, and robotics; VLSI implementations. Programming Languages Used: MATLAB.

Senior Design I EE 4810
Capstone Project: Autonomous maze navigating robot. Functions: maze mapping, maze learning, character recognition.

Senior Design II EE 4820
Capstone Project: Autonomous maze navigating robot. Functions: maze mapping, maze learning, character recognition.

Computer Architecture EE 4720
Memory hierarchy; pipelining techniques; design philosophies; parallel computing fundamentals.

SKILLS

Programming Languages As of 2014

C++, Python, Verilog, SPICE, ARMv7 Assembly, MIPS Assembly

Software As of 2014

MATLAB, PSPICE, L-Edit, PCB Express, Eagle PCB, Diptrace, Kiel IDE

Artificial Intelligence Programming As of 2014

Programs written using Hebb Rule vs Pseudoinverse analysis, Character Recognition, Perception Learning, Noice Cancellation

Projects include analysis of perception learning, analysis of Hebb Rule, and adaptive filtering for noise cancellation.

EMPLOYMENT

CPS Insruments Engineering Intern April 2014- August 2014

Work designing, testing, and building circuit boards. Experience with building and maintaining a large electronics system. CPS Instruments builds and sells Particle Size Detectors.

Peer Instructor LSU Physics Department January 2012 - May 2012

Worked as a peer instructor, leading small groups of physics students to complete group work. Taught concepts of physics instead of simple calcualtion. Lead small groups and graded student submissions.

Trainee ISC Constructors, LLC June 2012- August 2012

Worked for ISC and contracted to CF Industries in Donaldsonville. CF Industries is a chemical plant that produces fertilizer. Built strut, ran conduit, grounded equipment, etc. Worked with an electrician reading and analyzing Engineering Designs for MCCs.

Page for the Louisiana House of Representatives April 2011- May 2011

Spent one session in the Page program at the Louisiana state's Capital Building running errands, filing paperwork, and observing sessions for the Louisiana State Legislature.

Camp Counselor Whole Kids Outreach Summer 2007, 2008 and 2009

Spent one session in the Page program at the Louisiana state's Capital Building running errands, filing paperwork, and observing sessions for the Louisiana State Legislature.

PROJECTS

Hebb Rule vs Pseudoinverse Analysis Fall 2014

Programming project in MATLAB focused on comparing Hebb Rule vs Pseudoinverse effectiveness of recognizing distorted characters. The program took an image of a number or letter, converted it into a matrix of 1s or -1s, and generated weight matrices using Pseudoinverse and Hebb Rule. The weight matrices were generated using 2, 3, 4, 5, and 6 entries. Once the weight matrices were gathered, the program generated "noisy" test matrices by inverting the sign of 2, 4, and 6 of the pixels for each entry. The program then used the weight matrices gathered to see how well Pseudoinverse and Hebb Rule could produce as output the original numbers. The program compared how well each algorithm worked against each other as a function of number of "noisy" pixels added and number of entries learned by the weight matrix.

Perception Learning Algorithm Fall 2014

Programming project in MATLAB focused on implementing a simple Perception Learning Algorithm. The program takes in as many input and target matrices specified by the user. The program then creates a weight matrix and bias that can be used to identify a new test input into the one of the specified targets. If the inputs are not linearly separable, the program will inform the user that it cannot create a weight matrix and bias to accomplish the task. The program also allows for the user to specify how many iterations of the algorithm it wants to run. The program can be used with any specified number of inputs and any number of neurons.

Adaptive Noise Cancellation Filter Fall 2014

A programming project in MATLAB to create a filter that removes noise from a sound file. The program uses a graphical user interface to accept sound files from the user. One sound file should contain the original file signal with a distorted or altered form of the noise signal. The second sound file should contain an unaltered version of the sound file. The program places the noise file through an adaptive filter in order to learn it so that it may remove said noise from the original signal. The graphical user interface also allows the user to record their own original signal and noise signal.

RF Matching Network Solver Fall 2014

Programming project in MATLAB which provides a graphical user interface which designs for the user a matching network circuit which can be used to match a load impedance with a source impedance in order to reduces losses in a radio frequency antenna or filter. Students from the semester before wrote part of the code. The graphical user interface was completely written by myself, and over half of the mathematical code was also written by me. The graphical user interface takes in a load impedance value, a frequency to match at, and the dielectric constant of the board. The matching network solver can design matching networks using T, Pi, L, quarter wave transformation, and lumped and distributed configurations.

Chat Program Spring 2015

Programming project in Python to design a chat program that utilizes both UDP and TCP communication styles to facilitate client to client communication. Both server and client applications were devised. Utilized threading design methods continuously gather information while also running a GUI using python library tkinter. Sever can listen to up to 10 clients. See Github page for code.

Maze Solving Robot Fall 2014 - Spring 2015

Robotics project integrating hardware and software in order to create a robot that can autonomously navigate a maze while simultaneously recognizing characters on maze walls for bonus points in the IEEE Region 5 Robotics Competition. Software problems focus heavily on hardware/software interaction and artificial intelligence including A Search algorithm and Pesudoinverse Pattern Recognition Algorithm.*

AWARDS

Catholic High Golden Bear Award May 2009

Award voted on by the members of The Bearly Published School Newspaper to the student who best exemplifies the club.

Al Neuharth Free Spirit Award 2009

Scholarship awarded to a boy and a girl from each state in the union by USA Today honoring those with a free spirit and journalism skills.