Raj P Patel

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Objective

Third year computer engineering student with experience in C hardware programming, MATLAB data analysis, and controls. Proficient at project planning, timeline management, and documentation. Seeking a Summer internship starting in May 2019.

Education

Georgia Institute of Technology | Atlanta, GA *August 2016 – Present*
Bachelor of Science in Computer Engineering, GPA 3.68 Expected Graduation, May 2020
Robotics Minor (applied)

Skills

Programming: C, MATLAB, C++, VHDL, MIPS Assembly, Bash Scripting, VPython, HTML, CSS, ReStructuredText, Java (enrolled)
Hardware: Microcontroller (ARM mbed, TI LaunchPad), GPIO, Sensors, Altera DE2 FPGA, Oscilloscope, Soldering, Multimeter
Software: Mbed Online Compiler, TI Code Composer Studio, Altera Quartus II, Coolterm, Git Version Control, Simulink, Trello
Communication: Data Analysis, Documentation, Instruction Guide, Gantt Chart, Teamwork, Presentation, Technical Papers
Languages: English (fluent), Gujarati (conversational)

Experience

Intelligent Vision and Automation Lab (IVALab) | Atlanta, GA | Advisor: Patricio Vela *Jan 2019 – Present*
Undergraduate Researcher
Team-based effort to improve position tracking accuracy for quadrupedal locomotion.
- Characterize motor by estimating plant transfer function with bode plot analysis
- Design adaptive integral controller based on motor torque response

Ghost Robotics | Philadelphia, PA *May 2018 – Jul 2018*
Mechatronics Intern
Devise scalable quadrupedal UGV with SDK control for security and inspection.
- Developed robotic gaits in C++ to showcase and document different SDK functionalities
- Performed QA tests on motor systems, assembled robots, and evaluated UI design
- Soldered connections for motor systems, power routing, and battery management systems (BMS)
- Scripted automatic SDK installation in Bash, decreasing computer setup time by 85%
- Edited Makefile for automatic port detection, decreasing firmware flash setup time by 50%
- Wrote beginner-friendly documentation in ReStructuredText to highlight essential SDK features
- Mapped relationship to approximately convert between robotic leg extension in meters and radians
- Generated interactive animation in VPython that prints C++ robotic leg extension and angle code

Vertically Integrated Projects (VIP): Smart City Infrastructure | Atlanta, GA *Jan 2018 – Apr 2018*
Undergraduate Researcher
Team-based effort to determine feasibility of UGV tracking rural road degradation.
- Collected asphalt sample data to assess reliability and accuracy of the texture-recording instrument
- Prepared three MATLAB functions to visualize, analyze, and validate wornness of asphalt texture
- Presented data collection and testing progress to other subteams monthly

Kumon North America | Cherry Hill, NJ *Sep 2014 – Dec 2015*
Mathematics and Reading Tutor
Mathematics, reading, and writing tutoring for K-12 students using Kumon method.
- Allocated time for synthesizing different explanations to suitably teach 10+ students individually
- Improved scoring and data logging efficiency by 57% after combining both into a collated process

Projects

Servo Control *Jan 2019*
Embedded Systems Design Course
- Controlled servo motion with ARM mbed in C++ PWM signal, H Bridge, and AC power supply

I2C Sensor Interfacing *Nov 2018*
Control Systems Design Course
- Enabled I2C bus on TI Launchpad in C to retrieve data from TI BoosterPack accelerometer on a timer interrupt

SCI LED State Machine *Oct 2018*
Control Systems Design Course
- Used SCI module on TI Launchpad in C to transmit commands to LEDs and receive confirmations with Coolterm

DC Motor Instantaneous Position Control *Oct 2018*
Control Systems Design Course
- Setup PWM actuation and QEP sensing on TI Launchpad in C to rotate motor with state-space integral controller

Galaga Game Controller *Apr 2018*
Engineering Software Design Course
- Coded multiple game element classes with polymorphism and virtual functions
- Utilized ARM mbed in C++ with LCD, accelerometer, speaker, and pushbutton interrupts

Number Sense Data Collection *Feb 2018*
Engineering Software Design Course
- Constructed object counting test based on random number generator
- Utilized ARM mbed in C++ with LCD, speaker, microSD data logging, and pushbutton interrupts

Labyrinth Game Controller *Nov 2017*
Programming Hardware / Software Systems Course
- Managed heap to store doubly-linked list of different levels with game elements
- Utilized ARM mbed in C++ with LCD, accelerometer, speaker, LED, and pushbutton interrupts

AmigoBot Object Detection (Team-Based) *Nov 2017*
Digital Design Lab Course
- Theorized algorithm for robot movement and object detection using odometry and ultrasonic sensors
- Programmed and debugged Altera DE2 SCOMP robot moving and scanning algorithm in VHDL
- Produced extensive documentation, including proposal, presentation, animation, and design report

Image Object Recognition *Oct 2017*
Programming Hardware / Software Systems Course
- Composed algorithm in MIPS Assembly to scan images for potentially scaled versions of object
- Required 3% less static instructions, 35% less dynamic instructions, and 59% less storage than benchmark

Relevant Coursework

Engineering Software Design: C++, Class, Polymorphism, Inheritance, Virtual Function, Heap Management, Doubly-Linked List, Random Number Generator

Feedback Control Systems: Laplace Transform, Transfer Function, State Space, Stability, Routh Table, Root Locus, Bode Plots

Leadership

Georgia Tech Department of Housing | Atlanta, GA *Aug 2017 – Present*
Resident Assistant (RA) of Towers-Hanson Residence Halls
- Build inclusive home for 30+ Freshmen residents and act as first-responder to emergency situations
- Coordinate 30+ semesterly events by reserving resources, making marketing, and budgeting expenses
- Advise Towers-Hanson Hall Council about planning events and handling reimbursements
- Single-handedly created staff website in HTML and CSS to centralize access to common resources
- Awarded 2017-2018 Towers-Hanson Resident Advisor of the Year

Georgia Tech Residence Hall Association (RHA) | Atlanta, GA *Sep 2016 – May 2017*
Vice President of Matheson-Perry-Gray-Hayes Hall Council
- Communicated between RHA Executive Board, RAs, and residents for policy and event awareness
- Voted on 100+ sponsorship and resolution bills at Legislative Council for responsible budget usage
- Awarded 2016-2017 RHA Vice President of the Year
- Awarded 2016-2017 RHA Hall Council of the Year