Abishek Chandrasekhar

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Education

2016-2017 **University of Texas at Dallas - M.S. in Mechanical Engineering**, *GPA - 3.37/4.00.*
Area of Concentration: Dynamic Systems and Control

2010-2014 **Anna University - B.E. in Mechatronics Engineering**, *CGPA - 7.75/10.00.*

Research

May 2017 -Present **Application of Control theory in Cyber-Physical Systems**.
Developed controls laws in python and C for Anki OverDrive cars in a Linux environment
Each car was controlled independently by a Raspberry Pi paired with an ultrasonic sensor
Simulated platooning using a PD controller in python to maintain nominal distance
The level of control wasn't sufficient due to sensor delay and the low speed of commands sent to the car
Currently working on simulating malicious attacks on vehicle platoons

Github `https://github.com/Abishek92/Anki_Overdrive_Platooning.git`.

Professional Experience

Jun 2015 -Oct 2015 **ATS Elgi Ltd.**, Robot Programmer.
Developed an arc welding program for a FANUC 120iC 10L robot
Calibrated the Tool Frame and created User Frames for three rotating fixtures
Improved production by reducing the cycle time by 18 percent
Eliminated weld defects such as porosity and undercut

Aug 2014 -Mar 2015 **Difacto Robotics and Automation**, Trainee Engineer.
Performed robotic material handling and spot welding using FANUC LR 100iB and FANUC R2000iA 165F
Created off-line Robot programs using CimStation Robotics and RoboGuide
Designed fixtures, jigs and Robot Pedestals using SolidWorks

Academic Projects

Jan 2017 -May 2017 **Idle Speed Control and Air-fuel ratio Control of an Internal Combustion Engine**.
Built a Simulink model of a 4-cyl 2.4 L engine to model a plant in discrete domain
Optimized the input throttle angle to maintain idle speed of 800 rpm using SISO state feedback
Implemented MIMO control where the control inputs were throttle angle and Spark advance angle
Utilized controller developed using Root Locus technique to compare results of state feedback control
Developed and tuned a PID controller for the idle speed control and achieved zero steady state error

Jan 2017 -May 2017 **Reliability Analysis of an Airplane wing**.
Designed and simulated stress analysis of a scaled down version of a wing
Obtained a performance function using Two-point Adaptive Nonlinear Approximation (TANA)
Calculated the reliability of the wing using Monte Carlo Simulations, Mean Value First Order Second moment method and Hasofer Lind - Rackwitz Fiessler method

Aug 2016 -Dec 2016 **Humanoid Robot: CAD and Kinematic Model**.
Created equations to determine the forward kinematics of the limbs using Screw Theory
Calculated the position of the end effector (leg) using the Screws package in Mathematica
Created a CAD model of the humanoid robot using the values used to calculate kinematics

Aug 2016 -Dec 2016 **PD control of a Planar elbow Manipulator**.
Created a MATLAB code to simulate the dynamics of the two link robot
Tested different initial conditions and plotted the link responses and phase space trajectories
Implemented a PD controller for the system using control torques which are calculated using gains
Simulated the closed loop system for initial conditions and plotted link responses and tracking errors

Jan 2016 -May 2016 **Petri Nets in an Automated Assembly Line**.
Created a layout of an assembly line that incorporated eight industrial robots
Applied the concept of Petri Nets to the assembly line and described the layout with their properties
Predicted the future states of the system using matrix representations and the analysis methods

Jan 2013 -May 2013 **SAE Baja INDIA**.
Designed and built a tubular, off-road vehicle as a leader of the suspension team
Calculated spring length and travel and optimized the camber, castor and king-pin angles
Designed the suspension system in SolidWorks and simulated the model using Lotus suspension software

Jan 2014 -Apr 2014 **CFD Analysis of a Centrifugal Pump**.
Performed Static testing using Hypermesh and Radioss and CFD analysis performed using ANSYS-Fluent
Eliminated the need to build prototype impellers for testing

Systems and Control Proficiencies

Modeling: Automotive Power-train Systems, Serial Robot Manipulators, Vehicle Platoons

Control: State Feedback, LQR, Lyapunov Redesign, Feedback Linearization, Input-Output Linearization, Integrator Backstepping, Passivity Based Control, Adaptive Control, Force Control, PID Control

Tools

Controls: Matlab, Simulink, Python, Mathematica, LabVIEW, C, C++, RSLogix, Simscape

Mechanical: SolidWorks, AutoCAD, Catia V5, Creo, Pro E (Certified), Ansys, Hyperworks

Robotics: FANUC, Roboguide, CimStation Robotics, Robot Studio

Graduate Coursework

- Linear Systems
- Nonlinear Systems
- Digital Control of Automotive Powertrain
- Robust Control
- Reliability Based Design
- Modeling and Simulation
- Robot Control
- CAD
- Dynamics of Complex Networks
- Continuum Mechanics

Links

Website: `http://www.utdallas.edu/~Abishek.Chandrasekhar/`

Github: `https://github.com/Abishek92`

LinkedIn: `https://www.linkedin.com/in/abishekchandrasekhar/`

Achievements

2010-2014 Awarded the annual Mahatma Gandhi Merit Scholarship for academic performance for four years

Leadership

2013-2014 President of SEDS (Students for the Exploration and Development of Space)

2012-2014 President of the Academic Wing of "CHANGE", a student initiative