SESHAN RAJARAMAN

CONTROL THEORY · PHYSICAL FACTORS · TIME SERIES · MULTIBODY SYSTEMS · POWER SYSTEMS

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"Be the change that you want to see in the world."

Summary

My ultimate goal is to expand my understanding on the durability and efficiency of systems that promise to respond to the current environmental degradation. Focussing towards my goal, I work towards specalizing in Mechatronics, Physical Systems and Control Theory during my graduate degree program at University of Waterloo, Ontario, Canada.

Education

University of Waterloo
MENG IN SYSTEMS DESIGN ENGINEERING

Ontario, Canada
Sept 2022 - Present

- Primary focus on Mechatronics and Physical Factors, Control Theory.
- **CGPA:** 91% (4.0)
- **Courses:** Distributed Power Systems, Optimal Control Theory, Time Series Modelling, Systems Design Theory.

Vellore Institute of Technology
B.TECH. IN ELECTRONICS AND COMMUNICATION ENGINEERING

Chennai, India
July 2018 - April 2022

- Primary focus on Control Systems and Robotics.
- **Supervisor:** Dr. Sofana Rekha, Dr. Velmathi G
- **CGPA:** 8.48
- **Courses:** Probability Theory, Control Systems, Microcontrollers, Digital Signals Processing

Area of Expertise

Simulation Tools	**: MATLAB, Vitich Genesys, Visure Requirements, LTSpice, Proteus, NodeRed**
Programming Tools	**: Python, C, C++, R Programming, Keil**
Platforms	**: Google Cloud, AWS, Innoslate Rational System Architect**
Languages	**: English, Tamil, Hindi, German, Arabic**

Specialization

Six Sigma Yellow belt
BOARD OF REGENDS OF THE UNIVERSITY SYSTEM OF GEORGIA

Six Sigma Green belt
BOARD OF REGENDS OF THE UNIVERSITY SYSTEM OF GEORGIA

Teaching Assistantship

ECE2006
Digital Signal Processing
SUPERVISOR: PROF. SRIVATSAN K

VIT University
July 2020 – Dec 2020

ECE2005
Probability Theory and Random Processes
SUPERVISOR: PROF. REVATHI S

VIT University
Dec 2019 – April 2020

ECE2010
Control Systems
SUPERVISOR: PROF. SOFANA REKHA

<div align="right">VIT University
July 2021 – Dec 2021</div>

MAT3005
Applied Numerical Methods
SUPERVISOR: PROF. UMA DEVI

<div align="right">VIT University
Dec 2020 - July 2021</div>

Publication

Smart Classroom
INTEGRATED RESILIENT ENERGY SOLUTIONS, SCRIVENER PUBLICATION

Trashsort
HACKKU, KANSAS UNIVERSITY, USA

IOT based Self checkout stores using facemask detection
INTEGRATED RESILIENT ENERGY SOLUTIONS, SCRIVENER PUBLICATION

The Influence of Adolescent Siblings on Family Purchase Decisions
JOURNAL OF CHENGDU UNIVERSITY OF TECHNOLOGY

Projects

Stock Market Prediction
SOFTWARES: R STUDIO

- The main objective of the project was to forecast the stock prices of a company (Apple) with the available data by building an ARIMA model.
- Considering that the data consisted mostly of Open, High, Low, Closing or OHLC, our model was designed to be a univariate time series.

Infectious Disease Surveillance using Time Series
SOFTWARES: R STUDIO

- The project focused on the practical aspects of using ARIMA (autoregressive, integrated, moving average) time series modelling in the surveillance of reportable infectious diseases, with a focus on the widely available SSS1 package from the Centers for Disease Control and Prevention.
- ARIMA modelling requires the following steps: time series selection, series transformations, model selection, parameter estimation, forecasting, and forecast updating.

Route Planning with Real-time Traffic Predictions
SOFTWARES: R STUDIO

- A system for individual trip planning was designed, that effectively plans the route considering the future traffic hazards.
- Conditioning spatial regression on intermediate predictions of a discrete probabilistic graphical model allowed for the simultaneous incorporation of historical data, streamed online data, and a rich dependency structure.

LQR Design for Vehicle Suspension System
SOFTWARES: MATLAB AND SIMULINK

- Designed a Linear Quadratic Regulator (LQR) control system for the vehicle suspension system is the recommended approach.
- Based on the condition and inputs of the vehicle, the LQR system is a feedback control system that improves suspension performance.
- The LQR system will be made up of a state observer that will gauge the condition of the car and a feedback controller that will regulate the suspension system in accordance with the gauged condition.

Design of LQR Servo Controller
SOFTWARES: MATLAB AND SIMULINK

- The goal was to perform a steady coordinated turn for an aircraft.
- A controller that commands a steady turn by going through a 60° roll was designed.
- In addition, the design was made such that the pitch angle (θ) stayed close to zero.

Bluetooth-controlled Home automation System
SOFTWARES: C, PROTEUS

- The project consisted of a virtual simulation of the devices which can be controlled by Bluetooth through our phone such as AC, Light etc.
- All the features had to be done manually and not with the help of a PIR sensor.

Holistic Healthcare
SOFTWARES: C, ESP32-PICO-D4 MICROCONTROLLER

- The main features of this project are detection of sleepwalking, high heart rate, high body temperature and intimation.
- In an emergency, it must intimate a family member about the patient by making a call.
- The accelerometer data is used by the microcontroller to calculate the number of steps taken by the user, their body temperature and pulse rate.
- If the values exceed a particular threshold, then the family member gets notified.

Image Compression and Decompression using LZW Coding
SOFTWARES: PYTHON

- The idea of the compression algorithm is the following: As the input data is being processed, a dictionary keeps a correspondence between the longest encountered words and a list of code values.
- The words are replaced by their corresponding codes and so the input file is compressed.
- Therefore, the efficiency of the algorithm increases as the number of long, repetitive words in the input data increases.

Image Compression and Decompression using LZW Coding
SOFTWARES: ARDUINO UNO

- The project focuses on the development of a Wireless Sensor Network-based Forest Fire Detection System that comprises basic RF modules for wireless communication and solar energy harvesting system.
- The system will detect the presence of a fire using temperature, gas, and flame sensors and transmit a message to the base station with the help of a Zigbee module.
- It will also trigger the controller which will enable the process of extinguishing the fire.