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Top Skills

Navigation
Adaptive Control
Sensors

Honors-Awards

Dushman Award

Publications

Joint state and parameter estimation for a membrane bioreactor system

Reduced order model monitoring and control of a membrane bioreactor system via delayed measurements

Phase Step Estimation in Interferometry via an Unscented Kalman Filter

A Novel Nonlinear Complementary Filtering based INS/GPS Fusion Architecture

Patents

System, apparatus and methods for augmenting a filter with an adaptive element for tracking targets

Methodology to update Meta Models

A hybrid model based methodology to estimate the performance of an aeroderivative gas turbine

Adaptive observer and related method

A hybrid model based approach to estimate RUL of journal bearings from fleet level inspection data

Venkatesh Madyastha

Chief Data Scientist at Datasigns Technologies Pvt. Ltd.
Bengaluru

Summary

13+ years of experience in estimation & control methodologies and predictive modeling.

Specialties: Adaptive Control, Guidance and Navigation Control, Neural Network based Adaptive Estimation, Extended & Unscented Kalman Filtering, Particle Filtering, Unmanned Aerial Vehicles Guidance, Navigation, Control and Estimation, Backstepping Control, Dynamic Inversion, Lyapunov Stability Analysis, Sensor Bias Estimation, Reverse Osmosis (RO) Membrane Health Detection and Membrane Remaining Useful Life Calculations, RO Plant Sensor Change Detection, Condition Based Monitoring (CBM), Predictive Modeling, Genetic Algorithms, Particle Swarm Optimization, Neural Nets, Support Vector Machines, Ensemble Methods, Data Science, Machine Learning, Artificial Intelligence.

Very Proficient in MATLAB, SIMULINK, Python
Fairly Proficient in Databricks

Experience

Datasigns Technologies Private Limited
Chief Data Scientist
February 2020 - Present (7 months)
Bengaluru Area, India

I lead a team of passionate energetic data scientists in delivering cutting edge ML based solutions for credit risk modelling. Here are some of the digital products we are building:

1. ML based hybrid customer credit risk assessment model - pre loan disbursal
2. ML based hybrid early warning model predicting EMI default - post loan disbursal
3. Statistical data mining to estimate operational efficiency of various lenders partnering with us - primarily for NACH efficiency
4. Hybrid ML + empirical methodology for loan underwriting - pre loan disbursal

Felidae Electric - Cycling The Revolution.

Advisory

July 2019 - Present (1 year 2 months)

Pune Area, India

https://felidaeelectric.com/

Shell

3 years 6 months

Principal Data Scientist

June 2019 - February 2020 (9 months)

Bengaluru Area, India

As a part of the data science team, I work on problems that require solutions to predict faulty events that otherwise could lead to huge upsets and unbelievable loss of productivity resulting in an insane amount of money dumped down the drain

Data Science Lead

July 2018 - June 2019 (1 year)

Bengaluru Area, India

I work on developing and deploying predictive analytics solutions for oil and gas equipment.

Data Analytics Researcher

September 2016 - July 2018 (1 year 11 months)

Bengaluru Area, India

I work on applying data analytics for predictive modeling and maintenance of oil and gas equipment, both rotating (compressors, turbines, etc.,) as well as non-rotating (heat exchangers, molsieve beds etc.,).

A list of some of the projects I work on:

1. Production well output optimization: [Sep 2016 to Jan 2017]
2. Predictive Maintenance for Rotating Equipment: [Feb 2017 to Present]
3. Real Time Monitoring of Molsieve Dehyadration Beds in LNG Plants: [Feb 2017 to Feb 2018]
4. Real Time Monitoring of Acid Gas Removal Unit [AGRU]: [Feb 2018 to Present]
5. Optimizing the Molsieve Beds during the Regeneration Cycle: [Feb 2018 to Present]

For some details on these projects, refer the pdf attachment below.

General Electric

4 years

Senior Engineer

April 2015 - August 2016 (1 year 5 months)

Bengaluru Area, India

Lead Engineer

September 2012 - April 2015 (2 years 8 months)

Bangalore, India

Prognostics Systems Lab:

Reverse Osmosis (RO) Membrane Performance Monitoring: Jan '14 - Current

1. Developed method to:

a. Detect RO membrane degradation & sensor degradation

b. Generate alarms for RO health; Predict RO performance

c. Calculate RO membrane remaining useful life (RUL) based on flow & salt passage

2. Generated IT spec doc for on site implementation

Locomotive Engine Oil Health Monitoring: Jan '14 - Current

1. Developed a Kalman filter scheme to:

a. Predict % water & % fuel dilutions of lube oil (optimally schedule oil top-up & drainage)

b. Determine crank case bearing health based on wear metal concentrations of lube oil

AeroDerivative Gas Turbine Estimation: Jan. ’14 - current

1. Designed an Unscented Kalman filter to predict the flows & efficiencies of an aeroderivative gas turbine. Improvement in estimates of corrected power

Stage 2 Bucket Damage Estimation: Oct '13 - Dec '13

Aviation Sensor Monitoring via SST/VST Counter Trends & Thresholds: July '13 - Dec '13

1. Developed a methodology to identify shift, drift and outliers in SST data based on data trending over multiple flights. Successfully completed 2 chief reviews for IT implementation

Blade Health Monitoring: Apr '13 - Dec '13

Usage Based Lifing: Jan '13 - Dec '13

1. Developed a KF based crack prediction algorithm using field data
2. This method not only allows updating TF based models but also cross validation and testing
3. Developed a neural network (NN) based methodology to model wear of GT components (cap and cross-fire collars & stop brackets)

Monitoring health of gas turbine (GT) blades via an IR camera: Sept '12 - Dec '12

1. Developed a KF to estimate IR field-of-view (FoV) GT blade temperature profile
2. FoV temperature estimates are used to construct Non-FoV temperature estimates
3. Used turbine bucket cooling effectiveness for temperature profile reconstruction
4. Solved model and IR camera uncertainty quantification

CSIR - National Aerospace Laboratories

Scientist

August 2010 - August 2012 (2 years 1 month)

Bangalore, India

(I) Design and development of an autopilot for a class of Micro Aerial Vehicles (MAVs):

1. Implementation of model based control techniques (Classical PID control) for various modes of an autopilot.
2. Development of auto-landing algorithms which aids precise navigation and enables the aerial vehicle to land at a desired location.
3. Implementation of efficient path following guidance algorithms; vector field approach for path planning in 2-dimension.
4. Development of nonlinear control techniques such as back-stepping control.
5. Investigating L1 adaptive control.
6. Development and implementation of Kalman filtering based nonlinear estimation schemes for attitude stabilization and localization & mapping of MAVs, particularly in GPS denied environments.
7. Implementation of software & hardware -in-the-loop simulations for MAVs.
8. Online estimation of sensor bias (constant, time varying) using variants of Kalman filter based techniques (extended/error state/unscented Kalman filters)
9. Investigating vision based navigation approaches for GPS denied environments.

(II) Automatic Target Recognition (ATR) – static and dynamic scenes:
1. Scale invariant ATR for static targets – using maximum likelihood based estimation.
2. Horizon based aircraft attitude (roll & pitch) determination.

The above work has resulted in 9 international publications.

General Electric
Research Engineer
December 2007 - August 2010 (2 years 9 months)
Bangalore, India

(I) Healthcare:
1. Involved in understanding and developing a framework for predicting episodes of ventricular tachyarrhythmia (VT), which serve as precursors to sudden cardiac death.
2. Involved in developing a user-friendly data-reviewing platform for easy analysis and statistical trending of ECG data.
3. Involved in developing a strategy for causal statistical trending of TWA numbers for real time monitoring of patients in an intensive care unit (ICU).
4. Involved in understanding and developing a framework for predicting episodes of ventricular tachyarrhythmia (VT), which serve as precursors to sudden cardiac death.
5. Extensive code writing using MATLAB and SIMULINK.

(II) Transportation:
1. Involved in studying the sensitivity of parameters such as train mass, train length and Davis drag parameters to the fuel consumed by a freight locomotive over the entire journey.
2. Worked on suitable parameter estimation techniques, such as recursive least squares, extended Kalman filtering, to provide online estimates of locomotive uncertain parameters such as train mass, length and resistance parameters also called Davis parameters, to the optimization code.
3. Developed a methodology to classify railroad tracks based on the recorded elevation and associated sensitivity metrics such as fuel and train handling to these classes of tracks. Thus any new track can be classified according to the algorithm and the user is provided with a qualitative perspective of the fuel consumed on the given new track based on the classification.
4. Developed a parameter hedging strategy and established critical hedging numbers associated with the railroad track classes.

5. Involved in developing performance metrics to correlate in-train forces of various train configurations with track and train configuration parameters.
6. Extensive code writing using MATLAB and SIMULINK.

BELL Helicopters
Sr. Engineer - Aerodynamic Analyst
January 2006 - December 2007 (2 years)
Bangalore, India

1. Developed an efficient toolbox to assess the performance capabilities of BELL Helicopters in terms of the hovering capability, climb rate and cruise performance.
2. The developed toolbox also has the capability of analyzing various helicopter missions such as rescue missions, drop-off missions by optimizing the fuel onboard the helicopter.
3. An efficient graphics plotting capability is provided to the toolbox whereby the user can select the types of charts to be sketched such as shaft horsepower, helicopter hover, climb and cruise rates, fuel required to take-off/ hover/climb/cruise.
4. Extensive code writing using MATLAB – 2006a & 2006b.
5. Presented “Performance Analysis of Helicopters – Robust Graphic User Toolbox for Helicopter Mission Analysis”, to the top business leadership of Bell Helicopter Textron in March of 2007.
6. Obtained a Green Belt certification in Textron Six Sigma processes for the project titled “Performance Analysis during hover, take-off, climb, cruise & endurance and Mission Capability Analysis of Civilian Bell Helicopters” in July of 2007.

Dynacs Engineering Co
Summer Intern
May 1999 - August 1999 (4 months)

1. Worked on the attitude and rate control of the MIR Russian and the PG1 American controllers.
2. Tested various algorithms (model reduction) in FORTRAN for different configurations of space structures.

Indian Institute of Science
Research Assistant
March 1997 - July 1998 (1 year 5 months)
Bangalore

Advisor: Prof. M. V. Narasimhan – Department of Mechanical Engineering (IC Engines Laboratory)

1. Worked on the design of an efficient 2-stroke petrol engine with a direct injection system.
2. Conducted various laboratory experiments to test different performance characteristics of the developed engine such as power, torque and fuel consumption.
3. Collected laboratory data from the designed engine, which was used in comparison with a conventional 2-stroke petrol engine.

Education

Georgia Institute of Technology

Ph.D., Aerospace Engineering · (2000 - 2005)

University of Houston

M.S., Mechanical & Aerospace Engineering · (1998 - 2000)

Bangalore University

B.E., Mechanical Engineering · (1992 - 1996)