Carlos Felipe **Alcala Perez**

Milwaukee, WI. | (+1) 414-426-6814 | alcala21@gmail.com | alcala21 | alcala21 | Carlos F. Alcala

Data Scientist

Summary

Accomplished Data Scientist with extensive experience in the gathering, cleaning, modeling, analysis and visualization of large amounts of data to obtain valuable insights. Highly skilled in using advanced tools to develop and implement data science methods and achieve business goals. Award winning scholar who holds multiple patents.

Areas of Expertise

- Multivariate Statistical Analysis
- Data Analytics
- Data Visualization

- Process Improvement
- Application Development
- Research and Development

Experience

Johnson Controls   Oct. 2011 - Jan. 2020

PRINCIPAL RESEARCH ENGINEER   *Milwaukee, WI*   **Dec. 2017 - Jan. 2018**

- Utilized advanced optimization and data analytics methods to improve the efficiency of heating, ventilation and air conditioning (HVAC) systems.
- Key role in the transfer of newly developed technology into products and applications.

SENIOR RESEARCH ENGINEER   *Milwaukee, WI*   **May 2015 - Dec. 2017**

- Developed methods for monitoring the performance of PID controllers, to detect steady state operation of HVAC equipment, and reduce energy consumption in wireless thermostats while keeping acceptable comfort standards. Applied advanced mathematical tools to develop these methods, as well as artificial intelligence, machine learning and traditional statistical methods.

SENIOR RESEARCH ENGINEER   *Mexico City, Mexico*   **Jan. 2013 - May 2015**

- Developed data-driven methods for fault detection and diagnosis in connected chillers.

SENIOR RESEARCH ENGINEER   *Milwaukee, WI*   **Oct. 2011 - Jan. 2013**

- Developed a method for adaptive sampling of PID controllers.

Internship Experience

The Dow Chemical Company   *Freeport, TX*   **May 2010 - Aug. 2010**

SUMMER RESEARCH INTERN

- Developed an Excel application for multivariate statistical monitoring of continuous and batch processes.

Capstone Technology   *Seattle, WA*   **2006 - 2009**

SUMMER ENGINEERING INTERN   **May. 2009 - Aug. 2009**

- Developed a multivariate image analysis application to monitor combustion efficiency in furnaces.

SUMMER ENGINEERING INTERN   **May. 2007 - Aug. 2007**

- Developed a multivariate statistical application for statistical modeling and prediction in chemical processes.

SUMMER ENGINEERING INTERN   **May. 2006 - Aug. 2006**

- Developed a multivariate statistical application for detection and diagnosis of sensor and process faults.

NMC North Microelectronics   *Beijing, China*   **Jun. 2008 - Jul. 2008**

SUMMER ENGINEERING INTERN

- Developed a multivariate statistical application for monitoring the operation of a semiconductor manufacturing process.

Education

Doctor of Philosophy in Chemical Engineering *Los Angeles, CA* **Aug. 2007 - Aug. 2011**

UNIVERSITY OF SOUTHERN CALIFORNIA

- Awarded a Roberto Rocca Fellowship.

Master of Science in Chemical Engineering *Austin, TX* **Aug. 2005 - May 2007**

THE UNIVERSITY OF TEXAS AT AUSTIN

- Fulbright Scholarship Recipient.

Bachelor of Science in Chemical Engineering, summa cum laude *Ciudad Madero, Mexico* **Aug. 1999 - Dec. 2003**

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Skills

Programming	R, Python, Matlab, VBA, RMarkdown, LaTeX
Applications	Sublime Text, Git, Github, Visual Studio Code
Languages	English, Spanish (native)

Certifications

Statistics with R *Duke University* **Oct. 29, 2018**

COURSERA

Credential ID: UWG3PS5EXMBJ

Machine Learning *University of Washington* **Feb. 1, 2017**

COURSERA

Credential ID: 2VHFDHW5GUK6

Data Science *Johns Hopkins University* **Apr. 20, 2016**

COURSERA

Credential ID: W9DB45S3CGDZ

Publications

Patents

Control system with response time estimation and automatic operating parameter adjustment
    Carlos F. Alcala Perez, Timothy I. Salsbury
    US Patent 10324424, 2019

Control system with asynchronous wireless data transmission
    Carlos F. Alcala Perez, Kirk H. Drees
    US Patent 10333810, 2019

Building climate control system with decoupler for independent control of interacting feedback loops
    Timothy I. Salsbury, Carlos F. Alcala Perez, John M. House, Christopher R. Amundson
    US Patent 10253997, 2019

Building management system with voting-based fault detection and diagnostics
    Carlos F. Alcala Perez
    US Patent 10401262, 2019

Control system with response time estimation
    Carlos F. Alcala Perez, Timothy I. Salsbury

US Patent 10317856, 2019

Feedback control system with normalized performance indices for setpoint alarming
    Timothy I. Salsbury, Carlos F. Alcala Perez, Michael J. Ajax
    US Patent 10197977, 2019

System and method for output compensation in flow sensors using pulse width modulation
    Carlos F. Alcala Perez, Kirk H Drees, Timothy I Salsbury
    US Patent App. 15/908,041, 2018

System and method for output compensation in flow sensors
    Carlos F. Alcala Perez, Kirk H Drees
    US Patent App. 15/897,987, 2018

Normalized indices for feedback control loops
    Timothy I. Salsbury, Carlos F. Alcala Perez
    US Patent 9920943, 2018

Thermostat with efficient wireless data transmission
    Timothy I Salsbury, Carlos F. Alcala Perez, Homero L Noboa
    US Patent App. 15/618,492, 2017

Building control system with decoupler for independent control of interacting feedback loops
    Timothy I Salsbury, Carlos F. Alcala Perez, John M House, Christopher R Amundson
    US Patent App. 16/253,965, 2017

Systems and methods for steady state detection
    Carlos F. Alcala Perez
    US Patent App. 15/449,732, 2017

Systems and methods for automatically creating and using adaptive pca models to control building equipment
    Carlos F. Alcala Perez
    US Patent App. 15/279,336, 2016

Systems and methods for adaptive sampling rate adjustment
    Carlos F. Alcala Perez, Timothy I. Salsbury
    US Patent 9395708, 2016

Building management system with predictive diagnostics
    Carlos F. Alcala Perez, Samuel F. Hamilton
    US Patent App. 15/188,824, 2016

Journal Papers

A method for setpoint alarming using a normalized index
    Carlos F. Alcala, Timothy I. Salsbury
    Control Engineering Practice 60.3 (2017) pp. 1–6. 2017

An extremum-seeking control method driven by input–output correlation
    Timothy I Salsbury, John M House, Carlos F Alcala, Yaoyu Li
    Journal of Process Control 58 (2017) pp. 106–116. Elsevier, 2017

Analysis and generalization of fault diagnosis methods for process monitoring
    Carlos F. Alcala, S. Joe Qin
    Journal of Process Control 21.3 (2011) pp. 322–330. 2011

Generalized reconstruction-based contributions for output-relevant fault diagnosis with application to the tennessee eastman process
    Gang Li, Carlos F. Alcala, S. Joe Qin, Donghua Zhou
    Control Systems Technology, IEEE Transactions on 19.5 (Sept. 2011) pp. 1114–1127. 2011

Reconstruction-based contribution for process monitoring with kernel principal component analysis
    Carlos F. Alcala, S. Joe Qin
    Industrial & Engineering Chemistry Research 49.17 (2010) pp. 7849–7857. 2010

Reconstruction-based contribution for process monitoring
    Carlos F. Alcala, S. Joe Qin

Conference Papers

Self-optimizing Control of an Air Source Heat Pump
Zhongfan Zhao, Yaoyu Li, Timothy I Salsbury, Carlos F Alcala, John M House
2019 American Control Conference (ACC), 2019

Identification of a Self-Optimizing Control Structure from Normal Operating Data
Carlos F Alcala, Timothy I Salsbury, John M House
2019 American Control Conference (ACC), 2019

Decoupling Method for PI Controllers via Setpoint Modification Applied to HVAC Systems
Timothy I Salsbury, John M House, Carlos F Alcala
ASME 2018 Dynamic Systems and Control Conference, 2018

Reduction of Transmissions in Wireless Thermostats with Send-on-Delta Sampling and a Deadband Filter
Carlos F Alcala, Timothy I Salsbury
2018 Annual American Control Conference (ACC), 2018

Decoupling Method for PI Controllers via Setpoint Modification Applied to HVAC Systems
Timothy I. Salsbury, John M. House, Carlos F. Alcala
Proceedings of the Dynamic Systems and Control Conference, 2018

Reduction of Transmissions in Wireless Thermostats with Send-on-Delta Sampling and a Deadband Filter
C. F. Alcala, T. I. Salsbury
Proceedings of the 2018 Annual American Control Conference (ACC), 2018

Model Selection for Predicting the Return Time from Night Setback
John E Seem, John M House, Carlos F Alcala
Proceedings of the International High Performance Buildings Conference, 2016

Two new normalized EWMA-based indices for control loop performance assessment
Timothy I. Salsbury, Carlos F. Alcala
Proceedings of the American Control Conference (ACC), 2015

Monitoring of dynamic processes with subspace identification and principal component analysis
Ricardo Dunia Carlos F. Alcala, S. Joe Qin
Proceedings of the 8th IFAC International Symposium on Fault Detection, Supervision and Safety of Technical Processes, 2012, Mexico City, Mexico

Unified analysis of diagnosis methods for process monitoring
Carlos F. Alcala, S. Joe Qin
Proceedings of the 7th IFAC International Symposium on Fault Detection, Supervision and Safety of Technical Processes, 2009, Barcelona, Spain

Unification of contribution analysis for process monitoring
Carlos F. Alcala, S. Joe Qin
Proceedings of the 2008 AIChE Annual Meeting, 2008, Philadelphia, USA

Reconstruction-based contribution for process monitoring
Carlos Alcala, S. Joe Qin
Proceedings of the 17th IFAC World Congress, 2008, Seoul, Korea