

Aleem Pasha

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Professional Summary

Industrial and Systems engineer with expertise in optimization, data science, and applied machine learning for interdisciplinary systems. Skilled in advanced systems modeling, data analysis, and developing innovative solutions for complex industrial challenges. Specializing in the optimization of renewable energy storage systems with an extensive focus on PV-integrated hybrid technologies, leveraging a multidisciplinary approach that integrates advanced programming, decision analysis, heuristic search methods, genetic algorithms, and a wide range of machine learning techniques to promote energy efficiency and sustainability. My research also extends to practical applications in healthcare, supply chain, and developing data-driven solutions to complex real-world challenges. Dedicated to bridging academia and industry by advancing research-driven, sustainable, efficient, renewable energy technologies.

Research Interests

- Renewable energy storage systems.
- Large-scale optimization, decision-making in healthcare
- Artificial Intelligence, Machine Learning, Heuristic Search Methods.
- Decision Support Systems.
- Data Driven Optimization
- Big Data Analysis - Data Analytics and Data Mining

Education

- **MS Industrial and Systems Engineering (2023 – Present)**, King Fahd University of Petroleum and Minerals, Saudi Arabia
 - Major Subjects: Linear Programming, Probabilistic Modelling, Advanced Supply Chain Modelling
 - Achievement: Fully Funded Deanship Scholarship
 - GPA: 3.28/4
- **BE Mechanical Engineering (2018 – 2022)**, Osmania University, Hyderabad, India
 - Major Subjects: Operations Research, Manufacturing Processes, Thermodynamics, Heat Transfer
 - Achievement: Merit-Based Telangana Minority Scholarship
 - GPA: 8.15/10

Publications

- **Numerical and Machine Learning Approaches to Multi-Criteria Decision Making for Solar Panel Selection: A Comparative Study** – Developed a Novel Decision-Support framework for solar panel selection using Fuzzy Analytical Hierarchical Process, Grey Relational Analysis, and K-means++ to evaluate thirteen critical criteria.
Authors: **Aleem Pasha**, Ahmed M. Attia, Yasser Almoghathawi, Hasan Masrur, Abdullahi Salad.
Status: Submitted.
- **A Hybrid BWM-CRITIC-TOPSIS-MARCOS Framework for the Multi-Criteria Evaluation of Solar Panels** – Developed a Novel Decision-Support framework for solar panel selection using BWM, CRITIC, TOPSIS, and MARCOS to evaluate fifteen critical criteria and five solar panels.
Authors: **Aleem Pasha**, Ahmed M. Attia, Yasser Almoghathawi, Hasan Masrur, Abdullahi Salad.
Status: Submitted

- **Optimizing Photovoltaic System Performance: Integrative Approaches for Cost Efficiency and Risk Management**- Designed a Mixed-Integer Non-Linear Programming-based framework for Photovoltaic Systems with hydrogen storage, evaluating stand-alone vs grid-connected configurations with CVaR to address seasonal reliability and risk.
Authors: **Aleem Pasha**, Ahmed M. Attia, Yasser Almoghathawi, Hasan Masrur, Abdullahi Salad.
Status: Submitted (Conference).
- **Comparative Forecasting of Solar Irradiance and Temperature for Long-Term Energy Planning Using Statistical, ML, and Probabilistic Models** - Evaluated six forecasting models (Holt-Winters, SARIMA, Random Forest, SVR, Prophet, and BLR) using 2018–2023 Dhahran data.
Authors: Abdullahi Salad, Yasser Almoghathawi, Ahmed M. Attia, Hasan Masrur, **Aleem Pasha**,
Status: Submitted
- **IoT-Cloud Enabled Pollution Level Prediction for Sustainable Green Environment: A Deep Learning Approach** - Developed an IoT-based air quality monitoring and forecasting system using statistical analysis and LSTM deep learning techniques.
Authors: **Aleem Pasha**, Ahmad Abdullah, Mohammed Abdel-Aal.
Status: In progress.
- **An Integrated data mining algorithm to predict the readmission risk of diabetic patients** – Evaluated various machine learning and genetic algorithms to predict the readmission risk of diabetic patients.
Authors: **Aleem Pasha**, Najeeb Khan, Syed Mujahid
Status: In progress.

Academic Projects

- **MS Industrial and Systems Engineering (2023 – Present)**, King Fahd University of Petroleum and Minerals, Saudi Arabia
 - **A Deep Learning Approach for PM_{2.5} Prediction: Combining LSTM Self-Attention with SHAP Interpretability** – Developed a deep learning model using LSTM with self-attention for accurate PM_{2.5} air pollution forecasting using five years of weather data at the US embassy, Beijing, China. The model outperformed traditional methods such as Random Forest and Support Vector Regression with high predictive accuracy.
 - **Predicting the readmission risk of diabetic patients using various data mining algorithms: A Comparative Study** – Applied balanced sampling to handle imbalanced datasets and used Chi-square, ANOVA for feature selection. Evaluated multiple models and found that combining SVM with PSO achieved superior results in terms of accuracy, precision, recall, and F-measure compared to standalone SVM.
 - **A Sustainable Travel Route for Tourists in India using an Evolutionary Genetic Algorithm** – Proposed a multi-objective evolutionary algorithm (NSGA-II) to optimize travel routes across 15 major tourist cities in India, minimizing cost, travel time, and carbon emissions. Integrated environmental impact as a key factor in TSP modeling, offering sustainable and efficient route planning for eco-conscious tourism.
 - **A Comprehensive Review of Methane Pyrolysis for Hydrogen Production: Reactor Designs and Catalyst Advancements** – Conducted an in-depth review of thermal, catalytic, and molten metal reactor technologies for methane pyrolysis, focusing on hydrogen yield and carbon byproduct quality. Analyzed key parameters like temperature, flow rate, and catalyst composition influencing reactor performance and catalyst stability.
 - **Optimization of Concrete Mixture Design using Regression modelling**: Developed a regression model for concrete mix optimization and identified key factors influencing use and compressive strength using ANOVA, post-hoc analysis and model evaluation techniques.
- **BE Mechanical Engineering (2018 – 2022)**, Osmania University, Hyderabad, India.
 - **Performance and Heat Transfer Analysis of a Parabolic Solar Trough** – Investigated the best possible combination of material and working fluid for a parabolic solar trough, validating the results through experiment and heat transfer analysis.

Key Skills and Competencies

- **Languages:** Python, R
- **Frameworks:** Pandas, Numpy, Scikit-Learn, Matplotlib
- **Modeling Systems:** GAMS, Pyomo
- **Platforms:** Jupyter Notebook, Google Colab
- **Tools:** Excel, Power Point

Optimization Algorithms, Python Programming, Data Analysis, Decision Modeling, Multi-Criteria Decision-Making, Heuristic Search Methods, Genetic Algorithms, Machine Learning, Data Mining, Microsoft Office Suite and Google Workspace, R, Jupyter Notebook, Solid Works, ANSYS.

Cross-Function Collaboration, Leadership Skills, Public Speaking, Strong in conducting literature reviews to identify research gaps and synthesize findings, Strong Technical Writing abilities for reports.

Achievements

- **eBAJA - All terrain electric vehicle challenge (Sep 2021 – Jun 2022)**, NATRAX, Pithampur, Madhya Pradesh, India
 - Participated in the 15th edition of the BAJA SAEINDIA competition
 - Designed and manufactured an electric all-terrain vehicle capable of performing in harsh conditions

Academic Experience

- **Teaching Assistant/Grader (Jan 2022 – Jan 2025)**, King Fahd University of Petroleum and Minerals, Saudi Arabia
 - Courses: Reliability & Maintainability, Supply Chain Systems Modeling, Work and Process Improvements, Introduction to Machine Learning & Data Analysis, Optimization Methods
- **Home Tuition (2018 – 2022)**, Hyderabad, India
 - Provided personalized classes to intermediate and school-level students
 - Courses: Math, Physics, Chemistry, Biology, History, Social Studies, Languages.

Internships

- **AutoDrift Workshop (Jan 2022 – Feb 2022)**, Tech Analogy, Virtual, Hyderabad, India
 - An intensive hands-on workshop on 3D modelling, analytical design, and simulation of the Mercedes SLS AMG using SolidWorks, Ansys, and MATLAB
- **Fire and Security Intern (Sep 2021 – Oct 2021)**, MAXI FIRE AND SECURITY, Hyderabad, India
 - Assisted in the installation and inspection of fire alarms, smoke detectors, CCTV, and lighting systems.
 - Collaborated with technicians to ensure safety compliance and system functionality during field operations.

Community Engagement

- **Volunteer (Jan 2022 – Present)**, King Fahd University of Petroleum & Minerals (KFUPM)
 - Volunteered at rehabilitation centers for children, organizing interactive sessions to support their healing journey and bring joy to their lives. Participated in plantation activities at the university.
- **Student Volunteer (Aug 2020 – Jan 2022)**, National Service Scheme, Muffakham Jah College of Engineering and Technology, Banjara Hills, Hyderabad, India
 - Organized a plantation drive at a Government High School, assisting in the distribution of plant saplings, increasing awareness among students about environmental sustainability. Strengthened collaboration between MJCET and the local community for future eco-friendly initiatives.
 - Organized a Free Medical Camp in collaboration with Apollo Hospitals at the college premises. The camp aimed to provide free medical check-ups, consultations, and health awareness to students, faculty, and

residents.

- Organized a road safety awareness program in collaboration with the Traffic Training Institute, aimed at educating the public about the importance of safe driving practices and reducing road accidents.
- o **Community Service**, Lions Club, Manuguru, Telangana, India
 - Part of Lions Club International, contributed to community service initiatives focused on hunger relief, public health, and environmental sustainability to address local needs and contribute to the betterment of society.

Languages

English (fluent), Urdu (native), Telugu (native), Hindi (fluent), Arabic (intermediate).

References

Dr. Yasser Almoghathawi

(Chairman & Assistant Professor)

KFUPM

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