Anmoldeep Singh

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Education

Aug 2018 - Jul 2022 — **Indian Institute of Technology Goa, India**
Bachelor of Technology in Mechanical Engineering
CGPA: 7.85
Bachelor's Thesis: Artificial Neural Network for modeling CH_4-H_2 turbulent combustion

Apr 2015 - Mar 2017 — **Kendriya Vidhyalaya Itarana, Rajasthan, India**
11th to 12th class
CBSE Board: 88.4%

Apr 2014 - Mar 2015 — **Kendriya Vidhyalaya Itarana, Rajasthan, India**
10th class
CBSE Board: 10 CGPA

Work Experience

Aug 2022 - Present — **Thermax Private Limited**
Pune, India
Innovation Engineer

Feb 2025 - Present — **Caustic Scrubber-Bioreactor solution for High Strength H_2S removal**
- Developing a mathematical model for high-strength (30K PPM) H_2S removal for biomethane purification
- Working on decoupled models for scrubber and bioreactor

Nov 2024 - Present — **Vapor Pressure Swing Adsorption and Membrane hybrid solution**
- Developed and validated an innovative technology for biomethane purification
- Reduced methane slippage by 50% compared to conventional double VPSA systems, maintaining similar capital and operational expenditure
- Introduced sizing guidelines for scale-up, P&ID, and PFD preparation, and Product optimization

Aug 2024 - Present — **Knowledge Nexus**
- Designed a centralized platform to streamline knowledge transfer, enhance technological collaboration, and improve cross-functional communication across the Business unit
- Facilitated the adoption of Product Development Process, Mathematical Modeling, Machine Learning, and IoT to drive technological integration and innovation

Jun 2024 - Nov 2024 — **Green Hydrogen TSA test benchmarking**
- Assisted in the engineering and manufacturing of a scaled-down pilot plant for the tests
- Conducted benchmarking studies on industrial desiccants utilized across the Business for green hydrogen dehydration using Temperature Swing Adsorption technique
- Generated reliable in-house test data for DPT (Dew Point Temperature) and Adsorption-Desorption characteristics to enhance competitive positioning and support business strategy

Aug 2023 - May 2024

Smart boiler control using machine learning and predictive modeling

- Developed a novel hybrid mathematical model by integrating data-driven models for combustion and heat transfer with a physics-based model for boiler dynamics to control water level and pressure
- Implemented SGD (Stochastic Gradient Descent) with ADAM optimizer to improve model variables
- Created the codebase in Python for the control system to maximize performance, reduce OPEX, and minimize human interference in operations
- Hybrid model dynamically adjusts combustion parameters based on changes in fuel type and ambient conditions
- Assisted with commissioning to ensure sustained operational efficiency and adaptability to varying conditions

Feb 2023 - Jun 2023

Line balancing by optimizing bottlenecks and maximizing man-machine capacity

- Designed Process Flow Diagrams, implemented a job tracking system, and devised Work-In-Progress plots to identify and address bottleneck stations
- Identified opportunities for automation and semi-automation to enhance factory efficiency and productivity

Aug 2022 - Feb 2023

Industrial Training

- Innovation department: Fostered expertise in mathematical modeling for heat exchangers and furnaces using stirred reactor and plug flow models, numerical techniques, and physics-based and data-driven modeling. Explored fuel properties and biomass as alternative fuels for sustainable combustion
- Manufacturing department: Acquired knowledge of heat exchanger manufacturing processes, quality assurance methodologies, and the critical role of industrial health, safety, and environmental practices
- Services department: Developed proficiency in product troubleshooting, failure analysis, and commissioning of boilers and thermic fluid heaters. Conducted site visits for hands-on experience, documenting observations and generating reports for Residual Life Analysis (RLA) and Root Cause Analysis (RCA)

Projects

Aug 2021 - Dec 2021

Artificial Neural Network for modeling turbulent bluff-body flames

- Conducted numerical investigation of turbulent reacting flows using open-source CFD solver OpenFOAM coupled with Flamelet Progress Variable Model
- Designed and trained an Artificial Neural Network to replace OpenFOAM-Flamelet Progress Variable based model to simulate and analyze turbulent flame dynamics
- Achieved significant reduction in storage space with a linear correlation between the OpenFOAM-FPV model and ANN

Jul 2021 - Sep 2021

FMAE-FKDC 2021: Go-Kart Design Challenge

- Engineered a Go-Kart, ensuring compliance with all specified constraints and design requirements
- Created multiple chassis configurations using SolidWorks and performed impact simulations using Ansys Workbench to optimize safety and performance

Jun 2021 - Aug 2021

MiniCEA: Thermochemical Calculator

- Python program to calculate Adiabatic Flame Temperature and Heat of Reaction for various fuels (alkanes, alkenes, alkynes, and alcohols) based on specified Fuel-to-Air (F/A) ratios
- Utilized the Openpyxl module to process CSV data and generated relevant graphical representations using the Pyplot module

Jun 2020 - Jul 2020

Formula Student Electric Vehicle Concept Challenge

- Led the Chassis team designing chassis, differential, and mountings using AutoCAD and SolidWorks

- Conducted impact simulations with Ansys Workbench to optimize the design for performance and safety

Achievements

Oct 2021 — Secured 1st position in EV category at FMAE-FKDC National Online Go-Kart Design Competition, Season 2

Apr 2021 — Secured 3rd place among 102 participants at National Level Seminar Presentation at Tech-Tantra 2021

Dec 2019 — Represented IIT Goa in Basketball at the 54th Inter IIT Sports Meet held at IIT Kharagpur

Languages

English — **C1** (TOEFL iBT 106)

Hindi — **C2** (Native)

Punjabi — **C2** (Native)

Skills

Programming Languages — C++, Python, MATLAB, Fortran 98

CFD and Simulation Tools — OpenFOAM, Ansys Static Structural, Ansys Fluent, ParaView

Design and CAD Tools — SolidWorks, AutoCAD, FreeCAD

Positions of Responsibility

Dec 2021 - Apr 2022

Teaching Assistant HS101

- HS101 introduces first-year students to diverse Humanities and Social Sciences fields, covering literature, art, ethics, psychology, and culture. The course fosters leadership, creativity, cultural appreciation, and social responsibility
- Assisted faculty in delivering the curriculum, addressing student queries, and supporting interactive learning for first-year undergraduates

Jun 2020 - Jul 2022

IIT Goa Motorsports Mechanical Team Lead

- Directed the Chassis team, overseeing a team of 3 members to design and simulate chassis for various motorsport competitions
- Contributed significantly to chassis design, analysis, and optimization for performance and safety
- Coordinated and facilitated collaboration among various mechanical teams to ensure seamless integration of components and systems

Apr 2019 - Mar 2020

Mukhota Head (Dramatics Club of IIT Goa)

- Led a team of 20 members to secure 1st place and 2nd place in two Street Play competition
- Organized and managed multiple events, including cultural fests, Independence Day, Republic Day celebrations, and intra-college competitions as Head of the Dramatics Club