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 Limited
Pune, India
Innovation Engineer

Nov 2024 - Present

Vapor Pressure Swing Adsorption and Membrane hybrid solution

- Developed and validated an innovative technology for biogas 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

Jun 2024 - Nov 2024

Green Hydrogen TSA test benchmarking

- Assisted in the designing and manufacturing of a scaled-down pilot plant
- Conducted benchmarking studies on industrial desiccants for green hydrogen dehydration using Temperature Swing Adsorption
- 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 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 by dynamically adjusting combustion parameters based on changes in fuel type and ambient conditions
- Created the codebase in Python and implemented SGD (Stochastic Gradient Descent) with ADAM optimizer to improve model parameters

Aug 2022 - Jul 2023

Industrial Training

- Innovation team: Fostered expertise in mathematical modeling for heat exchangers and furnaces, numerical techniques, and physics-based and data-driven modeling. Explored fuel properties and biomass as alternative fuels for sustainable combustion

- Manufacturing team: Acquired knowledge of heat exchanger manufacturing processes, quality assurance methodologies, and the critical role of industrial health, safety, and environmental practices
- Services team: 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 CH_4-H_2 turbulent combustion**

- 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 requirement compared to the OpenFOAM-FPV model

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
- Secured 1st position in the Electric Vehicle category

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

Languages

English	**C1** (TOEFL iBT 106)
Hindi	**C2** (Native)
Punjabi	**C2** (Native)

Skills

Programming Languages	C++, Python, MATLAB, Fortran 90, Excel VBA
Simulation and Visualisation Tools	OpenFOAM, Ansys Static Structural, Ansys Fluent, ParaView Python Packages: JAX, NumPy, SciPy, SymPy, Pandas, PyTorch, Matplotlib, MayaVi
Design and CAD Tools	SolidWorks, AutoCAD, FreeCAD

Positions of Responsibility

Dec 2021 - Apr 2022 — **Teaching Assistant HS101: Foundation Programme in Humanities and Social Sciences**

Jun 2020 - Jul 2022 — **IIT Goa Motorsports Mechanical Team Lead**