Haotian MA

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Academic Background

- **Massachusetts Institute of Technology, Summer Program** — United States
  Institute for Data,Systems,and Society — July 2023 – Dec 2023
- **University of Warwick, Ph.D. Candidate** — United Kingdom
  School of Engineering, Green Energy and Digital Process Lab — Mar 2023 – Present
- **University of Birmingham, Ph.D. Candidate** — United Kingdom
  School of Engineering, jointly trained by School of Computer Science — Sept 2021 – Mar 2023
- **University of Nottingham, M.Sc** — United Kingdom
  Sustainable Energy Engineering,Vice President of Engineering Student Union — Sept 2020 – Sept 2021
- **Southeast University, B.Eng** — Jiangsu , China
  Energy and Power Engineering, 2019 Outstanding Bachelor Graduates of SEU — Sept 2015 – Jun 2019

Industrial Experience

- **University of Birmingham Electrochemical Engineering Group** — Birmingham , United Kingdom
  Ph.D. Candidate , Full-Time — Sept 2021 - Jan 2023
  - **Project**: Data development and analysis of electrochemistry engineering
  - **Lead Roles**: Manage a team of 14 people to collect the data from the proton exchange membrane water electrolyser and further analysis. Apply the data-driven, data mining model to accelerate the development of electrochemical engineering.
  - **Data Analysis**: Apply PCA Analysis, normalize and standardize the database, and use cluster algorithm to find the underlying potential physical relationship. Draw the heat map about the correlations between each input parameter and output parameter. Apply Enhance learning to the current database and make future analysis.
  - **Machine Learning**: The catalyst solution formula is optimized using a deep learning approach relied on a 0-D, semi-empirical neural network model of proton exchange membrane water electrolysis polarization behaviour and a data analysis framework.High-throughput screening of materials using catalyst eigenvalue sites to predict the best catalysts for hydrogen evolution reaction.The creator of the related GitHub Community.
  - **Output**: A well developed machine learning algorithm and data analysis model to interpret,guide and predict the electrochemical experiment design.
  - **Referee**: Dr.Leandro L. Minku,Associate Professor in University of Birmingham,School of Computer Science
    Dr.Shangfeng Du,Associate Professor in University of Birmingham, School of Chemical Engineering
- **Global Energy Interconnection Research Institute** — Birmingham , United Kingdom
  Research Engineer , Full-Time — Oct 2021 - Mar 2023
  - **Project**: Electrochemical energy storage project of Global Energy Internet Research Institute and University of Birmingham
  - **Project Description**: Conducted a rigorous techno-economic analysis of water electrolysis and fuel cell systems to assess the viability of hydrogen as a sustainable energy carrier.Implemented an advanced ultrasonic spraying methodology, optimized through genetic algorithm techniques and trial and error methods, to supplant traditional hand-spraying procedures for catalyst solution deposition onto electrodes.Attained a breakthrough electrolysis voltage of less than 1.8V at a current density up to 2 A/cm^2 under 3.5 MPa pressure, while maintaining hydrogen permeation below 1%. This achievement exceeded prevailing benchmarks in Faraday efficiency at that time.
  - **Output**: Completed a fully funded industrial project with a budget around £150,000 GBP brought by Birmingham Electrochemical Engineering Group
  - **Referee**: Dr.Geng Qiao,Staff Research Engineer in Global Energy Interconnection Research Institute
- **HUAWEI European Research Institute** — Nuremberg , German
  Research Engineer, Part-time — Aug 2022 - Feb 2023
  - **Project**: European Decarbonization Pathways and Hydrogen Energy Analysis

- **Project Description**: Collaborate with the HUAWEI Nuremberg Research Center and the University of Birmingham to pinpoint leading European specialists in energy system modeling, contributing to a strategic decarbonization pathway report. Conduct a political economy analysis on the prospects of hydrogen energy and author the associated report.
- **Planned Output**: Report: Hydrogen Decarbonisation Pathways for Europe's Energy Sector.
- **Referee**: Mr.Wenbo Sun, Former Director of Huawei Nuremberg Research Center
  Dr.Datao WANG, Staff Engineer of Huawei Central Research Institute Watt Laboratory

Research Experience

Supervised Learning Approaches for Metal Alloy Discovery Nottingham , United Kingdom
Master Project at University of Nottingham Apr 2021 - Sept 2021

- **Project**: Synthesis prediction of alloys with hydrogen storage potential using machine learning approaches.
- **Project Description**: Three different machine learning algorithms including random forest,gradient boosting tree and support vector machine have been used to achieve high-throughput screening of 6,480 possible prediction results which could have the potential to store hydrogen.Using k-fold cross-validation to prove the feasibility and the average precision in the test-set achieves 92.5% while in the precision set it is 71.1%.
- **Output**: Master Degree in Engineering.
- **Referee**: Dr.Sanliang Ling,Assistant Professor in Advanced Materials,University of Nottingham

Thermal Management System in Water Treatment Jiangsu , China
Bachelor Project at Southeast University Sept 2018 - Jun 2019

- **Project**: Finite Element Analysis of Heat-Mass Relationship Changes During Spray Evaporation.
- **Article Originality**: It introduces the spray evaporation technology that is widely used in the field of seawater desalination. The waste heat from the factory is used to heat the spray and evaporate to achieve desulfurization.The overall evaporation rate is about 53% when the temperature of wastewater and flue gas is 293 K and 363 K.Using CFD 15.0 to finite element analysis of the spraying method and ASPEN Plus to system analysis, and through the means of orthogonal test, the correlation between the key parameters is analyzed and fitted to graphs.
- **Output**: Fluent-based spray evaporation model at nozzle.
  System design of the installed flue gas waste water treatment device.
  Outstanding Graduation Thesis of School of Energy and Environment, Southeast University.
- **Referee**: Prof.Mingchun Wang,Full Professor,Vice Dean in School of Energy and Environment,Southeast University

Intern Experience

- **Warwick Manufacturing Group , University of Warwick** Coventry , United Kingdom
  Research Assistant Apr 2023 - July 2023
  - **Project**: Research Assistant for Heart Rate Variability App Development Using Kivy
  - **Data Analysis**: To provide a functional Python-based implementation of an electrocardiogram (ECG) analysis tool inspired by existing models, load and visualize ECG signals in static (stored in online databases) form,To carry out basic long-term and short-term time domain heart rate variability (HRV) analysis from ECG signals and display an output to user,and to adapt the mobile app for clinical use and telemonitoring applications in the long-term.
  - **Output**: A developed kivy-based APP for ECG signal analyze.

Extracurricular Achievements

- **Student Union**: Vice President of Student Union, School of Energy and Environment , Southeast University; Vice President of Postgraduate Engineering Union, University of Nottingham.
- **European JESS Summer School**: Participate in Joint European Summer School on Fuel Cell, Electrolyser and Battery Technology and get the related certification.
- **CSCST-SCI Conference**: Organize, participate and present in the 29th CSCST-SCI conference, the original work named "Data-driven Model of Membrane Electrode Assembly Optimization for Proton Exchange Membrane Water Electrolyser by Machine Learning" has been presented as a poster.
- **National Competition**: Second Price in 2018 "Challenge Cup" Entrepreneurship Competition as team leader; Third Price in 11th Energy Conservation and Emission Reduction Competition as team leader.
- **International Competition**: Second Price in 2018 Schneider "Go-Green" Competition as team leader.
- **Other Awards**: More than 20 Provincial and University-level competition awards;
  2019 Outstanding Bachelor Graduate in Southeast University.