Prateek Malhotra

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Experience

- **Solar Analyst** — Futr Energy
  June 2022 - Present
  - **Solar plant fault detection and root cause analysis**: Plant generation is examined on MPPT/SMB/String level to find anomaly type, downtime, and revenue loss due to individual anomaly.
  - **Digital twin**: Created predictive models for individual solar plant strings and a digital twin using geospatial data for visualization and analytics.
  - **Solar plant monitoring** : Implemented KPI parameters calculation for monitoring and maintenance, including interactive graphical dashboards.
  - **Fault detection with infrared imaging**: YOLOV7 model is created to detect various solar panel faults using infrared images (thermal images) of solar plant captured using drone.

- **Senior Research Fellow (SRF), Pursuing PhD** — The LNMIIT, Jaipur
  (PI : Prof. G.D. Sharma) — *Feb 2018 - June 2022*
  - **Prediction of photovoltaic properties**: Machine Learning, Deep Learning, models to predict photovoltaic parameters in Organic Solar Cells and drawing meaningful insights.
  - **Organic materials discovery / D:A combinations discovery**: Iterative approaches are used for organic materials / D:A combinations discovery using Bayesian Optimization and Random Forest based techniques.
  - **Organic Solar Cell Fabrication and characterization**: Fabrication with spin coating and thermal evaporation. Characterization using Keithley-2450 SourceMeter, UV-Vis Spectrophotometer, Spectrofluorometer, Cyclic Voltammetry(CV), External Quantum Efficiency(for calculation of Integrated Jsc and Voltage Loss Analysis).

Education

- **The LNM Institute of Information Technology** — Jaipur, India
  Pursuing PhD in Physics; CGPA: 7.75 — *July 2018 - Present*
- **Rajasthan Technical University** — Jaipur, India
  M.Tech in Power Systems — *Aug 2015 - March 2018*
- **Rajasthan Technical University** — Jaipur, India
  B.Tech in Electrical Engineering — *Aug 2011 - May 2015*

Skills Summary

- **Languages:** Python **PV Softwares:** PVsyst, HelioScope, Homer Pro
- Machine Learning, Data Science, Web Application, GitHub, MLOps

Web Applications

- **Calculating Jsc from EQE** Link
- **Calculating solar cell parameters from IV curve** Link
- **Solar DC Pump Design** Link

Publications

- **Directed Message Passing Neural Network for Predicting Power Conversion Efficiency in Organic Solar Cells**, Prateek Malhotra et al., ACS Applied Materials Interfaces (2023). Link
- **Active discovery of donor:acceptor combinations for efficient organic solar cells**, Prateek Malhotra et al., Applied Materials Interfaces.Link
- **Opportunities and challenges for machine learning to select combination of donor and acceptor materials for efficient organic solar cells**,Prateek Malhotra et al., Journal of Materials Chemistry C. Link
- **Calculating short circuit current density (Jsc) from external quantum efficiency (EQE),"**,Prateek Malhotra et al. Link
- **Prediction of non-radiative voltage losses in organic solar cells using machine learning.**,Prateek Malhotra et al. Solar Energy. Link
- **24 Tech Blogs on Solar Energy. Link**

Conference Proceedings

- **"Predicting photovoltaic properties of organic solar cells from encoded 2D images of donor molecules using Convolutional Neural Network"**in ACMS 2022 organized by IICE Kolkata, 14-16 April 2022.
- **"Prediction of power conversion efficiency (PCE) in organic soalr cells using machine learning"** in IWPSD 2021 Conference ", IIT, Delhi, 14-17 December.

Workshops and Meetings Attended

- Attended 5-day workshop on "Big Data Analytics and Data Science" organized by National Institute of Solar Energy.(14th to 8th December 2020).
- Attended 3-day workshop on "Theory and Technology of Silicon Solar Cell" organized by IIT, Bombay.(26th to 28th September 2019).