Prateek Malhotra

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Experience

- **Solar Analyst** — Futr Energy
  June 2022 - Present
  - **Solar plant MPPT/SMB/String level fault detection and revenue loss calculation pipeline**: Plant generation is examined on MPPT/SMB/String level to find anomaly type, downtime, and revenue loss due to individual anomaly.
  - **Solar plant monitoring parameters calculation for dashboard and data analytics**: All photovoltaic parameters required for solar plant monitoring, maintenance, and troubleshooting. Creating new interactive yearly/monthly/weekly graphs for individual inverters and complete plant generation.
  - **Automating solar plant with digital twin**: ANN model is crated for individual plant to predict generation of any string of the plant in any weather condition. Moreover, a twin is created using .tif and .shp files. With following data osgeo python library is used for visualization and geoanalytics
  - **Fault detection using thermal images (infrared images)**: 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 in Organic Solar Cells**: Machine Learning, Deep Learning, and Active Learning models to predict photovoltaic parameters in Organic Solar Cells and drawing meaningful insights.
  - **Organic Solar Cell Fabrication and characterization** : Organic solar cell fabrication. 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
- **Softwares**: PVsyst, HelioScope, Homer Pro
- **Machine Learning, Data Science, Web Application, GitHub, MLOps**

Web Applications

- **"Calculating Jsc from EQE"** This application calculates Jsc(Short Circuit Current Density) from EQE(External Quantum Efficiency) curve. https://jscfromeqe.streamlit.app/
- **"Calculating solar cell parameters from IV curve"** This application calculates all solar cell parameters: Jsc, Voc, FF, Pm, Rs, Rsh, and PCE.https://solariv.streamlit.app/
- **"Solar DC Pump Design"** This application designs Solar DC Pump system using water drawn/day, elevation and peak sunshine hours as input. https://solar-dc-pump.streamlit.app/

Publications

- **Directed Message Passing Neural Network for Predicting Power Conversion Efficiency in Organic Solar Cells**, Prateek Malhotra et al., ACS Applied Materials Interfaces (2023),(https://doi.org/10.1021/acsami.3c08068)
- **Active discovery of donor:acceptor combinations for efficient organic solar cells**, Prateek Malhotra et al., Applied Materials Interfaces (https://doi.org/10.1021/acsami.2c18540).
- **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 (https://doi.org/10.1039/D2TC03276G)
- **Calculating short circuit current density (Jsc) from external quantum efficiency (EQE),"**,Prateek Malhotra et al., https://nanohub.org/resources/jscfromeqe. (DOI: 10.21981/XY24-RV08).)
- **Prediction of non-radiative voltage losses in organic solar cells using machine learning.**,Prateek Malhotra et al. Solar Energy (https://doi.org/10.1016/j.solener.2021.09.056)
- **24 Tech Blogs on Solar Energy https://sunincity.blogspot.com/**

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).