DEEPAYAN BASU

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EXPERIENCE

DRDO - Defence Laboratory, Ministry of Defence
Summer Research and Development Intern

📅 May 2024 – July 2024   📍 Jodhpur

- Developed **radar absorbing material for camouflage for the fighter aircrafts** from classified Glass-Carbon Hybrid veil and Epoxy, using Hand-Layup technique and cured in Vacuum Bagging Process.
- Thoroughly tested for Radiation Loss in Anechoic Chamber, within 8-18GHz frequency range and performed processing tests under Rain Test Chamber, Thermal Shock Chamber, CHNSO Elemental Chamber and many more for its stablity.
- **Extended Research:** Engineered a Deep Learning model for SAR Target Classification using the MSTAR dataset, achieving **over 94% accuracy** in classifying SAR images of ground vehicles. (project link)

PROJECTS

Predictive Modeling of Material BGs using DFT and ML
B-Tech Project

📅 October 2024 – December 2024   📍 IITJ

- Developed a predictive model to estimate material band gaps using machine learning, trained on properties extracted from the Materials Project database (MPI-ID).
  - **Tools & Techniques:**
    - **DFT Calculations:** Leveraged **VASP**, **VESTA**, and **LAMMPS** on Linux for simulation and material property extraction.
    - **Python & Pydefects:** Utilized Python for data manipulation, model development, and defect structure analysis.
    - **Materials Project API:** Extracted data points for training the predictive model from the database. project link

Synthesis of 2D Materials

- Graphene synthesis from graphite powder , drop-casting of HOPG over Si wafer, with cleaning techniques: RCA1, RCA2, Piranha.
- Exfoliation methods like Scotch tape and ultrasonic exfoliation for graphene sheet microstructure. (project link)

STRESS-HOTSPOTS ML PREDICTION IN FCC MATERIALS

- Developed a Random Forest model with 74.03% AUC to predict stress hotspots in FCC materials.
- Engineered and selected key crystallographic and geometric features (e.g., Schmid factor, grain size). project link

LANKFORD COEFFICIENT PREDICTION

- Designed and implemented a **CNN-based model** achieving more than 95 percent correlation between predicted and actual **Lankford coefficients (r-values)**.
- Processed and analyzed **10,000+** ODF images, leveraging deep learning to extract crystallographic texture features. project link

EDUCATION

B.Tech in Materials Science and Metallurgy
IIT Jdohpur

📅 Dec 2021 – Present   CGPA: 7.46

Class XII
South Point High School

📅 May 2021   94%

Class X
South Point High School

📅 May 2019   96%

SKILLS

DSA Python SQL TEM
Machine Learning SEM Git
Tensorflow Keras XRD
Vasp Lammps Matplotlib
Auto CAD Software- ONSHAPE

COURSEWORK

- Phase Transformations
- Material Characterization
- Materials Processing and Manufacturing
- Computational Modeling of Materials
- Physical Metallurgy
- Smart Materials
- Machine Learning for Material Design

POSITION OF RESPONSIBILITY

- **MENTOR AND CORE TEAM MEMBER OF SANGAM MUSIC SOCIETY, IITJ:** Handled multiple instruments and demonstrated proficiency in handling the society's diverse performances along with managing band members, sound engineers and venue staff.
- **ASSISTANT HEAD AND COORDINATOR (UDBHAAS-2022 EXHIBITION IITJ):** Successfully organized and managed event logistics, showcasing the talent of local artists, with events inaugurated by Hon'ble Union Minister Shri Gajendra Singh Shekhawat.