Ankit Kumar

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INTRODUCTION

Results-oriented M.Tech student in Land and Water Resources Engineering at IIT Kharagpur with proven skills in AI/ML for geospatial data, IoT-based automation, GIS, CAD, and renewable energy systems. Hands-on experience in nanofluids, phase change materials, solar drying systems, and automated irrigation through academic research and internships at SPRERI and Swaraj Tractors. Strong analytical and problem-solving abilities, recognized with top GATE ranks (AIR 111 & 69) and national scholarships. Adept at bridging agriculture, data science, and clean energy to deliver innovative, cost-effective, and scalable solutions for industry and rural development. Proficient in Python, QGIS, ArcGIS, ANSYS, and Fusion 360.

EXPERIENCE

Intern Aug 2024-Nov 2024
SPRERI *Anand, Gujarat*

- Worked on developing and analyzing nanofluids and nano-phase change materials (nano-PCMs) for enhanced thermal energy storage applications.
- Conducted experiments to evaluate the thermal conductivity, heat transfer efficiency, and stability of nanofluids for solar energy systems.
- Investigated the performance of nanofluids and nano-enhanced PCMs in improving the energy storage capabilities of solar thermal systems.
- Contributed to optimising nanofluid and material properties to enhance the performance of renewable energy technologies.
- Explored the impact of different nanoparticle concentrations on the thermal performance of solar thermal energy systems.
- Collaborated with a multidisciplinary team to analyze test results and recommend improvements for nanofluid-based energy storage solutions.

Intern June 2024
Swaraj Tractor *Jharkhand*

- Completed a one-month internship in Sales and Service of agricultural machinery in Jharkhand.
- Gained practical experience in tractor maintenance, sales promotion, dealer management, and financial analysis.

Trainee June 2023
NERFMTTI *Sonitpur, Assam*

- Trained in the operation and maintenance of **essential farm machinery**.
- Hands-on experience with Tractors, **ploughs, seeders, and harvesters**.
- Learned **maintenance and repair** techniques for efficient machinery performance.
- Familiar with **safety protocols** for safe machinery operation.

TOOLS & SKILLS

- **Software Skills:** Python, QGis, Ms Excel, ArcGIS, ANSYS, Fusion 360
- **Soft Skills:** Speaking, Leadership Quality, Management
- **Interest:** IoTs, Remote Sensing, CAD-CAM, GIS, Solar Thermal Storage, Agrivoltaics, Vertical Farming

EDUCATION

M.Tech Land and Water Resource Engineering June 2025 - June 2027
Indian Institute of Technology, Kharagpur *Kharagpur, West Bengal*

B.Tech Agricultural Engineering June 2021 - June 2025
College of Agricultural Engineering and Technology, Anand Agricultural University *Godhra, Gujarat*
CGPA: 8.057

CERTIFICATES

Introduction to Python — July 2025
DataCamp

Intermediate Python — Aug 2025
DataCamp

Remote Sensing and Digital Image Analysis — Oct 2024
IIRS, ISRO

AI/ML for Geodata Analysis — Aug 2024
IIRS, ISRO

Tools for Data Science — Dec 2023
IBM

Data Science Methodology — March,2023
IBM

What is Data Science — Nov 2022
IBM

ACHIEVEMENT

- Got **AIR-111 and AIR-69** in **GATE 2024 & 2025 (AG) respectfully.**
- Got **ICAR-National Talent Scholarship**
- Qualified **PRMO** 2020
- Qualified **NTSE** stage 1 (2019)
- Got several medals in **School Olympiads** and **exhibitions.**

VOLUNTEERING

NSS Volunteer — June 2021 - June 2023
College of Agricultural Engineering and Technology, Anand Agricultural University — *Godhra, Gujarat*

MINOR PROJECTS

- **Design and Development of an Auto-Irrigation system**
  - Designed and developed an automated irrigation system to optimize water usage in agriculture.
  - Integrated soil moisture sensors and microcontrollers for real-time monitoring and control.
  - Automated irrigation scheduling based on soil moisture levels, reducing water wastage.
  - Conducted field tests to evaluate system performance and improve irrigation efficiency.
- **Design and Development of Mobile mobile-controlled rover for automatic spraying**
  - Designed and developed a mobile-controlled rover for automated spraying in agriculture.
  - Integrated wireless communication and sensor systems for real-time control and efficient spraying.
  - Optimised pesticide and fertiliser application to reduce manual labour and resource wastage.
  - Conducted field tests and performance analysis to ensure reliable and accurate operation.
- **Preparation and Testing of Nanofluid for Solar Thermal Application.**
  - Prepared and tested nanofluids for enhanced solar thermal energy applications at SPRERI, Anand, Gujarat.
  - Synthesised nanofluids with varying nanoparticle concentrations to analyse thermal performance.
  - Evaluated thermal conductivity, heat transfer efficiency, and stability for solar thermal systems.
  - Conducted experiments to assess the impact of nanofluids on energy storage and system efficiency.
- **Preparation and Testing of Nano-enhanced PCM for high-temperature cooking**
  - Prepared and tested nano phase change materials (PCMs) for cooking applications.
  - Incorporated nanoparticles into PCMs to improve thermal conductivity and heat retention.
  - Conducted performance analysis to evaluate heat storage efficiency and temperature sustainability.

- Optimized material composition to enhance energy storage capacity for solar thermal cooking systems.

MAJOR PROJECTS

- **Study of different types of heat-absorbing media for Solar drying applications.**
  - Developed and evaluated an **indirect passive solar dryer** integrated with **three TES media**: grit, pebbles, and black-painted metal bottle caps.
  - Achieved **peak thermal efficiency** of **161.24%** and **average efficiency** of **59.7%** using **grit-based TES**, compared to 92.46% (no TES).
  - Maintained **outlet air temperatures 25–30°C above ambient**, extending drying beyond **sunset by 1.5–2 hours**.
  - Dried **100 g beetroot slices (4 mm)** to <10% moisture within 7.5–8 hrs, a **35–40% faster rate** than cabinet and open sun drying.
  - Improved **nutrient retention** over other methods:
    - **Protein**: up to **2.75%**
    - **Ascorbic Acid**: up to **13.2 mg/100g**
    - **Total Phenolic Content**: **25.8 mg GAE/100g**
    - **Betalain pigments**: highest retention in grit dryer
  - Recorded and analyzed **hourly thermal data** (To, Ti, irradiance, TES surface temp, airflow) across 4 configurations using digital sensors.
  - Computed **mass flow rate, useful heat gain, and collector efficiency** with real-time environmental inputs under natural convection.
  - Recommended **grit-based TES** as a **cost-effective, scalable solution** for solar drying in rural, off-grid agri-processing.

CONFERENCES

- Presented a paper titled **"Design and Development of Automated Fertigation System Using IoTs for Vegetable Crops"** at the **35th National Convention for Agricultural Engineers and National Seminar on Emerging Technologies for Advances in Agriculture & Horticulture** organized by **The Institution of Engineers (India), Jabalpur Local Chapter**.Authors: Ankit Kumar, Dr. Jogunuri Sravankumar.
- Presented a paper titled **"Exploring Advances in Thermal Energy Storage: Innovations, Technologies, Applications, and Sustainable Solutions"** at the **58th ISAE Annual Convention on "Engineering Innovations for Next-gen Digital Agriculture"** and **International Symposium on "Agricultural Engineering Education for Aspiring Youth in Transforming Agriculture"**. **Authors**: Ankit Kumar, Dr. D.K. Vyas, Dr. Jogunuri Sravankumar.