

# SURIYAPRASAAD B

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## Summary

Data Science practitioner passionate about applying research-driven ML solutions to uncover hidden patterns across diverse data sources. Proficient in Python with expertise in machine learning, deep learning, and AI. Eager to contribute to interdisciplinary research at the forefront of ML and Heat transfer.

## Education

**Bachelor of Science (B.Sc.)** in Data Science and Applications

Expected Graduation: **May 2024**

*Indian Institute of Technology, Madras*

CGPA: 8.18/10

**Bachelor of Technology (B.Tech.)** in Mechanical Engineering

Expected Graduation: **June 2024**

*Sant Longowal Institute of Engineering & Technology, Longowal*

CGPA: 8.2/10

## Experience

### Research Intern

**December 2023 – Jun4 2024**

*AI4BHARAT, Indian Institute of Technology, Madras*

- Contributed to data acquisition by scraping Indian centric PDF data from the internet for Sangraha and participated in the analysis and transliteration of the SFT data for the same.
- Recognized for contributions in the research paper (*IndicLLMSuite*), currently under submission to the ACL 2024 conference.
- Currently engaged in a project focusing on the evaluation of Indic Language Models (LLMs), exploring their effectiveness in various contexts.

### Research Intern

**May 2023 - August 2023**

*Thermal and Fluid Transport Laboratory, Indian Institute of Technology, Patna*

- Conducted research on boiling heat transfer and developed a novel unsupervised machine learning method using principal component analysis (PCA) to understand boiling from bubble images and acoustics.
- Developed a method using PCA to analyze bubble dynamics and classify boiling behavior, revealing connections between acoustics and images for deeper understanding.
- Contributed to a data-driven approach for boiling research, paving the way for control systems to improve boiler safety and efficiency.

### Mentor

**August 2022 - February 2023**

*B.Sc. Degree, Indian Institute of Technology, Madras*

- Mentored student cohorts in programming courses (Python, Database Management Systems).
- Received Certificates of Appreciation for guiding and supporting students.

## Publications

- Suriyaprasaad B, Avinash Upadhyay, Rishi Raj. “*Boiling Regime Classification via Principal Component Analysis on Bubble Images and Acoustics*”. Accepted for presentation at the 27th National and 5th International ISHMT-ASTFE Heat and Mass Transfer Conference 2023.
- Mohammed Safi Ur Rahman Khan, Priyam Mehta, Ananth Sankar, Umashankar Kumaravelan, Sumanth Doddapaneni, Suriyaprasaad B, Varun Balan G, Sparsh Jain, Anoop Kunchukuttan, Pratyush Kumar, Raj Dabre, Mitesh M Khapra paper. “*IndicLLMSuite: A Blueprint for Creating Pre-training and Fine-Tuning Datasets for Indian Languages*”. Paper under submission for ACL 2024

## Projects

### PlantDoc

- Built an accurate plant disease detection web app using PyTorch, ResNet9 and Python-Flask.
- Achieved 98.99% accuracy in classifying plant diseases from leaf images.
- Offered seamless user experience and accurate disease prediction for effortless leaf image uploads and corresponding solutions.

### Kanban

- Developed a web app using Python-Flask, Vue.js & SQLAlchemy framework which helps user organize tasks.
- Implemented security protocols like token-based authentication and features such as monthly reports & reminders.

### Blog lite

- Created a user-friendly web application using HTML, CSS, Python-Flask & SQLAlchemy where people can share their blogs.
- Users can upload, edit and delete their blogs with pictures and others can like and leave comments on them.

## Skills & Relevant Coursework

- Languages / Tools:** Python, Java, JavaScript, SQL, Git, Linux
- Frameworks:** Python-Flask, Vue.js, PyTorch
- ML Libraries:** NumPy, Pandas, Matplotlib, Scikit Learn
- Database:** MySQL, PostgreSQL
- Data Cleaning, Data Visualization & Web Scraping
- Machine Learning
- Deep Learning
- Artificial Intelligence
- Reinforcement Learning
- Big Data

Mohammed Safi Ur Rahman Khan, Priyam Mehta, Ananth Sankar, Umashankar Kumaravelan, Sumanth Doddapaneni, Suriyaprasaad B, Varun Balan G, Sparsh Jain, Anoop Kunchukuttan, Pratyush Kumar, Raj Dabre, Mitesh M Khapra paper. "IndicLLMSuite: A Blueprint for Creating Pre-training and Fine-Tuning Datasets for Indian Languages" . Paper under submission for ACL 2024

### **Statement of Purpose**

Gear shifts and algorithms collide in my world, where the analytical rigor of mechanical engineering meets the transformative power of data science. This unique fusion, fuels my passion for research, leading me to explore the intersection of these powerful fields.

My academic journey began with a foundation in mechanical engineering at Sant Longowal Institute of Engineering and Technology. This foundation equipped me with technical expertise and analytical thinking skills, which I further honed during my undergraduate studies in Data Science and Applications at IIT Madras. During this time, I delved into the intricate world of machine learning algorithms, igniting a deep passion for the field.

A pivotal point in my career was my research internship at TFTL, IIT Patna. This experience provided me with hands-on training in applying machine learning techniques to multimodal data analysis. The project involved classifying boiling regimes of a pool boiling experiment using a combination of bubble image analysis and acoustic emissions. This challenging endeavor forced me to bridge the gap between engineering principles and data-driven insights. This research resulted in a paper titled "Boiling Regime Classification via Principal Component Analysis on Bubble Images and Acoustics," and poster at the 27th National and 5th International ISHMT-ASTFE Heat and Mass Transfer Conference, showcasing my commitment to advancing knowledge through an interdisciplinary approach.

I am currently serving as a Research Intern at AI4Bharat, IIT Madras, where I contribute to building an Indic language dataset corpus. My work on this project is acknowledged in a research paper currently under submission to the prestigious ACL 2024 conference. I am currently engaged in exploration of Indic LLM evaluation further strengthens my research approach.

My research interests primarily lie in the interdisciplinary areas of machine learning, deep learning, fluid dynamics, and heat and mass transfer.

Like a conductor wielding a mathematical symphony, I see algorithms as transformative tools for forging solutions to global challenges. This is my lens, shaped by a unique blend of data science and mechanical engineering. I'm eager to contribute to research endeavors and look forward to discussing my application further.

Thank you for considering my application.

## **Statement of Purpose**

Imagine a researcher who sees algorithms as both mathematical symphonies and transformative tools for breakthrough solutions to global challenges. This is my lens, shaped by a unique blend of data science and mechanical engineering. I'm Eager to contribute to Google's research endeavors and look forward to discussing my application further.

Uncovering intricate algorithms and harnessing them as powerful tools for progress."

"I see the world through a unique lens, where complex data patterns become symphonies and algorithms become tools for breakthrough solutions to global challenges."

My journey into the realm of data science has been an enthralling one, where my fascination with the transformative power of machine learning algorithms intertwines seamlessly with my background in mechanical engineering. This unique blend of expertise has not only shaped my academic pursuits but also instilled in me a profound appreciation for the interdisciplinary nature of data science, where the convergence of diverse fields leads to groundbreaking discoveries and impactful solutions.

This unique blend of expertise fuels my passion for interdisciplinary research, where diverse fields converge to generate groundbreaking discoveries and impactful solutions.

Imagine a researcher who sees algorithms as both mathematical symphonies and transformative tools—this is the perspective I bring.

With a strong foundation in mechanical engineering from Sant Longowal Institute of Engineering & Technology, I embarked on my undergraduate studies in Data Science and Applications at the IIT Madras. It was during this time that my passion for data science ignited, as I delved into the intricacies of machine learning algorithms and their potential to revolutionize various industries.

My research internship at TFTL, IIT Patna, served as a pivotal point in my career, providing me with hands-on experience in applying machine learning techniques to multimodal data analysis. The project, focused on classifying boiling regimes of the pool boiling

experiment using a combination of bubble image analysis and acoustic emissions, challenged me to bridge the gap between engineering principles and data-driven insights.

Our novel approach leverages Principal Component Analysis (PCA) to revolutionize the understanding and monitoring of boiling phenomena. Unlike conventional methods relying on visual or acoustic analysis alone, our PCA-based method integrates both modalities, offering a synchronized view of bubble dynamics and acoustic emissions. Key advantages include unsupervised feature extraction, enhanced dimensionality reduction, and superior classification accuracy for diverse boiling conditions. Notably, the simplicity of PCA contrasts with complex deep learning approaches, making it computationally efficient and highly interpretable.

This method not only advances boiling research but also holds the potential to revolutionize boiler safety and efficiency. Real-time monitoring and control enabled by this method could prevent accidents caused by boiling instabilities and optimize boiler operation for maximum efficiency without compromising safety. For instance, it could detect and prevent critical heat flux (CHF), a condition that can lead to catastrophic boiler failures. Additionally, it could optimize boiler parameters, such as heat flux and flow rate, for maximum energy transfer and minimal fuel consumption.

My research, titled "Boiling Regime Classification via Principal Component Analysis on Bubble Images and Acoustics". Accepted for presentation at the 27th National and 5th International ISHMT-ASTFE Heat and Mass Transfer Conference, exemplifies my commitment to advancing knowledge through an interdisciplinary approach.

My research interests lie in the areas of machine learning, deep learning and multimodal learning. I'm particularly intrigued by the potential of these techniques to uncover hidden insights from diverse data sources, such as images, audio, and text. I envision these methods as catalysts for advancing our understanding of the world and developing innovative solutions to global challenges.

Harnessing deep learning, I developed PlantDoc, a web application that accurately detects plant diseases from leaf images, achieving 98.99% classification accuracy. Empowering farmers and enthusiasts, PlantDoc enables easy image uploads and provides prompt disease predictions with tailored solutions.

Beyond my academic and research endeavors, I actively engage with the data science community. My participation in hackathons like Data Hacks 2.0, where I developed a web application that connects waste generators with potential buyers, reflects my commitment to sustainability and resource optimization. Additionally, my experience as a mentor for a cohort of students in the programming in Python course at IIT Madras highlights my passion for sharing knowledge and empowering others to explore the world of data science.

I am particularly inspired by Google's work on projects like TensorFlow and Google AI, which have democratized machine learning and empowered researchers worldwide. I believe that my skills and interests align perfectly with Google's vision of advancing the state-of-the-art in machine learning and making a positive impact on society.

In conclusion, my distinctive background positions me as a candidate capable of bringing a fresh perspective to research challenges, combining the analytical rigor of data science with the practical insights of mechanical engineering. I am eager to contribute to Google's research endeavors and look forward to the opportunity to discuss my application further.

I am eager to discuss my qualifications and research interests in more detail. Thank you for considering my application.

Sincerely,  
Suriyaprasaad B