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| ARAVINDAN KAMATCHI SUNADARAM|MM21B010|IIT MADRAS | IIT Madras - Wikipedia [A picture containing screenshot, logo, graphics, symbol  Description automatically generated](https://www.linkedin.com/in/aravindan-kamatchi-sundaram/) |

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| **EDUCATION AND SCHOLASTIC ACHIEVEMENTS** | | | | | | | | |
| **Program** | | | | **Institution** | | **CGPA/ Score** | | **Year of completion** |
| B. Tech Metallurgical and Materials Engineering and Interdisciplinary M. Tech Data Science | | | | Indian Institute of Technology Madras | | 9.38 | | 2025 |
| XII (CBSE) | | | | The Indian High School, Dubai | | [98.6%](https://drive.google.com/file/d/1yQyak6s5SaLfUTky_ptJS1H0V7Dx4ctb/view?usp=drive_link) | | 2021 |
| X (CBSE) | | | | The Indian High School, Dubai | | [97.67%](https://drive.google.com/file/d/1UwbZwrYISHZtQbMLgB3tofDS8m8-ENLW/view?usp=drive_link) | | 2019 |
| **Scholastic Achievements** | | * Awarded the **Satish Pai Prize** in March 2024 for achieving the **highest CGPA** in the MME department. * Secured **All India Rank** [**1912**](https://drive.google.com/file/d/1IXDlDGx2XnCiktq0-x7wBSaJHrGJRDZ0/view?usp=drive_link) (99.84 percentile) in JEE Main 2021 and  **All India Rank 5053** in the JEE Advanced 2021. * Honoured with the **Golden Visa** in the United Arab Emirates for academic excellence. * **Gold Medallist** in the **International Chemistry Olympiad** **Qualifier** held in the UAE in 2021. | | | | | | |
| **RELEVANT COURSEWORK AND SKILLS** | | | | | | | | |
| Linear Algebra  Differential Equations  Probability, and statistics | | | Foundations of Machine Learning  Machine Learning Operations(MLOps)  Mathematical Foundations of Data Science | | Deep Learning  [Competitive Programming](https://drive.google.com/file/d/1O2ZOaORAkrSsPgkKuIGBhXSmfitA02jJ/view?usp=drive_link)\*  Modern Computer Vision | | Deep Learning for Imaging  [Design and Analysis of algorithms](https://drive.google.com/file/d/1nAuj2gGejc4YA8lmNV9qhmBuTRo9zX-q/view?usp=drive_link)\*\*  Data Analytics Lab | |
| **Skills** | Python: Pytorch, Numpy, Pandas, Langchain, Scikit-learn, Transformers, OpenCV, Matplotlib, Huggingface, cudatoolkit, wandb; MATLAB; C++; Llama factory;  System commands, MLflow, Docker, FastAPI, Apache Airflow, Apache Spark, DVC, Git, Prometheus, Grafana, LaTeX; Video production & editing; PostgreSQL; | | | | | | | |
| **PROFESSIONAL EXPERIENCE** | | | | | | | | |
| Research Intern  *Adobe*  ***May ‘25- Aug ‘25*** | | ***Smart Design: Fix Layout Issues as You Create*** | | | | | | |
| * Developed a **smart layout correction system** trained on design principles that auto-propagates layout corrections across related design elements, reducing redundant user actions during the design process in Adobe Express. Demonstrated a prototype of the system. * Set up a **perturbation-based scalable data curation** pipeline that relies on a novel mechanism that **identifies related design elements**. * Used the pipeline to create **a dataset for multi-modal fine-tuning**, having 650,000+ datapoints that models intermediate design states. * Pre-trained and fine-tuned **Qwen2.5-7B MLLM** using **PEFT-LoRA** for **near real-time, intent-driven suggestions**, improving productivity. * Achieved **significant improvements** in **FID(50%),** and **VLM as a judge scores(33%)** for the outputs, reflecting the workflow’s effectiveness. * **First author** in a filed patent for the workflow; currently authoring a peer-reviewed paper on its technical and user-experience impact. | | | | | | |
| Undergraduate researcher,  *MI Lab, IITM*  ***Aug ’24- May ‘25*** | | ***Development and analysis of largest, accurate and comprehensive high entropy alloy database using LLMs*** | | | | | | |
| * Selected as one of 30 Young Research Fellows (out of 500+ applicants) to work under the guidance of Dr. Rohit Batra in **the Materials Informatics Lab** to develop an **LLM-based pipeline** to extract alloy records from textual and tabular data present in research articles. * Proposed a modified F1-Score for **evaluating LLMs on data extraction** and **developed a pipeline** that achieved **~0.90 F1-Score** for text and **~0.95 F1-Score** for tables, enabling creation of the largest public HEA dataset with **180k+ records** from **10k+ research articles**. * Leveraged **in-context learning** with a **RAG pipeline** backed by a custom vector database having 1000+ material property descriptors. * Uncovered **new chemical trends** linking properties by creating informative Ashby plots; framework adaptable to other materials domains. * **First author** of an upcoming publication; Delivered an oral presentation at **AI4X 2025, NUS** conference held in Singapore. | | | | | | |
| YRF,  ***Aug ’23- Aug ‘24*** | |
| Research Intern  *Adobe*  ***May ‘24- Aug ‘24*** | | ***CoCoNO: Attention Contrast-and-Complete for Initial Noise Optimization in Text-to-Image Synthesis*** | | | | | | |
| * Developed **CoCoNO**, a training-free noise optimization framework that enhances accurate representation of noun tokens by addressing issues of **subject mixing and neglect** in **image synthesis using diffusion(DDPM) models** via **novel attention contrast and completion losses.** * Conducted a detailed study to demonstrate that the **attention maps from the initial denoising steps** can detect these issues and proposed **attention zones** that can help quantify misrepresentation and formulated losses that alleviate these issues by optimizing initial latents. * Achieved **state-of-the-art** performance on Stable Diffusion v2.1 benchmarks: **76%** on VQAScore and **80%** on CLIP-TT across various benchmarking datasets, GenAI bench, T2I-Compbench. Used **Grounded-SAM** to prove further that CoCoNO improves noun representation. * **First author** of a publication accepted at **ACM Multimedia 2025 (A\* conference)** and **US patent** granted for the method formulated. | | | | | | |
| **PROJECTS** | | | | | | | | |
| **MLOps** | | * Built a **dockerized AI application** for cricket fantasy score prediction with data in **PostgreSQL**, **Apache airflow** for managing the CI/CD, **DVC** for pipeline and model versioning, **MLflow** for experiment tracking, **Prometheus** for monitoring and **Grafana** for visualization. | | | | | | |
| * Developed an automated image-caption pipeline by scraping Google News using Python (**BeautifulSoup, Selenium**) and **PostgreSQL** with de-duplication, scheduling with **Apache Airflow** **DAGs** for orchestration, lazy-loading, and email alerts via **SMTP** and a **UI** for visualization. | | | | | | |
| **Computer Vision** | | * Secured **3rd place** among 47 in a SPAD Depth Estimation Kaggle competition, exploring model architectures and denoising strategies. | | | | | | |
| * **Fine-tuned** pre-trained VGG16 with multiscale side-outputs on the BSDS500 dataset, achieving state-of-the-art **edge detection.** | | | | | | |
| **Deep Learning** | | * Implemented **RNN, LSTM, and GRU-based seq2seq models** with and without **attention** for transliteration on the **Dakshina dataset**, performing hyperparameter sweeps with **Weights & Biases**, and visualizing **attention heatmaps** to analyze model behavior. | | | | | | |
| * Implemented a feedforward neural network, backpropagation, and optimizers from scratch in NumPy for classification on Fashion-MNIST. | | | | | | |
| * Fine-tuned pre-trained GoogLeNet with layer freezing and dropout, showing gains over scratch-trained models via filter visualizations. | | | | | | |
| **ML Foundations** | | * Implemented Lomb–Scargle periodogram for time series analysis and compared its predictions with ARIMA on Tesla stock price data. | | | | | | |
| * Trained a scratch-built Naïve Bayes spam classifier, mitigating class imbalance via upsampling, feature augmentation etc. scoring F1 ~0.85. | | | | | | |
| **Materials modeling** | | * Created SageMath interactives to understand the heat transfer equation as a teaching assistant for transport phenomena in materials. | | | | | | |
| **EXTRA-CURRICULAR ACTIVITIES** | | | | | | | | |
| *IITM Cricket*  ***May’ 22-Present*** | | * Represented IITM in cricket tournaments, notably winning runners up in the Sanmar inter college tournament in 2024 and was awarded the best bowler award. Was a part of the 16-member Inter-IIT cricket team in 2024. * Secured 3rd place among 16 hostels in the inter hostel tournament in 2025 and was the man of the tournament for all-round performance. * Was a member of the state under-19 cricket team in 2022 in Dubai, won a runners up medal and was awarded the best bowler in the state. | | | | | | |

*\*- All India Topper in the course offered by IIT Gandhinagar on NPTEL \*\*-Completed and graded ‘Elite’ in the course offered by CMI on NPTEL*