

Bricks with Clay*

The Quarterly Newsletter of MFSDSAI @ IITPKd

This is the first issue of the quarterly newsletter of the Mehta Family School of Data Science & Artificial Intelligence at IIT Palakkad. The newsletter features important events in the school and the achievements of the members in the quarter. This edition also features conversations with a newly joined faculty member and a masters' student setting out on an internship.

~ Events ~

1. Research Symposium '25

Jan 2025



This edition of the Data Science research symposium featured **talks by department faculty, research scholars, and masters' students** spanning a wide range of topics of interest to Data Science students and researchers.

2. Seminar by Prof. Mini Das and Prof. Howard Gifford, University of Houston

Jan 2025

The seminar on **Novel Computational Imaging Systems for Signal Detection and Classification** was well-attended. The speakers illustrated how computational imaging methods leverage new physics and models along with novel instrumentation to reduce experimental complexity and effectively yield new image contrast for diagnostics, and discussed techniques to develop models under low availability of training data.

3. Talk by Dr. Renu Rameshan, Vehant Technologies India

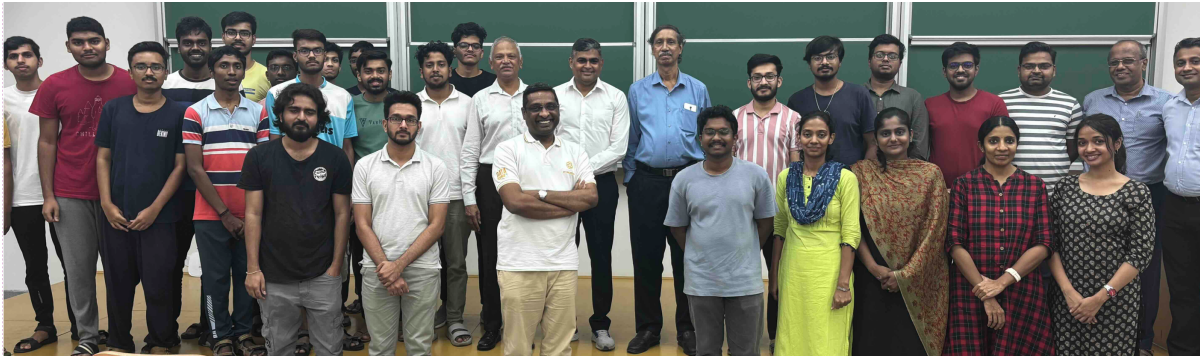
Jan 2025



The talk on **Revolutionising Physical Security with AI** was laced with many real-world examples and elicited several questions from the audience. The talk provided insights on how deep learning has changed the nature and quality of solutions used in physical security equipment like 3D under-vehicle scanning, X-ray baggage scanners, and video analytic systems.

4. Talk by Dr. Naveen Jha, Global Director at Mehta Family Foundation

Feb 2025



The talk on **Leadership, Entrepreneurship, and Impact Investment** was illuminating and interactive.

5. Florence Nightingale Data Science Online Talk Series - 1st Talk

Mar 2025

Into its glorious fifth year, the [Florence Nightingale Data Science Online Talk Series](#) is aimed at bringing together the brightest minds and eminent speakers from diverse domains within the realm of Artificial Intelligence (AI), Deep Learning (DL), and Machine Learning (ML). The first talk of this year featured **Dr. Ashish Tendulkar, AI engineer at Google** speaking on **Practical applications of Large Language Models**. The talk covered basics of Large Language Models (LLMs) and included a demonstration of how these models are used for different practical applications.

[Past talks in the series are listed here.](#)

~ Publications ~

- “Warping resilient robust anomaly detection for multivariate time series”, S. Abilasha and Sahely Bhadra, **Machine Learning**, 2025.
- “Generalized Cross-domain Multi-label Few-shot Learning for Chest X-rays”, A. Aimen, A. Verma, M. Tapasvi, and N. C. Krishnan, *accepted to* **International Symposium on Biomedical Imaging (ISBI)**, 2025.
- “Focus On What Matters: Guiding Vision Transformers Towards Justification”, Thomas John and Mrinal Das, *accepted to* **Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD)**, 2025.
- “MLP-SVM: A Hybrid Approach for Improving the Performance of the Classification Model for Health-Related Documents from Social Media Using Multi-Layer Perceptron and Support Vector Machine”, Etana Fikadu, Mrinal Das, Teklu Urgesa, *accepted to* **Springer Nature Discover Applied Sciences**, 2025.
- “Fusing Self-supervised and Supervised Learning: A Unified Pre-training Framework for Crop Mapping”, A. Rojarani, T. R. Kumar, N. C. Krishnan, P. Pankajakshan, *accepted to* **International Geoscience and Remote Sensing Symposium (IGARSS)**, 2025.
- “Glacier Lake Segmentation from Remote Sensing Landsat Image”, V. Singh, A. Mahadevan, R. K. Tiwari, and N. C. Krishnan, *accepted to* **International Geoscience and Remote Sensing Symposium (IGARSS)**, 2025.
- “Streaming Codes for Three-Node Relay Networks With Burst Erasures”, M. Vajha, V. Ramkumar, and M. N. Krishnan, **IEEE Transactions on Information Theory**, vol. 71, no. 1, pp. 348-359, 2025.

~ Congratulations! ~



Vishnu Shreeram secured an All India Rank (AIR) 73 in Graduate Aptitude Test in Engineering (GATE) in Data Science and Artificial Intelligence (DA).

~ Research Corner ~

In conversation with **Dr. Swapnil Hingmire** who joined the school faculty recently. He works on Natural Language Processing and Machine Learning.



Q. *First things first, you are an NLP expert; is chatGPT becoming “as wise as” you or I in the near future?*

A. It depends on what you mean by “wise” or “intelligent.” Models like ChatGPT focus on the form of words rather than their meaning or intent. The underlying assumption in training Large Language Models (LLMs) is “next-token prediction,” which presents a limited view of how we process language. From a technological perspective, LLMs like ChatGPT or DeepSeek aim to generate highly sophisticated responses, but that doesn’t mean they are truly wise or intelligent.

Q. *What got you interested in NLP?*

A. While working at TCS Research, I was exposed to NLP projects. Over time, I came to appreciate the beauty of language. The theory of Computation was my favorite subject, which led me to ponder: can we build a Turing Machine that understands humor, sarcasm, or poetry? When reading fiction, we experience emotions like anger, sadness, or excitement—all triggered by black dots on a white page. These dots become letters, which form words, and ultimately influence our emotions. What exactly is happening in the brain during this process? That curiosity sparked my interest in NLP.

Q. *A bit about your academic background.*

A. I earned my engineering degree in Computer Science and Engineering from Walchand College of Engineering in Maharashtra. I joined TCS Research, and after three years, I began my MS (by research) at IIT Madras as an external student, which I later upgraded to a PhD. While at TCS

Research, I spent some time at Yale University as a TATA Scholar. I also spent about a year at the University of Victoria, Canada.

Q. *Can you elaborate on your future research plans?*

A. I am interested in understanding how we interpret text—specifically? How the heuristics or biases we live by influence interpretation. What causes different users to interpret the same text differently? In collaboration with linguists, I am also interested in developing NLP applications for Indian languages.

Q. *Did you always dream of becoming a teacher/researcher?*

A. It simply happened. Often, I found myself in the right place at the right time.

Q. *What advice would you give to students pursuing Data Science?*

A. We should strive to learn from the first principles. Only then can we make meaningful contributions to science and society. We must be able to explain, at least

to some extent, why an AI or Data Science system behaves as it does-or doesn't-according to our expectations. Remember a quote from Richard Feynman: *"There is a difference between knowing the name of something and understanding it."*

We should also learn from other branches of STEM and the social sciences. Doing so broadens our

outlook.

Q. *Apart from academics, what do you enjoy?*

A. I enjoy reading and spending time in libraries.

Q. *What is one thing that you would love to see implemented in the department?*

A. I would love to see faculty,

students, and research scholars meet more often to brainstorm new and old ideas that have shaped AI/Data Science in general.

Dr. Swapnil would be happy to discuss AI/Data Science and for that matter, anything interesting; one can find him in his office on the first floor of Dr. APJ Abdul Kalam block.

~ Intern's turn ~

In conversation with **Pusala Pavan Teja**, our M.Tech student who recently secured an internship at Amazon, Bangalore.



Q. *Congratulations! You must be excited about the internship. What will you be working on?*

A. Thanks, yes, I am excited about the internship. At the end of the interview, they mentioned that I would be given a problem statement, and throughout the internship, I would be working on that problem. However, the other details about the internship have not been disclosed yet.

Q. *What kind of questions did you get in the interview?*

A. Initially, there was an online coding round where there were two coding questions, which were easy. Then, in round 1, I got

a graph question, which was modified to [Leetcode 1976](#) and the other problem was based on dictionary and heap. These were medium-level and solvable. In the last round, there were questions related to my project, DeepFake detection, such as how deepfake videos are created, along with parallel questions on deep learning topics.

There was also a case study about building a spam classifier where the explainability of the model was important. I suggested Naive Bayes for the classification task and answered several questions about it. The interviewer asked, *What are the assumptions of Naive Bayes?* I answered that Naive Bayes assumes independence between features. The follow-up question was, *If Naive Bayes assumes independence, how can it work when the current word in a sentence depends on the previous word?* This led to a discussion about how Naive Bayes works despite the dependency in natural language and the simplification made by the independence assumption.

Another question was about differentiating Naive Bayes from other classifiers. I explained that Naive Bayes is a generative

model, meaning it learns the data distribution, unlike other models, such as discriminative models, which focus on learning the boundary between classes.

Q. *Can you give us an example of a question you struggled with?*

A. Yes, there were two questions where I struggled and my answer was, *I don't have an idea about this*. We were discussing deep fakes, and the interviewer asked how to implement CNN using a DNN (Deep Neural Network). I didn't catch the question at first, but then he broke it down and asked how CNN works. I mentioned kernels and shared parameters. The second question was about a spam classification case study, discussing how to debug our model for better explainability. The interviewer asked, *During debugging, you found that one word is responsible for the wrong classification in a particular class, how would you deal with it?* I responded that we would adjust the specific word's conditional probability where it is responsible for the wrong classification. The follow-up question was, *How would you do this without manually updating the conditional probability of that word?*

Q. *How did you prepare for the interview?*

A. For the last 4-5 months, I focused on solving DSA and LeetCode problems on various topics like trees, graphs, dynamic programming, etc. These helped me solve the graph problems in the interview. As for machine learning and deep learning concepts, they were part of my M.Tech curriculum and helped me answer questions on those topics during the interview.

Q. *So, the courses you took came to your aid during the interview...*

A. Yes, the Deep Learning course by Sahely Ma'am and the Machine Learning course by Swapnil Sir helped me with several questions in the interview. There is a Q&A session for the course, and one

of the questions in the interview was similar to the question from the Q&A: *Find the number of trainable parameters for a CNN when you are given a color image ($256 \times 256 \times 3$) and need a 128×128 output from the CNN.*

Q. *Do you have a favourite area/subject?*

A. Yes, my favorite area is machine learning (ML), which involves neural networks, CNNs, traditional ML algorithms, and working with them.

Q. *What are your plans after this internship and M.Tech?*

A. I developed an interest in the field of AI during the final year of my B.Tech, so I joined M.Tech. Right now, my goal is to give my

best during the internship by applying my knowledge and learning new things there. I want to level up my skills and gain more practical experience.

Q. *What advice would you give to students pursuing Data Science?*

A. I would advise them to focus on understanding the theory and mathematics behind ML and DL concepts rather than just focusing on implementation. Implementation is important, but having a deeper understanding of how a particular model works and its assumptions is crucial to effectively applying and improving those models.

Pavan would be happy to answer further queries from the readers; reach out to him on his student email.

~ Editor's dime for the quarter ~

"You know what's wrong with scientific power? It's a form of inherited wealth. Most kinds of power require a substantial sacrifice by whoever wants the power. There is an apprenticeship, a discipline lasting many years. Whatever kind of power you want. President of the company. Black belt in karate. Spiritual guru. Whatever it is you seek, you have to put in the time, the practice, the effort. You must give up a lot to get it. It has to be very important to you. And once you have attained it, it is your power. It can't be given away: it resides in you. It is literally the result of your discipline. Now, what is interesting about this process is that, **by the time someone has acquired the ability to kill with his bare hands, he has also matured to the point where he won't use it unwisely.** So that kind of power has a built-in control. The discipline of getting the power changes you so that you won't abuse it. But **scientific power is like inherited wealth: attained without discipline.** You read what others have done, and you take the next step. There is no discipline lasting many decades. There is no mastery: old scientists are ignored. There is no humility before nature. There is only a get-rich-quick, make-a-name-for-yourself-fast philosophy. Cheat, lie, falsify - it doesn't matter. They are all trying to do the same thing: to do something big, and do it fast. And because you can stand on the shoulders of giants, you can accomplish something quickly. **You don't even know exactly what you have done, but already you have reported it, patented it, and sold it.** And the buyer will have even less discipline than you. The buyer simply purchases the power."

— Michael Crichton, *Jurassic Park* (Novel, 1990).

Write to us: mfdsai@iitpkd.ac.in