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Reminiscing about the Challenges and Coping Mechanisms of Teaching Styles during Pandemic and Sustaining Today

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Abstract

The Covid-19 triggered the online education so fast that now it's become mandatory for a new-normal education systems to accommodate the online education tools in day-to-day teaching. The digital education surged making teachers forget about the chalk-and-board methods: the long-lived traditional method of teaching. The digital education tools such as PowerPoint presentations, virtual labs, small concept videos are mandatory as the students are adapting from Covid-19 era to the new-normal education classes. To toggle between the two teaching styles and trying to accommodate all types of learners in the learning process have always been the challenges for the teachers. This article discusses this toggling of teaching-learning styles and presents a case-study of author's education institute in India during the pandemic along with the students' testimonials. They affirm the impactful engagement during the pandemic. The author confirms that, the adoption of online tools helped the educators to survive the pandemic challenge and sustain in today's world.

***Keywords*— Concept videos; Covid-19; Digital education tools; Online education; Pandemic; New-normal education.**

***JETLP Category*—Case Report**

1. Introduction

The Covid-19 period was the most challenging period of the twentieth century. It had a deep impact on all fronts of life in this modern world of highly digital life. It invited many uninvited gadgets in the life of school going kids: the smart phone, tabs are to name a few! The need arose because the

education cannot stop. The author would like to quote an example of a very famous school, Jyanprobodhini Prashala, situated in Pune. The moment the lockdown was declared, the next day, the school sent the meeting invite to all the parents and explained them how they are going to conduct the online lectures for these secondary school students. It was amazingly overwhelming as the technical higher education institutes were still thinking and musing over how to continue, the school had already begun their online teaching!

The online meeting platforms like Zoom, Google Meet, MS Teams, FCC were available for conducting the sessions. The students were adapting very fast to this learning style and teachers were learning "how to teach using these tools"! It was really a transformation phase for a teacher…not only the school teacher but also the professors.

As a professor, it was very challenging to keep the students motivated to attend and participate. It was an online education where the teachers and students were not able to see each other. The author would like to quote an anecdote over here: *"The sunflowers take energy from the sun to bloom when it rises. The question arises, what happens to those flowers when the sun is covered by the clouds? The sunflowers gain their energy by looking at each other!! What a beautiful way to keep blooming!!".* The teachers are just like the sunflowers. They get their energy to bloom by their students. And online education was that cloudy weather when the teachers were not able to see their sun to get energized! It was a tough task to stay motivated to keep the students engaged and learning. The author discusses the transitions faced by her and how she coped up with the situations by revising her teaching styles. The next section will provide an overview of teaching-learning methodologies adopted during the period of 2004 to 2020 in line with capturing the essential and gradual change in the strategies.

2. Literature Survey

The author discusses a variety of strategies proposed and implemented by other educationists and researchers during the above-mentioned span. Blended learning and the integration of digital tools in education were topics of academic focus well before the COVID-19 pandemic. Understanding this progression is essential to framing the post-pandemic shift toward toggling between online and traditional teaching-learning methods. *Bernard et al. [1]* conducted a foundational meta-analysis comparing classroom instruction with distance education. Their results suggested that blended approaches were more effective than purely online or face-to-face methods, especially in higher education contexts. Researchers were observing the shift in the students' understanding levels with shift in the approach.

Zhao et al. [2] further examined what makes distance education effective, analysing different types of instructional settings. Their work emphasized the importance of context, learner characteristics, and course design, laying the groundwork for future studies on blended modes. *Tallent-Runnels et al.* [3] reviewed the literature on online teaching methods and instructional design. The review was focused to identifying key trends and gaps, particularly in the areas of student engagement and teacher preparedness. *Lim, Morris, and Kupritz* [4] explored faculty and student perceptions of online versus blended learning environments, finding that satisfaction and learning outcomes varied significantly based on instructional design and support.

Researchers like Means et al. [5] conducted a meta-analysis of empirical studies to compare the effectiveness of online and traditional instruction. The study concluded that blended formats were often more beneficial than either format alone. *López-Pérez et al.* [6] investigated further how blended learning affects dropout rates and learning outcomes. Their findings showed a positive

relationship between well-structured digital interventions and reduced student attrition. *Drysdale et al.* [7] analysed trends in blended learning through doctoral dissertations and theses, showing growing interest in hybrid learning models and the need for teacher adaptability.

Boelens et al. [8] identified four key challenges in blended learning: flexibility, interaction, personalization, and course coherence. These issues are central to the toggling challenges faced by educators after COVID. *Halverson et al.* [9] analysed the highly cited studies in blended learning and identified pedagogical and technological themes that influenced instructional strategy development. In the end of pre-covid, *Raes et al.* [10] reviewed synchronous hybrid learning environments in higher education. Although published in 2020, their study was conducted pre-COVID and identified the pedagogical strain felt by teachers in managing both physical and remote learners simultaneously—a direct precursor to post-pandemic challenges.

The section 3 will discuss the challenges faced and how the teacher took efforts to overcome it despite the unseen challenges at their family and academic fronts.

3. Discussion of challenges

The author has taken classes for two subjects, namely, Artificial Intelligence (AI) for final year engineering students and the Digital Signal Processing (DSP) for third year engineering. The author would compare the education styles during pre-covid-19 period and covid-19 period. The next session will discuss the challenges faced during covid-19 online education.

3.1 Challenge 1 Awareness of the online teaching-learning platforms and related tools:

The first thing during an online education was to make them aware of the meeting platform facilities. The google meet platform was selected at the author's institute. It has the facility of whiteboard. To make the students participate in the session, during Artificial Intelligence Class, the author used whiteboard for solving the search algorithms in AI subject. It provided the competitive environment for the students to solve the sum fast. Everyone was able to see who is solving on that whiteboard. There were 3-4 boards available and students used all of them to solve it. Figure 1 depicts the participative and enthusiastic approach of the students towards learning

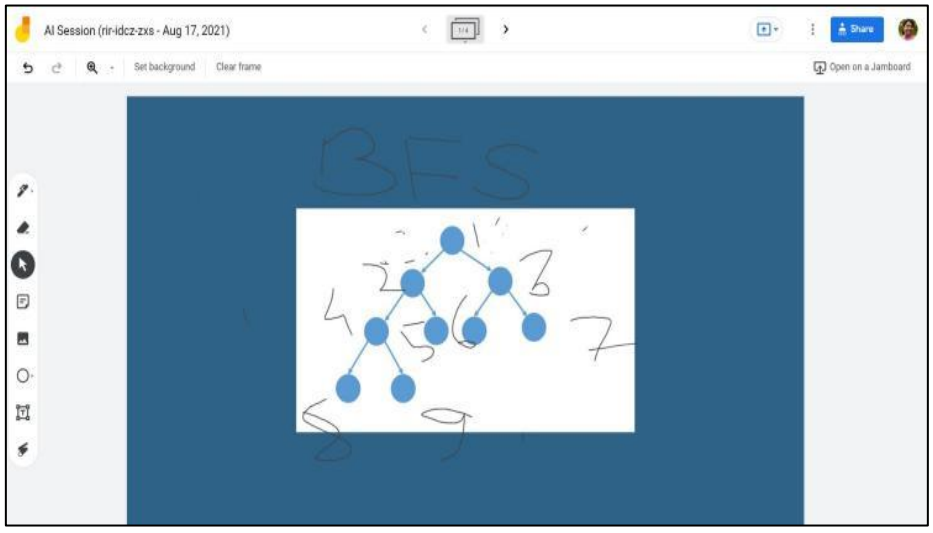


Figure 1: Use of Whiteboard - DFS and BFS algorithm implementation in AI subject

3.2 Challenge 2 Students' engagement in online mode

There are few algorithms in the subject of Artificial Intelligence like Depth First Search (DFS) and Breadth First Search (BFS). The graphical approach will make students understand the concept, so the whiteboard facility of Google meet was used to make the students participate and solve the related sums. It was a collaborative work by the students. The teacher opened four different whiteboards for collaborative solution to DFS and BFS problems. The class was not only collaborative but interactive and competitive as each team tried to solve it faster.

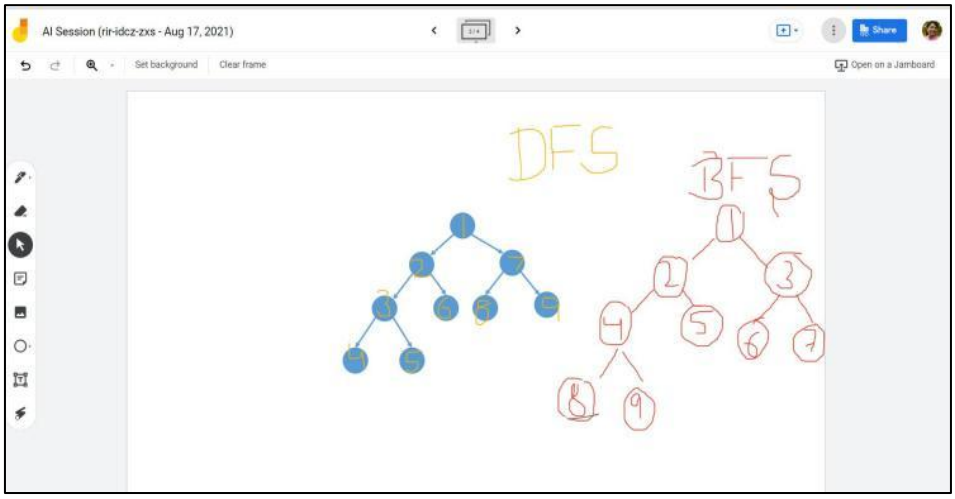


Figure 2: Understanding algorithms with collaborative learning

3.3 Challenge 3 Encouraging them to prepare the hard topics

In AI, there are many algorithms named as search algorithms. They are used to design the games - single agent and multi-agent games. The search strategies are challenging to understand unless a numerical is solved to fix the idea of it. The author provided them the links of the videos by Dr John Levin from Imperial College of London, UK. Then the flipped classroom technique was used and they were asked the questions by the author. The questions were set in a manner to check their understanding and not only the conventional knowledge. The questions included the comparison of the algorithms, why one is used despite the other powerful algorithms, what change should be made to the algorithm to make it better and real time applications in online games. Such brainstorming during the flipped classroom made them strong and they no more needed to recite the algorithms.

Later, as the outcome of this activity, they were asked to prepare a video of the discussed algorithm and the author rewarded them for preparing the insightful video. The methodology itself demonstrated the "Reinforcement Learning"- a famous algorithm in AI, among the students.

Along with the video preparation they were asked to explore the Analytics Vidhya platform for the free certification courses and increasing their understanding of AI algorithms. There was

an evaluation in the end of the Analytics Vidhya course. The students collaboratively solve the assessment where they were stuck and achieved successful completion certificate. Figure 3 showcases the Analytics Course certification samples.

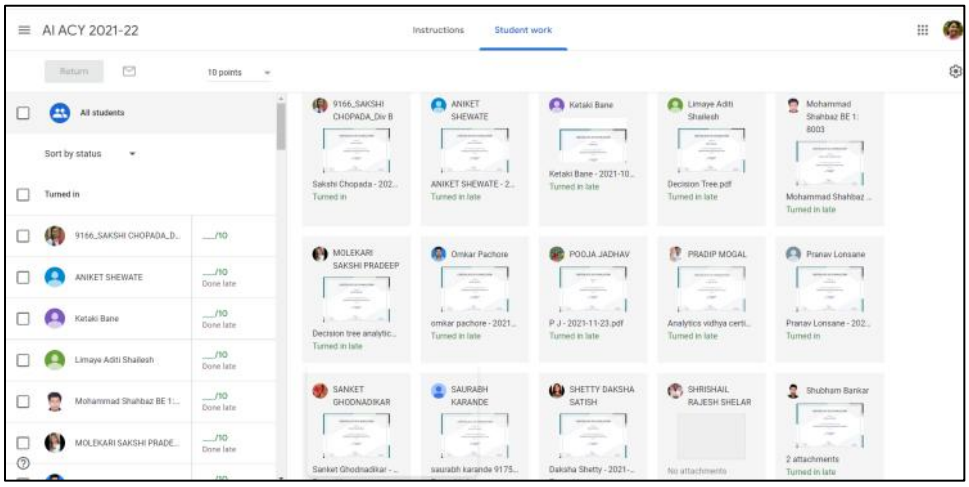


Figure 3: Analytics Certification: Different Practice to help them to collaborate to solve each others' doubts and earn the certificate

The end of the AI class was very happy because of highly interactive and engaging sessions throughout the semester. The Figure 4 is a click of the Google Meet session on the last day of semester.

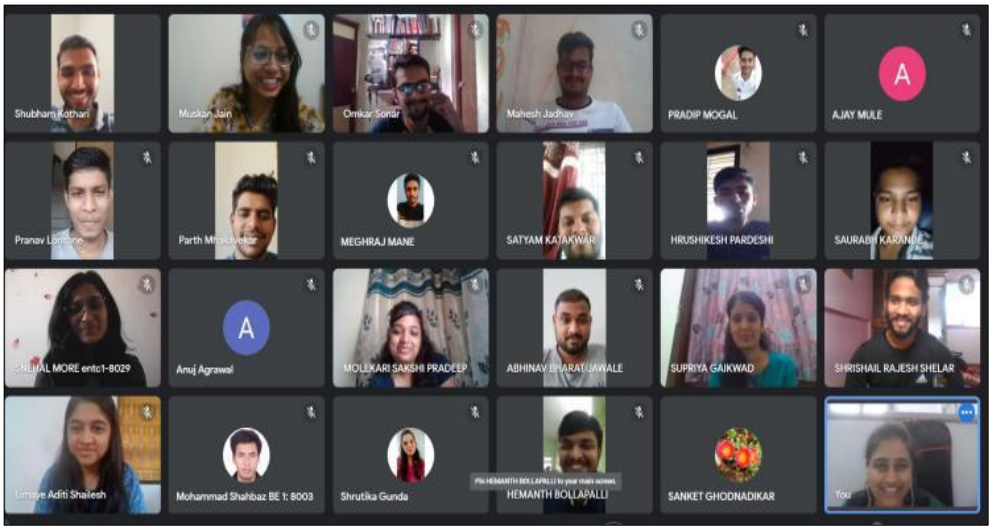
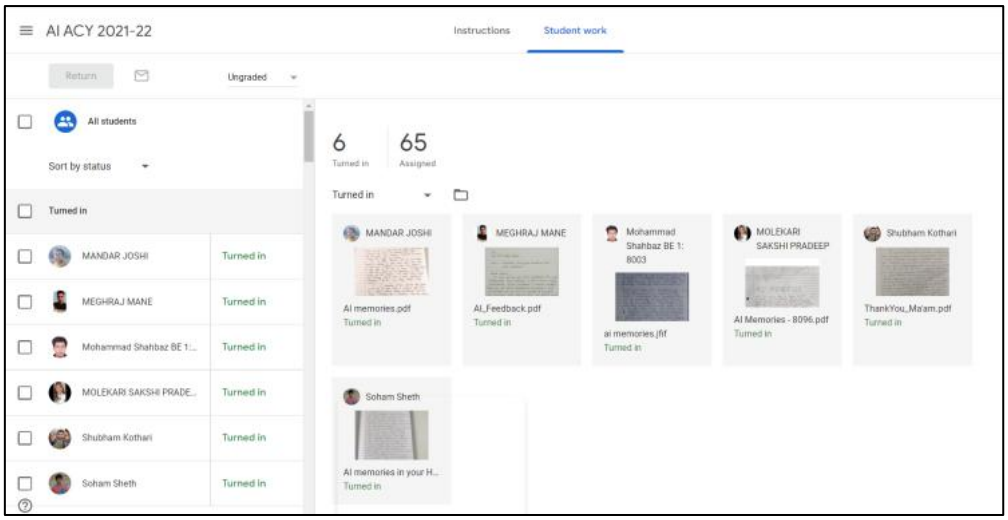
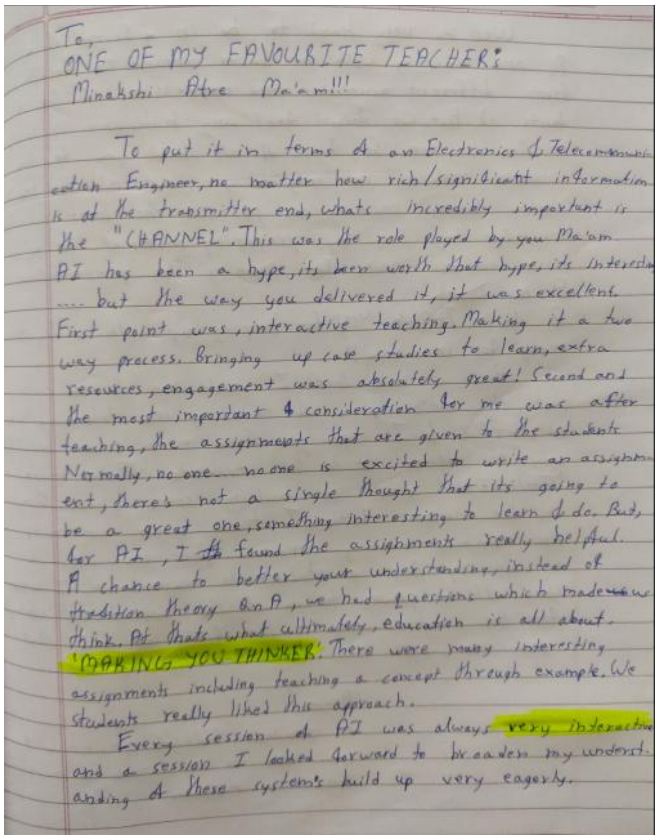


Figure 4: Happy faces on the last day session of AI class

Figure 5 summarizes their memories in their own handwriting which made the whole journey a carved memory in author's teaching career.




To,
ONE OF MY FAVOURITE TEACHERS
Minakshi Atre Ma'am!!!

To put it in terms of an Electronics & Telecommun... engineer, no matter how rich/significant information is at the transmitter end, what's incredibly important is the "CHANNEL". This was the role played by you Ma'am. AI has been a hype, it's been worth that hype, it's interesting ... but the way you delivered it, it was excellent. First point was, interactive teaching. Making it a two way process. Bringing up case studies to learn, extra resources, engagement was absolutely great! Second and the most important consideration for me was after teaching, the assignments that are given to the students. Normally, no one... no one is excited to write an assignment, there's not a single thought that it's going to be a great one, something interesting to learn & do. But, for AI, I found the assignments really helpful. A chance to better your understanding, instead of tradition theory Q n A, we had questions which made us think. Pt. That's what ultimately, education is all about. 'MAKING YOU THINKER'. There were many interesting assignments including teaching a concept through example. We students really liked this approach.

Every session of AI was always very interactive and a session I looked forward to broaden my understanding. These systems build up very eagerly.

Figure 5: AI Memories

4. Summary of Learning

Teaching is not a one-way arrow but it's a bidirectional process where a mutual learning enhances the experience of both. It further adds many more analogies for hard concepts. The collaborative learning encourages students to share their understanding and ideas of the subject. The subjects like AI need updated information with vast reading of research articles from Google and Intel. The preparation of video encouraged many students to learn video editing, how to practice the content

of the video and how to choose the suitable platform for uploading and finally a way to upload the video successfully. The teacher rewarded the students a 'Travel Back-pack' as they prepared the informative videos on the hard concepts of AI like A* search algorithm.

A special workshop on "Online Teaching & Learning Tools" was conducted for the faculty where the students were also involved as the volunteers and the demonstration of online tools was successful because of their participative presence in that workshop. The following figure shows one of the tools, named Mentimeter. This helps the teacher to check the retention of the concepts learnt during the class. The word cloud is depiction of the concepts they remembered in the end of the lecture.

They also used these learning tools during their project presentations and seminars held as the part of their internal assessment. This complete workshop changed their way of presentation and confidence to handle the evaluation in online mode. A google meet whiteboard proved to be the best tool for solving the problems collaboratively in online classes.

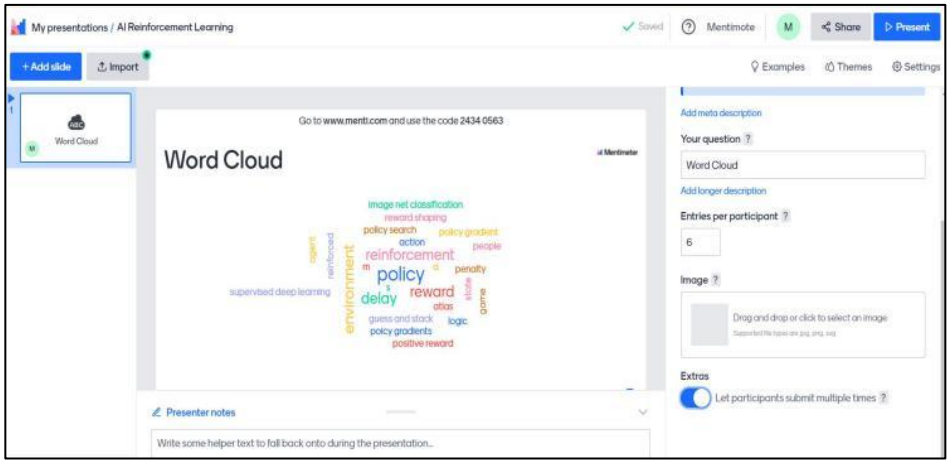


Figure 6: Reinforcement Learning Video Summary in Word Cloud

Teaching and learning are the two sides of a flipped coin. Any side you get, it's the part of other side. The learning did not stop during the pandemic but the author made them to celebrate this online learning in variety of ways and Engineers' Day Celebration is an example of it! The AI class defined 'Engineer' in its own way and the author summarized their definitions on digital stick-ons.

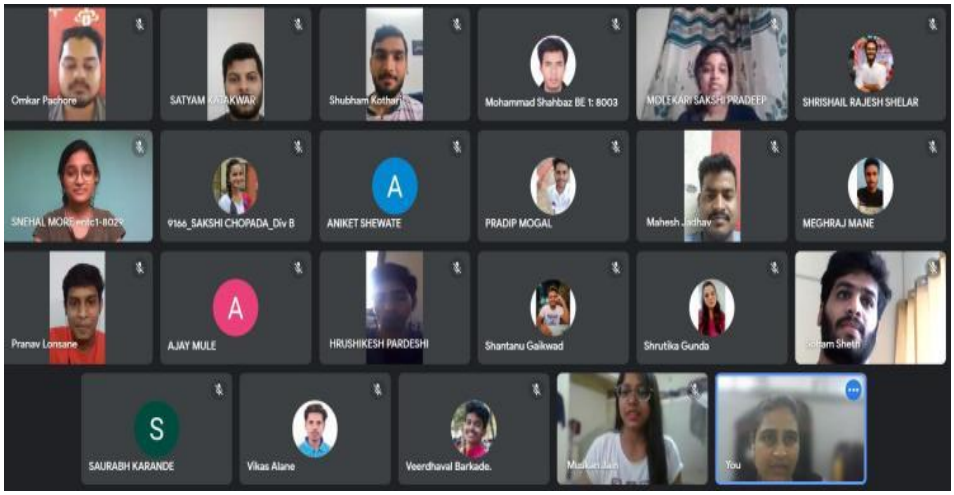


Figure 7: Celebrating Engineers' Day in Online Mode

To provide a quick overview of the challenges and coping mechanisms, and understand the author's work, the Table 1 is presented as the ready reference for the work carried out by her.

Table 1 Summary of challenges of Online Education

Sr No	Challenges identified	Remedial actions
1	Awareness of the online teaching-learning platforms and related tools	Conduction of faculty workshops with students as volunteers to demonstrate the tools
2	Students' engagement in online mode	Making them conversant with online teaching with the help of online platforms like Analytics Vidhya
3	Encouraging them to prepare the hard topics	Hosting video making competition for hard topics by giving them standard references
4	Celebrating National Days online which otherwise in offline mode would have increased interactions among the students	Celebrated Engineers' Day in online mode – watched videos together to understand the role of an Engineer in society
5	Face to face interaction and real feedback for continuous improvement in the teaching-learning process	Students were asked to write their experiences in a notebook and share the screenshots of the feedback

With students' great support and online tool literacy made the class more interactive, collaborative and participative. As a guest teacher, when she visits the other college, the students' crowd is different and a teacher may need to change the strategy to teach the students. So, a teacher needs to be a good learner and should be able to flip the other side of the coin whenever there's change in the class-course-college. The online teaching styles definitely helped the author to succeed to teach AI subject and those online digital mechanisms later helped to make the offline classes more interactive with tools like mentimeter.

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Author Bio

Dr Minakshi Pradeep Atre is associated with PVG's College of Engineering, Technology and Management, Pune. She is currently the *Head of the AI & DS dept* and also holding the position as the *Dean, Research and Development* at the institute. She is *Nvidia Brand Ambassador* in the domain of Deep Learning and has a keen research interest in Machine Learning, Deep Learning

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