

THE HITCHHIKERS GUIDE TO

# ARTIFICIAL INTELLIGENCE

2019



**greatlearning**  
*Learning for Life*

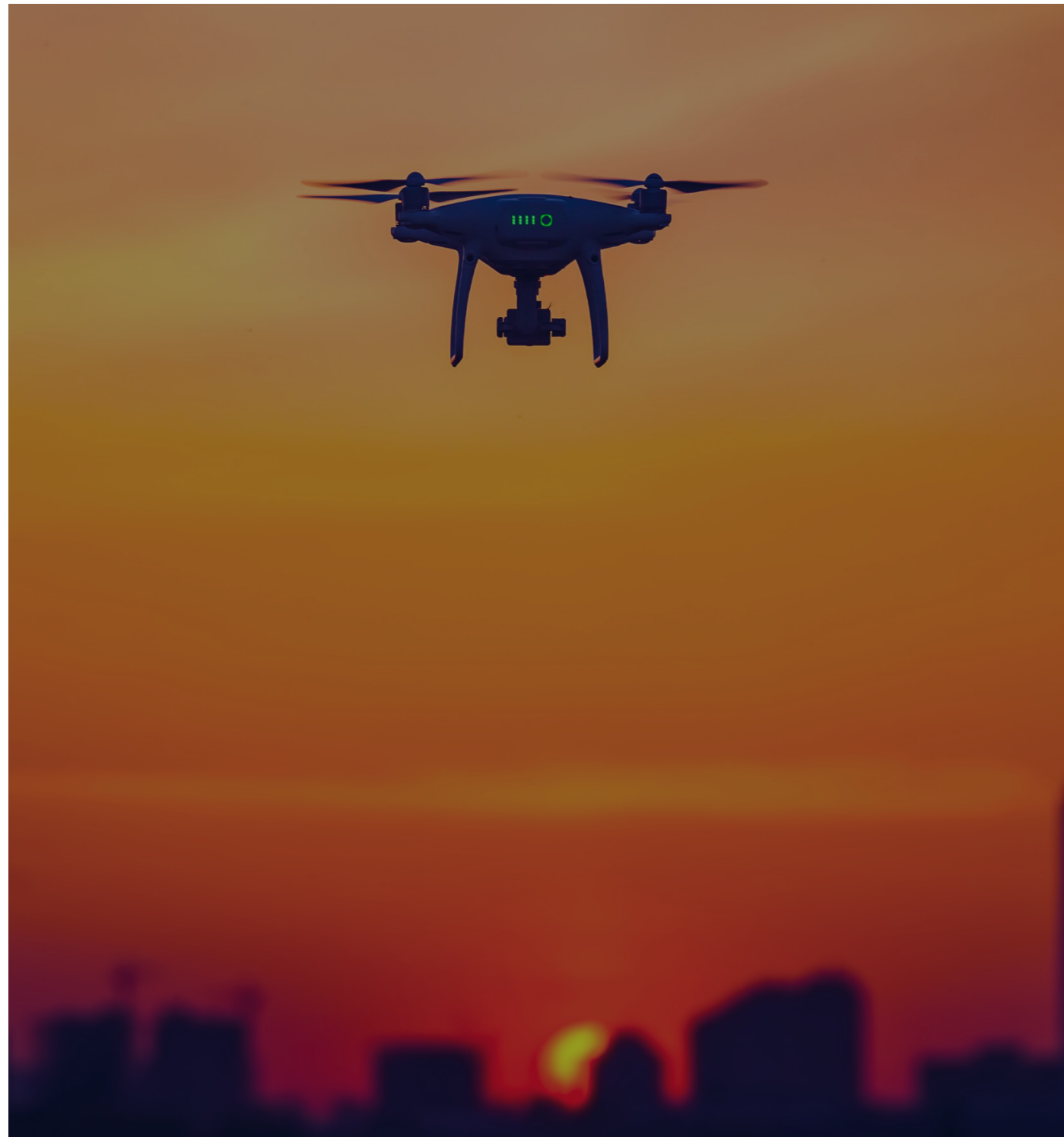


**Disclaimer:** This document is the result of continued research by Analytics India Magazine and Great Learning. Permission may be required from either one of the parties for reproduction of the information in this report. Reasonable efforts have been made by Analytics India Magazine and Great Learning to source and present data that is believed to be reliable, but makes no representations or warranty, express or implied, as to their accuracy or completeness or correctness. All rights reserved with the aforementioned parties.

## TABLE OF CONTENTS

INTRODUCTION	4
KEY TRENDS	6
AI PROFESSIONALS IN INDIA	8
AI COMPANIES IN INDIA	14
AI SALARIES IN INDIA	18
AI JOBS IN INDIA	20
CONCLUSION	22
AI AT GREAT LEARNING	26
OUTLINE OF GREAT LEARNINGS AI/ML PROGRAMS	29
LIFELONG LEARNING WITH GREAT LEARNING	30
HEAR FROM GREAT LEARNING ALUMNI	31

# INTRODUCTION



In the last decade, we have seen AI transitioning from an industry buzzword to finally being adopted across various enterprise applications. Indian businesses are analysing how they can make processes more efficient which has led to increasing adoption of artificial intelligence in the enterprise across different verticals. Products and services are being rebuilt with the integration of artificial intelligence with the objective of creating a better experience for end consumers. As enterprises are wary of getting left behind, this has driven the demand for professionals skilled in AI-based technologies. The trend is clear—professionals who are skilled in AI are being rewarded, along with a rising emphasis on upskilling keeping artificial intelligence in the centre.

In collaboration with Great Learning, we have started tracking the AI industry in India over the last two years. The result of the partnership is our annual AI study- The Hitchhiker's Guide to Artificial Intelligence 2019-2020: By AIM & Great Learning, where we look at the key AI trends

dominating the Indian AI market. The study covers professionals, salaries, AI jobs across different Indian cities, and the companies leading in terms of AI hiring in the country.

The most significant outcome of the study is the much-accelerated growth of the AI industry since last year. Growing by 80%, we see AI is no longer in a hype stage and has observably entered the period of real productivity.

In fact, a WEF report states over 133 million new roles [1] will surface due to AI over the next two years. It is therefore clear that in the coming years, there are going to be many more vacancies in the AI sector, than the number of skilled talent available. The trend is already visible in many enterprises, as most companies fail to implement planned AI projects due to a lack of skilled talent.

In the second half of the report, we cover AI literacy in India through Great Learning's comprehensive AI/ML programs that are bridging the gap and consequently boosting workforce transitions.

# KEY TRENDS



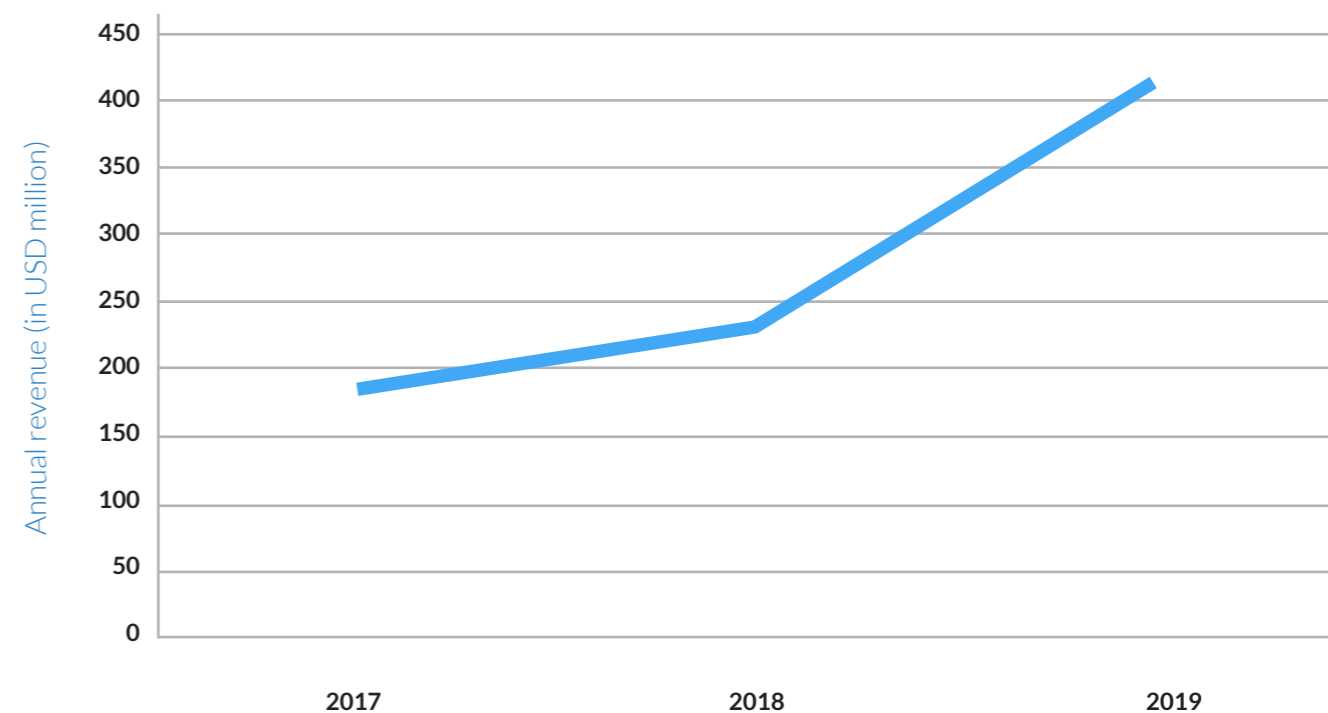
The Indian AI market size in 2019 has broken out of the trend that we had seen the years before. This year, the overall market size witnessed a dramatic jump in terms of market growth, which is a great sign for the industry. Here are the key trends of the AI market in India that we found out:

- Artificial Intelligence Industry in India is currently estimated to be **\$415 million** annually in revenues, up from **\$230 million** a year ago.
- AI Industry grew by a healthy

annual rate of **80%** last year. This is an extremely high increase, peculiar with technologies that are in early stages of adoption.

- This is a remarkable jump since last year when the industry growth was estimated to be **28%**.
- In 2019, there are approximately **72,000** AI professionals in India. This is an 80% increase from the year prior when there were **40,000** professionals in AI.

Revenue of AI Industry (USD \$ million)



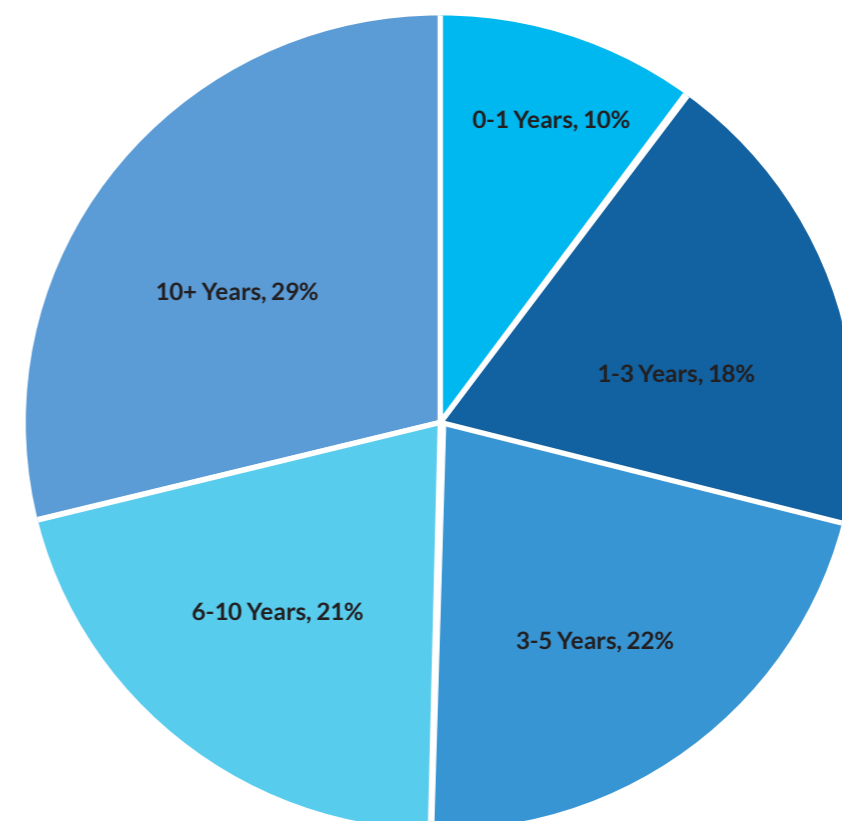
# AI PROFESSIONALS IN INDIA



At a time when there is an apparent shortage of AI skills, skilled professionals have been critical for the growth we have seen in the last year. Here are the findings of the study that concern the demographics and experience levels for AI professionals:

- Out of the **72,000** AI professionals, around **6,000** freshers were added to AI workforce in India in 2019. The number was **3,700** in 2018.
- The average work experience of AI professionals in India is **7.2 years** – than **6.6 years** from last year.
- Almost **51%** of AI professionals in India have a work experience of less than 5 years, which is the same as last year.
- **29%** of AI professionals have more than 10 years of work experience. This work ex is not necessarily in AI but these professionals have transitioned into AI over time.
- Women participation in AI workforce remains low – only **26%** of AI professionals in India are women. This is still a slight increase from 2018, when the share of women in the Indian AI workforce stood at **24%**.

Percentage of AI Professionals and their work experience



## AI TALENT DIVIDE ACROSS COMPANIES

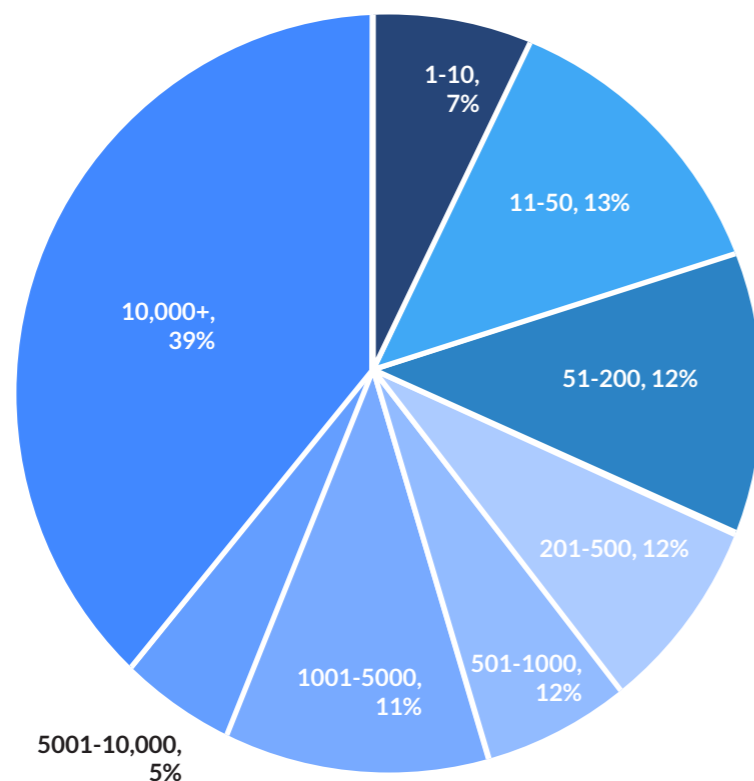
Here we track the spread of AI professionals across different organizations based on employee size. While the trend remains somewhat the same as last year, we found the proportional size of AI professionals increased in large organizations.

- Almost **39%** of AI professionals in India are employed with large-sized companies – with more than 10,000 total employee base. Here, we

witness an increase from 2018 when such organizations had employed **37%** of the AI workforce.

- Mid-sized organizations (total employee base in range of 200-10,000) employ **29%** of all AI professionals in India.
- Startups (less than 200 employees) account for **32%** of AI professionals in India. This number has come down from **34%** in 2018.

Percentage of AI Professionals in organisations of various sizes



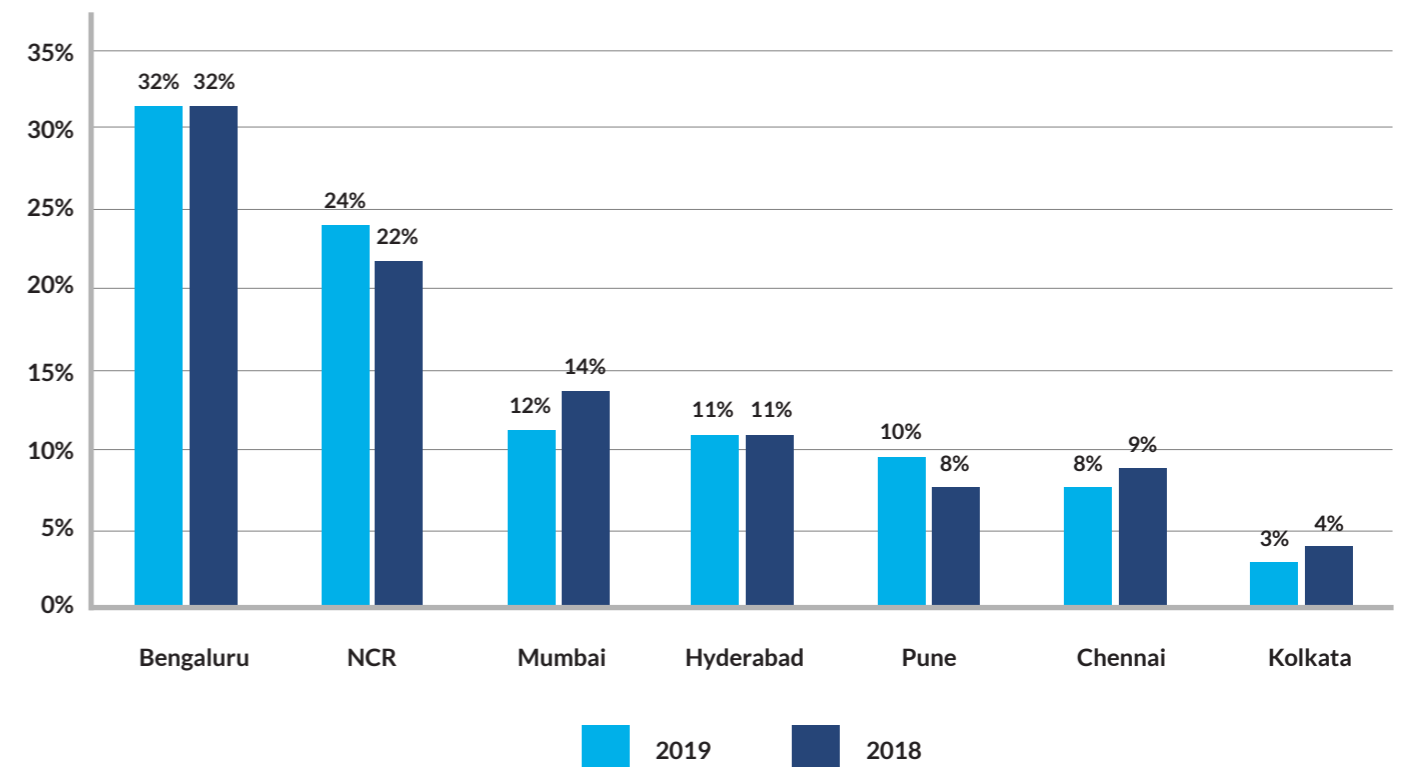
## TENURE

Looking at how long AI professionals have been working in this specific technology domain, we find that there is a clear shift. New professionals are increasingly recognising the AI opportunity and making a transition.

- On average, AI professionals in India have joined/transitioned to their current role in the last 3 years.

- 65% of AI professionals in India have joined/transitioned to their current role in the last 2 years.
- These stats signify that AI is a very recent technology and a huge number of professionals are gravitating towards it.

Average number of year's professionals have been in AI domain (by cities)



## CITIES

In India, there are only a handful of destinations for AI professionals and similar to last year, not much has changed in this regard. India's metropolitan IT hubs is where professionals need to be to snatch the best work opportunities in artificial intelligence space. Here is what we witnessed for 2019:

- Bengaluru leads again in terms of the size of the ecosystem as **32%** of AI professionals in India

are working in the city in 2019.

- This is closely followed by Delhi NCR at **24%**.
- In 2019, Pune has surpassed Chennai in terms of the percentage share of AI professionals.
- Hyderabad's share remains the same this year at 11%, whereas Mumbai saw a decline in its contribution to India's total AI professionals, falling to **12%** from **14%** in 2018.

## EDUCATION

Advanced jobs correlate with advanced degrees, and the fact is evidential from our findings when it comes to the AI professionals. Here are the findings:

- **48%** of AI professionals have a Master's/ Post Graduation degree, same as last year.
- **2.6%** of AI professionals in India hold a PhD or Doctorate degree.



# AI COMPANIES IN INDIA



We see that there is a growth rate of almost **200%** year over year in the number of AI companies in India since 2018. This shows the proliferation of AI in the enterprise space, confirming that companies are catching onto the opportunity in an exponentially fast rate.

- Indian tech behemoths TCS and Infosys have paced up their hiring in the emerging tech sector manifold. Numbers show that TCS has increased their hiring in IT by **377%** and Infosys by **642%**.
- More than **3,000 companies** in India claim to work on AI

in some form. This includes a small number of companies into products and a larger chunk offering either offshore, recruitment and training services. Last year, we had found that **1,000 companies** reported using AI.

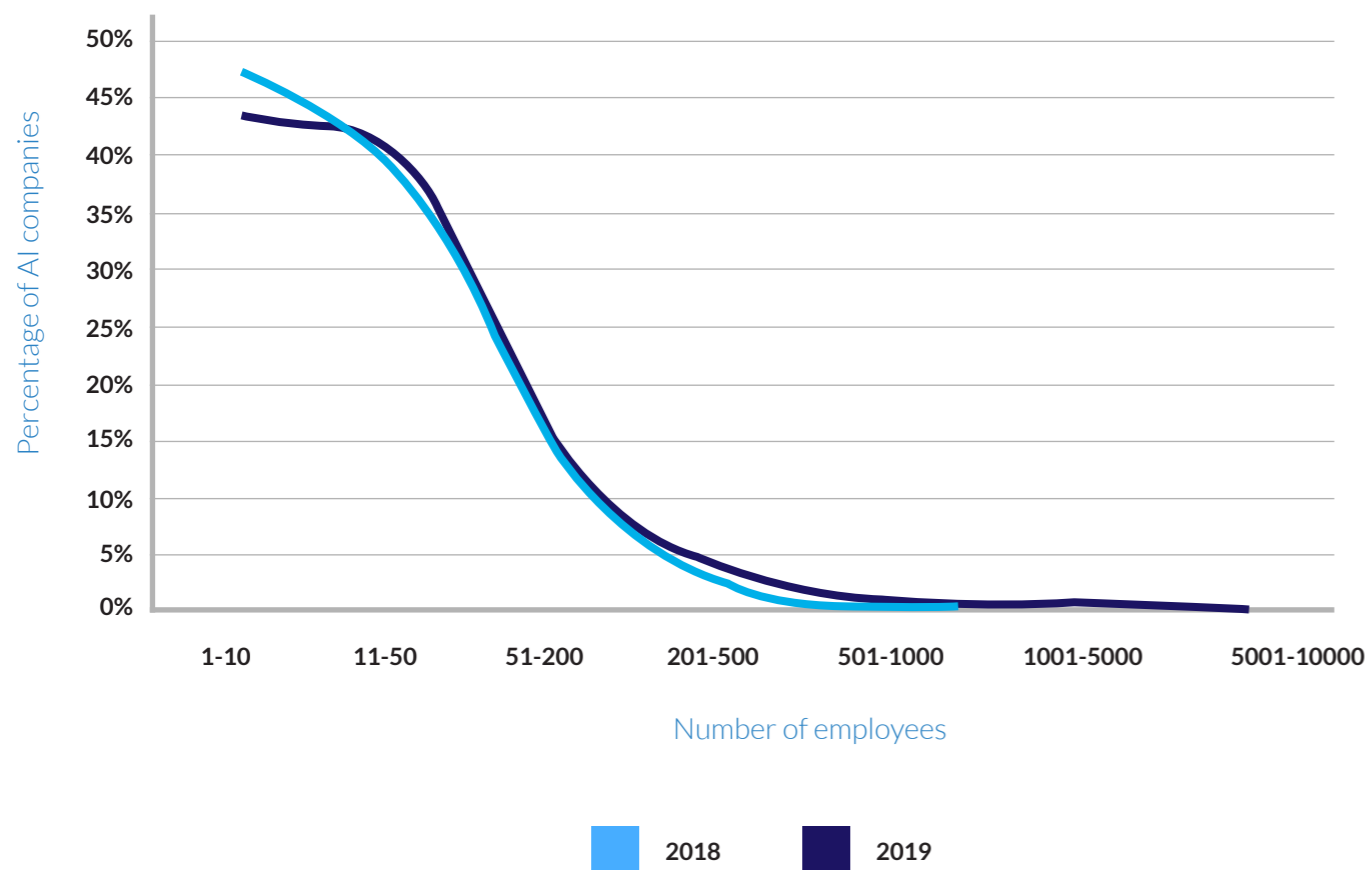
- The number of AI companies in India are still very few in number, compared to the strength of analytics companies around the globe. In fact, India accounts for just **12%** of global analytics companies. In 2018, we found that Indian companies accounted for **8%** of the global share, which indicates a noteworthy growth.



## COMPANY SIZE

- On average, Indian AI companies have 81 employees on their payroll. This is slightly lower from 87 last year.
- Almost 83% of analytics companies in India have less than 50 employees, slightly less from last year at 85%.
- As seen from the graph, the number of AI firms with less than 10 employees have decreased from last year and an increase is seen in the number of firms with 200-500 employees.

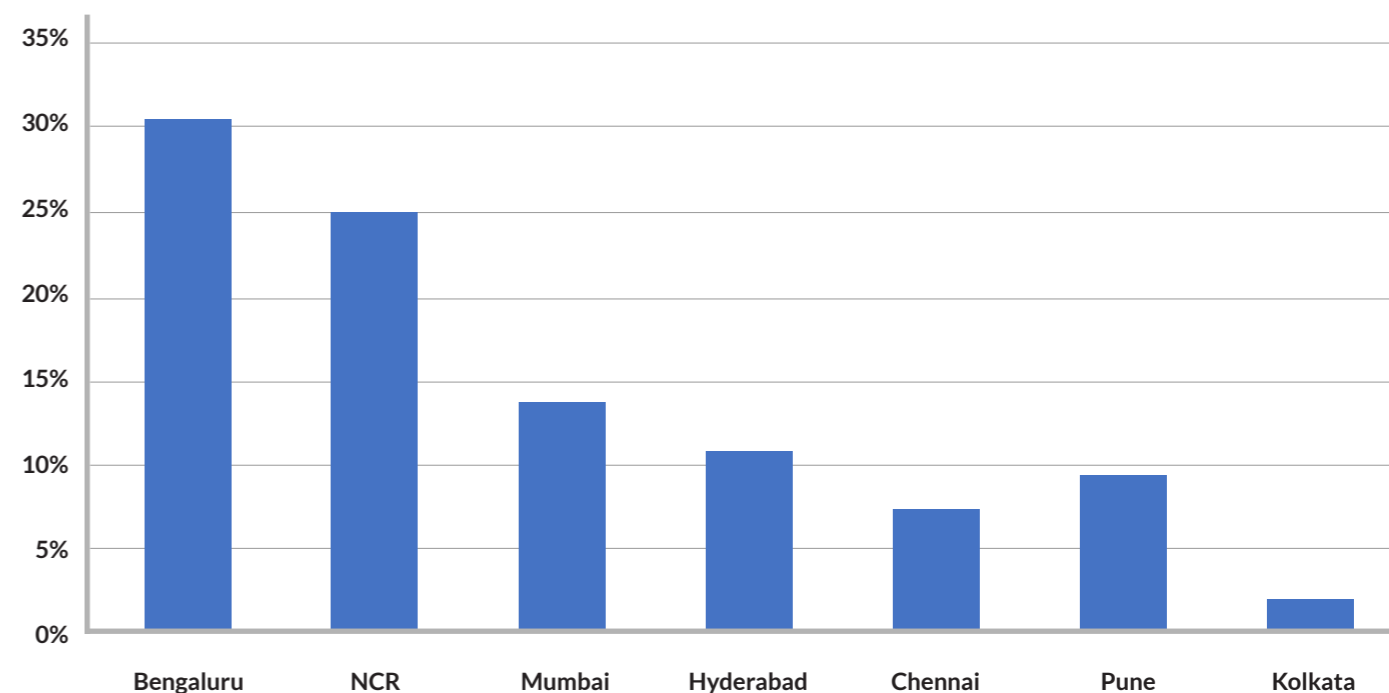
Employee strength across AI companies



## CITIES

- Bangalore leads other cities to house the most number of AI firms in India this year, at almost 31%.
- It is followed by NCR at 25% and Mumbai at 14% AI companies.
- Hyderabad, Chennai and Pune are far behind with their percentages of analytics companies in single digits as reflected in the graphs above.

Percentage of AI companies in various Indian cities

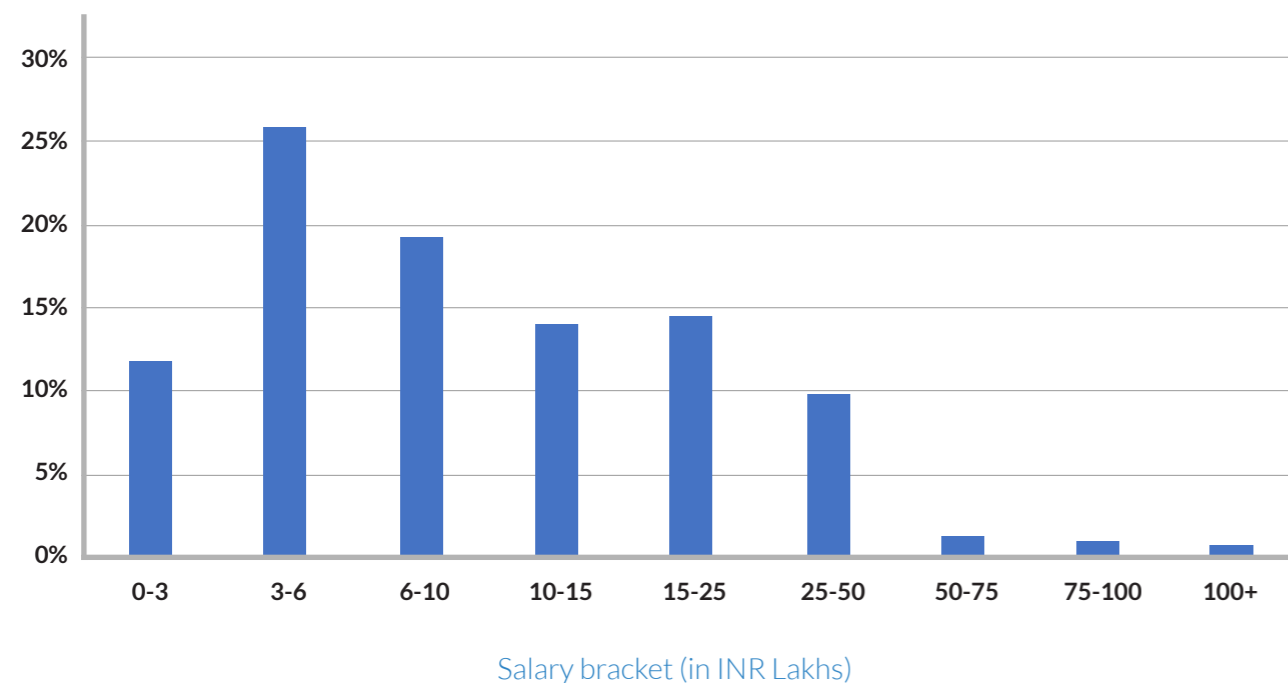


# AI SALARIES IN INDIA

In the previous section, we mentioned that that three thousand businesses in India are leveraging AI professionals to create operational value across functions in 2019. The AI market size has seen a tremendous shift upwards since last year, hence, salaries remain attractive for professionals to take notice.

- The median AI salary in India is INR **14.7 Lakhs** across all experience level and skillsets. This is almost the same as last year.
- **38%** of AI professionals in India fall in the salary bracket of less than **6 Lakhs**.
- Almost **4%** of AI professionals in India command a salary higher than **50 Lakhs**.

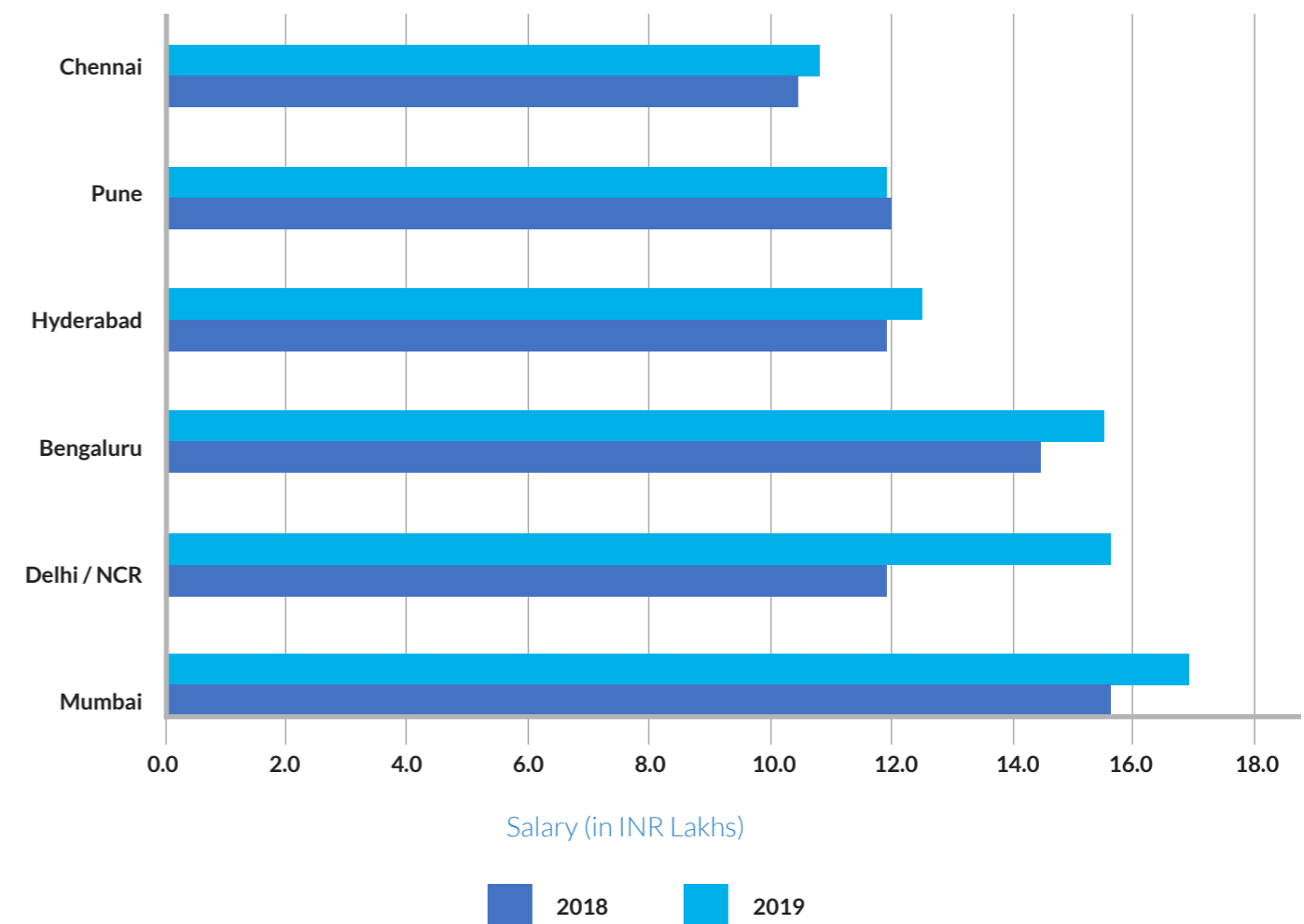
Percentage of AI professionals in various salary brackets



## SALARY TREND ACROSS CITIES

- Mumbai is the highest paymaster in AI at almost **17 Lakh** per annum as median salaries, followed by Delhi/NCR at **15.6 Lakh**.
- Chennai is the lowest paymaster at **10.8 Lakh**.

Average salary of AI professional in various cities in India



# AI JOBS IN INDIA

In this section, we look at the number of AI positions in India currently, and the companies offering the most vacancies. The key finding is that compared to 2018, there are fewer AI positions waiting to be filled. Additionally, we observed that India's contribution to AI-related job openings declined slightly despite it being already small compared to the AI job openings worldwide.

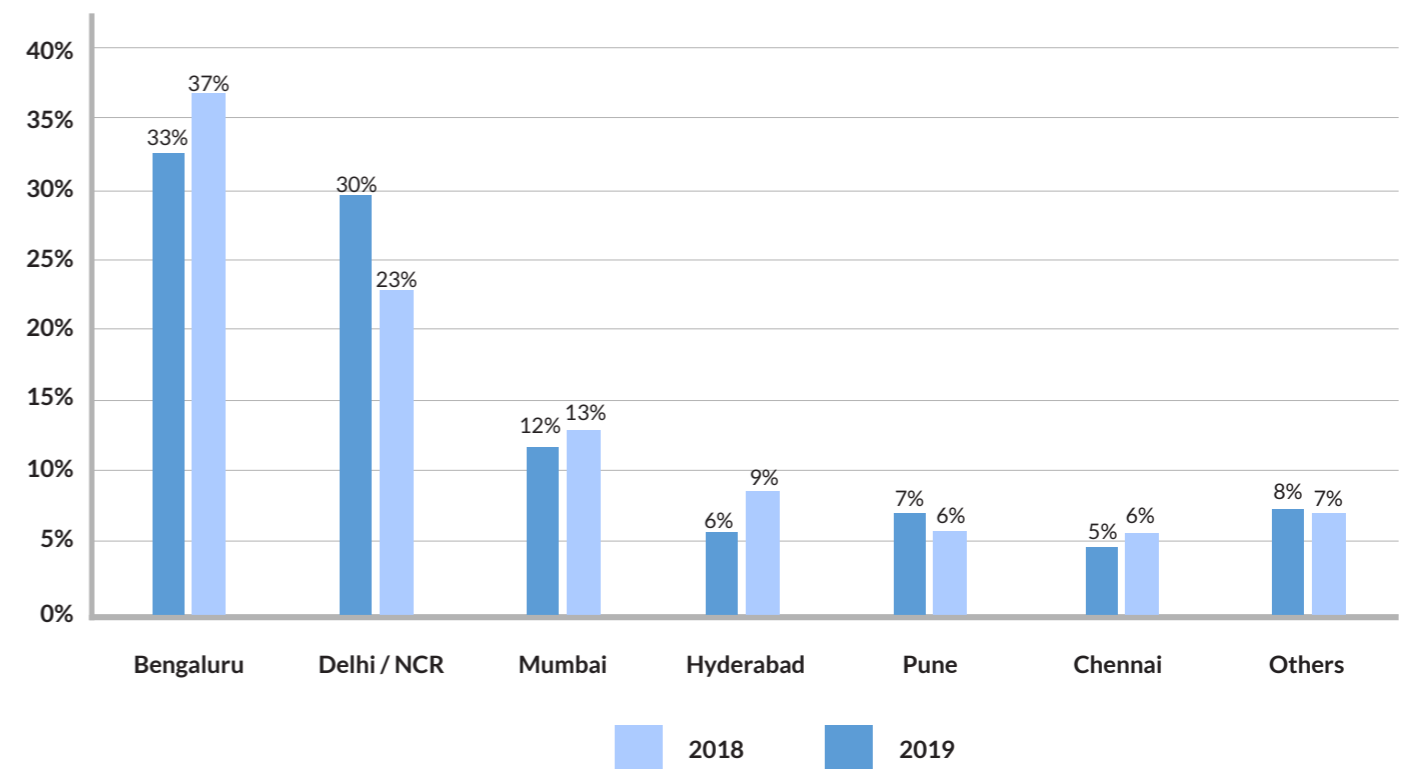
- While, it is difficult to ascertain the exact number of open AI job openings; according to our estimates, close to 2,500 positions related to AI are currently available to be filled in India.

- Compared to worldwide estimates, India contributes 7% of open job openings currently. Growth in the number of AI jobs globally was much higher than India.
- Our numbers suggest that the top 10 leading organisations with the most number of AI openings this year are – IBM India, Accenture, 24/7 Customer, Nvidia Corporation, Hewlett-Packard, Ernst & Young, Genpact, Amazon, eClerx Services & Capgemini.
- Almost 92% of AI jobs advertised in India are on full-time basis, rest are part-time, internships or contract basis jobs.

## AI JOBS BY CITIES

- In terms of cities, Bengaluru accounts for around **33%** of AI jobs in India. This is down from **37%** last year.
- Delhi NCR comes second contributing to **30%** AI jobs in India. This is up from **23%** last year.
- Approximately **12%** of AI jobs are from Mumbai, almost the same as last year.

Year on year comparison of AI jobs across cities in India



## SALARY REQUIREMENT FOR AI JOBS

- The salaries advertised for jobs are usually substantially lower than the actual salaries offered in the industry.
- On a median, the AI jobs advertised in India are offering a salary of 11.6 Lakhs per annum. This is substantially lower than the actual salary median of 14.7L for AI professionals.

# CONCLUSION

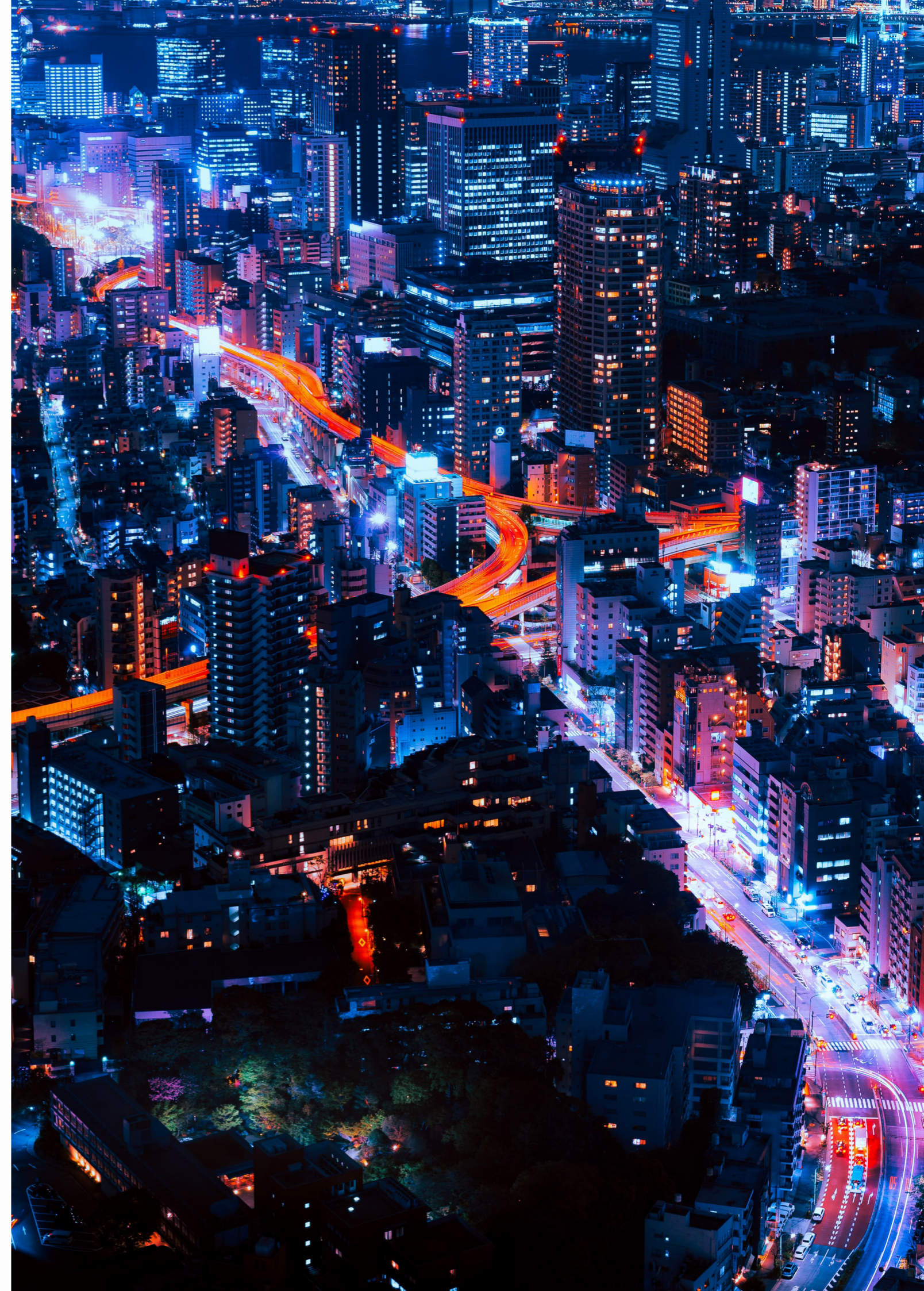
The Hitchhiker's Guide to Artificial Intelligence 2019-2020: By AIM & Great Learning found a steady growth in AI field in India, both in terms of market growth and the number of professionals added to the analytics workforce. Looking at the increasing number of jobs in AI, coupled with the void created due to the lack of skilled mid and upper-level management, education is one of the crucial ways this talent gap can be filled. In a modern enterprise, AI is not only needed at a product and development-level, but it is also of vital importance in decision-making.

The key trends that we predict we will see in 2020 revolve around the mass acceptance and usage of artificial intelligence

at an enterprise as well as consumer-level. New trends such as explainable AI, augmented analytics, hyper-automation and quantum computing, among others, are paving the path for creation and usage of advanced products and services to look forward to in 2020.

Some of the other important trends we suggest that readers look forward to are:

- Large scale adoption of business intelligence
- Rising AI-based optimization of enterprise processes
- Improved data management across Indian organizations
- Increasing use of chatbots and NLP voice assistants from end consumers
- Bigger AI budgetary allocations from the government



## RESEARCH **METHODOLOGY**

The Hitchhiker's Guide to Artificial Intelligence 2019-2020 is a result of a six-month-long survey where we sought responses from Indian professionals in Artificial Intelligence and Machine Learning industry with varying years of experience--ranging from freshers to mid and senior-level executives. Each respondent was questioned on his/her location, work designation, income level, educational background, experience level, industry type, company size, and tools and aptitudes they use in the profession. The respondents were

active across different business verticals including customer service, BFSI, medicine and healthcare, retail, e-commerce, IT products and services and manufacturing. The research methodology also incorporated an efficient arrangement to distinguish the different elements impacting work situations around artificial intelligence in India. Multiple data points were gathered after communicating with organizations across all major cities in India.

## ABOUT **ANALYTICS INDIA MAGAZINE**

Founded in 2012, Analytics India Magazine has since been dedicated to passionately championing and promoting the Analytics ecosystem in India. It chronicles the technological progress in the space of Analytics, Artificial Intelligence, Data Science, Big Data by highlighting the innovations, players in the field, challenges shaping the future, through the promotion and discussion of ideas and thoughts by smart, ardent, action-oriented individuals who want to change the world.

Analytics India Magazine has been a pre-eminent

source of news, information and analysis for the Indian analytics ecosystem by covering opinions, analysis and insights on the key breakthroughs and developments in data-driven technologies as well as highlighting how they are being leveraged for future impact.

With a dedicated editorial staff and a network of more than 250 expert contributors, AIM's stories are targeted at futurists, AI researchers, Data Science entrepreneurs, Analytics aficionados and technophiles

## ABOUT **GREAT LEARNING**

Great Learning is an ed-tech company that offers programs in career critical competencies such as Business Analytics, Data Science, Deep Learning, Machine Learning, Artificial Intelligence, Cloud Computing, Cybersecurity and more. Their programs are taken by thousands of professionals every year who build competencies in these emerging areas to secure and grow their careers.

Great Learning's programs are developed in collaboration with the world's foremost academic institutions like Stanford University, Purdue University, IIT Bombay, the University of Texas at Austin and Great Lakes Institute of Management, and are constantly reimagined and revamped to address the dynamic growth in the skills and technologies in these areas of study. Great Learning is the only

ed-tech company to provide these programs in a blended mode, classroom mode and in purely online mode, relying on its vast network of expert mentors and highly qualified faculty to deliver an unmatched learning experience for learners in India and the world over.

Having delivered over 10 Million learning hours and with 15,000+ alumni, Great Learning believes it is still in the initial phase of its avowed mission - to enable transformative career success in the digital economy for professionals and students across the globe. Their alumni network is spread across 250+ companies such as Google, Microsoft, Amazon, Barclays, Boeing, Ford, American Express, Deloitte, IBM, McKinsey, Accenture, Flipkart and many more.

# AI AT GREAT LEARNING

With Artificial Intelligence becoming an important part of most organizations, the subject has attracted wide attention among IT professionals and engineering graduates. They are keen to build a strong base in this upcoming field. The interdisciplinary application of AI and Machine Learning has led to a surge in interest among students from the STEM background, who are looking to improve skills and gain a deep understanding of AI theory and its business applications.

The following three programs by Great Learning in conjunction with the Great Lakes Institute of Management are widely regarded as one of the best MOOCs offering a combination of mentorship-based and technical learning in ML and AI:

1. Post Graduate Program In Artificial Intelligence & Machine Learning (PGP-AIML)
2. Post Graduate Program in Machine Learning (PGP-ML)
3. Deep Learning Certificate Program (DLCP)
4. AI for Leaders (AIFL)

These comprehensive programs, led by stellar faculty, introduces learners to the fundamentals of AI and ML concepts that underlie real-world application areas like Natural Language Processing, Computer Vision and Intel-

ligent Automation.

According to a Great Learning faculty member, learning by doing is hard, but effective. "Our programs are taught by industry practitioners – each an expert in their respective area. Our network of moderators and evaluators also bring a practitioner's perspective when evaluating and providing feedback to projects," a faculty member shared.

The format of the PG programs and the Capstone project gives students an opportunity to expand their learning, allowing them to gain hands-on experience with real-world use cases. Meanwhile, the 3-month online certificate program - DLCP allow learners to gain an in-depth understanding in Deep Learning. The live support sessions and a Deep Learning Lab, set a stage for a career in this rapidly growing field.

As one faculty member explained, to get more than a superficial understanding of a topic, a sustained focus is essential. That's the reason why Great Learnings unique program formats of online learning with weekend mentorship sessions or weekend classroom sessions with online content trump self-paced learning. They provide a framework and inculcate the discipline necessary to learn hard topics.

# BROAD OUTLINE OF AI/ML PROGRAMS & WHAT SETS THEM APART

## 1. PGP IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (PGP-AIML)

A 12-month comprehensive AI and ML program, is designed by Great Lakes and UT Austin-McCombs in the context of industry's requirement for AI applications. The program introduces learners to the basics of Neural Networks, Machine Learning and its application to AI tasks. The program is available in two formats to suit different individual learning needs

- A blended format with weekend classroom sessions and online content
- An online only format with online content and personalized weekend mentorship sessions

"The AIML program contains over 400 hours of learning (and much more depending on your starting point) - and is more exhaustive and thorough than nearly every program out there," explained Great Learning CS faculty member.

By the end of the program, students will be able to build and tune Deep Learning models and understand their variations in CNN and RNN. The experiential learning-based program backed by assignments, a Capstone project and led by award-winning faculty ensures one is job-ready with a solid portfolio of work on completion of the program. Some of the key features of the programs are mentioned below:

- Earn Dual Certificate from The University of Texas at Austin and Great Lakes
- Proficiency in all aspects of Machine Learning, Deep Learning and a glimpse of emerging areas in AI
- A real-world portfolio of projects: Build recommender systems, face recognition models, and fake news detectors, among many others
- The program covers the entire Deep Learning workflow and the code required to build various algorithms. By the end of the program, learners will be proficient in building and visualizing models in Python, use of Deep Learning frameworks Keras and TensorFlow and libraries like Scikit-Learn, Matplotlib and Numpy

**Key Facts:** The program consists of over 400 learning hours with Hackathons, Labs, 12 projects including a Capstone project . All project submissions are made on Github, ensuring that learners can showcase their entire body of work upon completion of the program.

**Prerequisite:** The program is aimed at working professionals with a graduate degree who are comfortable using a programming language and are familiar with college-level mathematic & statistics.

## 2. PGP IN MACHINE LEARNING (PGP-ML)

Another popular program, the 7-month PGP ML, (available in both blended as well as online only formats) gives learners a solid grounding in Machine Learning technologies and methodologies. Some of the topics covered are Bayesian networks, SVM, Supervised and Unsupervised Learning and Reinforcement Learning. The program is designed by Great Lakes and UT Austin-McCombs which includes video lectures, well-defined projects and class assignments to get a jump-start in this buzzing field.

A key part is the robust industry participation from leading tech companies like Genpact, MuSigma, Cognizant, Fybor among others in the form of guest lectures, visiting faculty and career opportunities. Some key features of the program are mentioned below:

- Earn Dual Certificates from The University of Texas at Austin and Great Lakes

## 3. DEEP LEARNING CERTIFICATE PROGRAM (DLCP)

With Deep Learning taking over a range of tasks, the 3-month Deep Learning Certification program, delivered online, introduces learners to the fundamentals of Deep Neural Networks and the tools required to build Deep Learning models and fine-tune them further. One of the most comprehensive Deep Learning programs, the program's faculty is drawn from IIT Bombay and Great Lakes. IIT Bombay's Dr. Arjun Jain is widely recog-

- Hands-on training in Machine Learning tools and techniques such as Python (Pandas, Numpy, Scipy), Matplotlib, Seaborn, Scikit-Learn
- An industry-relevant curriculum designed keeping in mind the business needs, packed with classroom assignments, projects and quizzes that arms learners with the skills to be job-ready.

**Key Facts:** The program features 120 hours of learning, with hackathons, 8 projects and 1 Capstone project. Learners will be armed with tech tools such as Python, Matplotlib, Seaborn, Tensorflow, Keras and Scikit-Learn. Learners can choose their own format based on their learning needs.

**Prerequisite:** The program is aimed at working professionals who want to hone their skills in Data Science, Machine Learning and Deep Learning.

nized for his contribution to Deep Learning, while Dr. Amit Sethi has extensively applied Deep Learning to cancer pathology. Professor Mukesh Rao, a well-known Data Scientist, designed and implemented ML algorithms for fake news detection and social media analysis. Some of the key features of the program are mentioned here:

- Learners can build industry-relevant skills by working on 3 real-world projects with

support from experts from IIT's, IIIT's and IISC

- Learners will gain an in-depth understanding of Deep Learning methods and its application in image classification, NLP, machine translation and computer vision
- The program can also benefit advanced learners who are looking for an in-depth overview of Deep Learning architecture and how to build end-to-end models for tasks
- Learners can work on an accelerated computing platform with GPUs and all other

software tools that one requires to build and test Deep Learning models on large-scale data sets

**Key Facts:** The program features 80+ hours of learning with live support sessions, industry sessions combined with hands-on projects.

**Prerequisite:** The course requires learners to have a strong background in statistics, mathematics, programming experience and an understanding of Machine Learning to understand the fundamentals effectively.

## 4. AI FOR LEADERS (AIFL)

**Learning Formats:** Online Sessions with Personal Mentoring

AI for Leaders is a 4-month intensive online program designed by Great Lakes and UT Austin-McCombs for leaders who want to use the knowledge of data and AI to make informed strategic business decisions. The program is suitable for non-tech business professionals who are looking to leverage the power of AI in their day-to-day decision making. Relevant profiles include product managers, directors, category managers, CXOs, delivery managers, product managers, senior managers and team leads who want to upskill themselves.

The program focuses on conceptual and real-world case-based approach which helps to simulate working scenarios where AI can be adopted to improve business outcomes.

**Key Facts:** Earn Dual Certificate from The University of Texas at Austin and Great Lakes.

The program follows an online delivery model over 4 months so that participants can learn according to their convenience. It offers 15 mentorship sessions, 6+ case studies, and 1 capstone project.

**Prerequisite:** The program is suited for managers and business leaders with at least 8 years of work experience.

## LIFELONG LEARNING WITH GREAT LEARNING

In addition to learning skills and building competencies required by the industry, Great Learning programs help students build their profiles in the Artificial Intelligence space. In a previous interview, Harish Subramanian, Director, Great Learning shared that a major differentiator is the key resources, workshops and industry interactions conducted regularly that allow candidates to prepare better for roles of their choice.

Candidates are able to build a body of work through multiple well-designed projects which add to their resume. Further, industry interactions enable the candidates to network with industry professionals working in leading tech companies. "Another added advantage is an active job board where we share opportunities with our candidates. The AIML programs offer lots of opportunities from leading companies and our alumni have successfully converted these opportunities," noted Subramanian.

The age of the degree is ending; the age of skills is here. More and more employers are looking for people who have cared to equip themselves with the latest skills.

The shelf life of a skill is getting cut in half every decade. Today, AI and ML are the skills in demand - in just 5 years, they may well become a commodity. The only way to stay relevant is to develop a learning habit.

At Great Learning, one can learn as much from peers as from the faculty. "Your peers have an average of 10+ years of professional experience. Some are master programmers, while others have a mastery of their domain. Learning with them, working on labs with them and building prototypes with them is an invaluable learning experience," shared a Great Learning faculty member.

A simple thumb rule - if you're learning something because a lot of people are telling you it's the thing to learn, you're already probably late. If your last acquired skill is 5 years old, it's definitely time to add the next one. At Great Learning, multiple programs are launched in a year, merely to help you stay with the times.

The 15000+ alumni of Great Learning have definitely learned at least one skill — the learning habit.

## HEAR FROM GREAT LEARNING ALUMNI

About building expertise with the transformational programs

“

*The projects have been tailor-made to get one started on the real projects that one would work in companies*

- SIDDHARTHA MURTHY,  
SENIOR ADVISORY CONSULTANT, IBM

“

*THE WEALTH OF KNOWLEDGE FACULTY CARRIES HELPED US UNDERSTAND THE TRUE POTENTIAL OF MACHINE LEARNING*

-BISHNOO ANANTH,  
SENIOR MANAGER, VMWARE

“

*The capstone project gave me an opportunity to optimize and automate the best practises used in the industry.*

-MONDAL SUDIPTA,  
SENIOR DATA ANALYST



FOR MORE INFO,  
**CONTACT**



**Analytics India Magazine**  
#280 , 2nd floor, 5th Main,  
15 A cross, Sector 6 , HSR  
layout, Bengaluru, Karnataka  
560102



[info@analyticsindiamag.com](mailto:info@analyticsindiamag.com)



**Great Learning**  
Plot No. 758 - 759, 1st Floor,  
19th Main Rd, Sector 2, HSR  
Layout, (Near Sri Sai Mandir),  
Bengaluru, Karnataka 560102



[info@greatlearning.in](mailto:info@greatlearning.in)