THE HITCHHIKER’S GUIDE TO
ARTIFICIAL INTELLIGENCE
2018-2019

A REPORT BY
ANALYTICS INDIA MAGAZINE AND GREAT LEARNING
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INTRODUCTION

Everyone is talking about Artificial Intelligence — the new normal, which has entered almost every work process across industries. Enterprises are rethinking and strengthening their AI capabilities, using it as a tool to improve products and services. With AI becoming crucial to enterprise success, upskilling has become the new mantra among Indian IT professionals, who are keen to make an impact in their careers with Machine Learning and AI.

In our annual AI Study, we take a look at key AI trends dominating the Indian AI market-leading companies, professionals, salaries, jobs broken down by cities and how AI’s potential for industry growth has risen over the last few years.

In the second half of the study, we cover AI literacy in India through Great Learning’s comprehensive AIML programs that are bridging the current skill gap and consequently boosting workforce transitions.
KEY TRENDS

- The Artificial Intelligence Industry in India is currently estimated to be $230 Million (annual) in revenue, up from $180 Million a year ago.
- Currently, there are around 40,000 AI professionals in India.
- There is a growing interest in AI with even the Indian Government doubling up spends/efforts in AI and ML research.
- AI applications have emerged in key areas like healthcare and agriculture.
- Bengaluru outpaces its peers in terms of attracting AI talent and has emerged as a leading AI hub in India.
AI PROFESSIONALS IN INDIA

- The average work experience of AI professionals in India is 6.6 years, same as last year.
- Around 3,700 freshers were added to the AI workforce in India this year.
- Almost 55% of AI professionals in India have a work experience of less than 5 years, same as last year.
- 23% of AI professionals have more than 10 years of work experience. This work experience is not necessarily in AI but these professionals have transitioned into AI over time.
- Women participation in AI workforce remains low – only 24% of AI professionals in India are women.
TENURE

• On average, AI professionals in India have joined/transitioned to their current role in the last 3 years.
• 67% AI professionals in India have joined/transitioned to their current role in the last 2 years.

• These numbers reveal that AI is a relatively emerging technology and a large number of professionals are gradually gravitating toward it.

CITIES

• Bengaluru leads the cities in terms of the size of the AI ecosystem. 32% of AI professionals in India are working in Bengaluru.

• This is closely followed by Delhi NCR at 22%.

EDUCATION

• 48% of AI professionals have a Masters/Post Graduate degree.

• 5% of AI professionals in India hold a Ph.D. or a Doctorate degree.

AVERAGE WORK EXPERIENCE OF AI PROFESSIONALS IN INDIA

<table>
<thead>
<tr>
<th>Work Experience</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 Years</td>
<td>27%</td>
</tr>
<tr>
<td>1-2 Years</td>
<td>40%</td>
</tr>
<tr>
<td>3-5 Years</td>
<td>19%</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>10%</td>
</tr>
<tr>
<td>10+ Years</td>
<td>4%</td>
</tr>
</tbody>
</table>

TOP CITIES WITH AI TALENT

<table>
<thead>
<tr>
<th>City</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bengaluru</td>
<td>35%</td>
</tr>
<tr>
<td>NCR</td>
<td>30%</td>
</tr>
<tr>
<td>Mumbai</td>
<td>25%</td>
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<tr>
<td>Hyderabad</td>
<td>20%</td>
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<tr>
<td>Chennai</td>
<td>15%</td>
</tr>
<tr>
<td>Pune</td>
<td>10%</td>
</tr>
<tr>
<td>Kolkata</td>
<td>5%</td>
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</tbody>
</table>
AI COMPANIES IN INDIA

• The 10 companies that employ the most AI professionals in India are Accenture, TCS, Cognizant, Infosys, Wipro, IBM, Microsoft, Amazon, Capgemini & HCL Technologies.

• More than 1,000 companies in India claim to work on AI in some form. This includes a small number of companies into products (chatbots, AI-powered visual search and recommendation engines) and a larger chunk offering either offshore, recruitment or training services.

• There is an increase of ~30% (YoY) in the number of companies setting up dedicated AI teams in India.

• Moreover, the number of vertical AI companies in India are still very few in number, compared to the strength of AI companies around the globe. Even in Analytics, India accounts for just 8% of global Analytics companies.
COMPANY SIZE

- On average, Indian AI companies have 87 employees on their payroll.
- Almost 85% of Analytics companies in India have less than 50 employees.

AI TALENT DIVIDE ACROSS COMPANIES

- Almost 37% of AI professionals in India are employed with large-sized companies (with a total employee base of 10k+).
- Mid-size organizations (total employee base in the range of 200-10K) employ 29% of all AI professionals in India.
- Startups (less than 200 employee base) employees form 34% of AI professionals in India.
- A large percentage of AI professionals are absorbed by digitally mature big tech firms that are increasing their investment in AI in India.
- This is also a clear indication of the AI talent divide between enterprises and startups in India which will only continue to widen further.
CITIES

• Bengaluru leads other cities when it comes to housing the most number of AI firms in India this year, at almost 31%.
• It is followed by NCR and Mumbai which house 25% and 14% of AI companies respectively.
• Hyderabad, Chennai, and Pune are far behind with their percentages of AI companies in single digits as reflected in the graphs here.
AI SALARIES IN INDIA

- The median AI salary in India is **INR 14.3 Lakhs** across all experience levels and skill sets.
- Around **40%** of AI professionals in India have an entry-level salary of 6 Lakh onwards.

Almost 4% of AI professionals in India command a salary higher than 50 Lakhs.

AVERAGE SALARY TREND ACROSS CITIES

- Mumbai is the highest paymaster in AI at almost **15.6 Lakhs** per annum, followed by Bengaluru at **14.5 Lakhs**.
- Chennai is the lowest paymaster at 10.4 Lakhs.
AI JOBS IN INDIA

- While it is difficult to ascertain the exact number of open AI job openings, according to our estimates, close to 4,000 positions related to AI are currently available to be filled in India. Open AI jobs is a different metric than new jobs advertised per month. Open jobs are number of jobs to be filled that month, whereas advertised jobs are new job openings in that month.
- Compared to worldwide estimates, India contributes to 10% of job openings currently. Growth in the number of AI jobs globally was much higher than in India.

- The 10 leading organizations with the most number of AI openings this year are – IBM, Accenture, Amazon, Fractal Analytics, Societe Generale, SAP Labs, 24/7 Customer, Atos, Nvidia & Tech Mahindra.
- The top skill sets that AI employers are looking for are Machine Learning, Natural Language Processing, Neural Networks, Analytics, Cloud Computing & Pattern Recognition.
- Almost 92% of AI jobs advertised in India are for full-time roles; 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.

EXPERIENCE REQUIREMENT BY AI JOBS

- Around 43% of organisations hiring for AI are looking for candidates with less than 5 years of experience.
- 6% of AI jobs are for freshers.

- Approximately 12% of AI jobs are from Mumbai, almost the same as last year.

- 57% of AI job openings are for professionals with more than 5 years of work experience.
CONCLUSION

With AI being perceived as a key driver for digital transformation, Indian companies are increasing their bench strength with the right people with specialized skillsets to take their businesses to the next level. A key takeaway from our annual study is that there is a high demand for AI professionals in India who will be core to developing AI solutions to solve business challenges. Another takeaway is that mid-sized companies are fast catching up with big India tech firms in terms of strengthening AI talent in India. With AI capabilities deepening across business functions in various sectors in India, the AI industry is estimated to be $230 million (annual) in revenue, up from $180M a year ago. India’s vibrant ecosystem is led by Bengaluru and Mumbai, with AI hubs upcoming in Gurgaon and Pune.
RESEARCH METHODOLOGY

This study is a result of extensive primary and secondary research, carried out over a period of six months by Analytics India Magazine, in association with Great Learning. The research methodology included a systematic plan to identify the various factors influencing job scenarios around artificial intelligence in India.

The data was collected through research on leading job portals in India, interactions with 100+ companies and 1000+ professionals across all major cities in India.

The samples were collected by quizzing the participants on employment trends in AI, the salary structure from fresher’s level to the managerial level, cities that offer best opportunities for these jobs, tools and skills that companies are looking for, analytics jobs across company type and much more.

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 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 is on a mission to make professionals proficient and future ready. They do this by creating industry relevant programs and crafting learning experiences that help candidates learn, apply and demonstrate capabilities in these high-growth areas.

At Great Learning, the programs always focus on the next frontier of growth in industry.
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)

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 Intelligent 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 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:

- 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 professionals with 3+ years of experience in a technology role, including some programming knowledge, preferably in Python.
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 co-created by Great Lakes faculty and industry professionals and 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:

- Hands-on training in Machine Learning tools and techniques such as Python (Pandas, Numpy, Scipy), Matplotlib, Seaborn, Tensorflow, Keras and 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.

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 recognized 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, IIT’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.
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 AML programs offer lots of opportunities from leading companies and our alumni have successfully converted these opportunities,” noted Subramanian.

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 5000+ 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 program was a natural choice as it allowed a blend of practical industry exposure and real-life project interspersed with domain knowledge through eminent faculty members and industry guests alike."
- AMIT MADAN,
COUNTRY MANAGER, TRANSTECHNOLOGY INDIA PVT LTD

“One thing that stands out about the program is the insights shared by the faculty that opened my eyes to the various applications and opportunities in the field of AI & Machine Learning."
- RAMACHANDRAN PURANAM,
DATA SCIENTIST, FSS

“The projects during the program was a great learning experience and helped me immensely during my statistical modeling projects."
- VISHRANTH CHANDRASHEKAR,
SENIOR CONSULTANT, FRACTAL ANALYTICS