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THE ONLINE SCHOOL OF ANALYTICS

Analytics Vidhya
Learn everything about analytics

ANALYTICS INDUSTRY REPORT 2017

SALARIES & TRENDS

An inside look on what influences
the Indian Analytics industry

INDEX

KEYNOTE

Kunal Jain,
CEO &
Founder
Analytics Vidhya

These are exciting times to be alive. On one side machines are rising and are helping us increase our productivity. On the other, they are automating work a lot of people used to do - in an efficient and accurate manner. Driverless cars, delivery drones, stores like Amazon Go are changing the face of industries - one after another. In such times, it is crucial to continuously upskill ourselves.

Last year, we released our first ever Salary Report. It was the first time a study based on real data was undertaken at such a scale. Even today, organisations refer to our Salary Report to influence decision making. The idea behind launching the Salary Report was to provide transparent, industry relevant, real time information about the current job market to our followers and audience.

Things have progressed rapidly in the industry post the last salary report. In times like these, releasing information by looking at the rear-view mirror is good, but not sufficient. The information and trends from the past need to projected into the future. Trends need to be tracked and understood before they are out there. That's why a simple Salary Report would not do this year, rather, an Industry Report outlining the latest trends and salaries in the economy and the ecosystem.

We have laid out how new age tools like Spark and techniques like Machine Learning are disrupting the industry. We have highlighted the impact of the automation wave and what it would mean for you. In addition, we have noticed and highlighted interesting trends that will affect the industry.

Without further ado, I invite you to go through the report. Have a look at the trends and plan on how can you upskill yourself.

EXECUTIVE SUMMARY

- Machine Learning is the best paying skill, beating Big Data to the top spot. However, a combination of Big Data and Machine Learning skills, ensures being recruited with a sizeable pay package.
- Open source tools dominate the analytics landscape, with Python and R commanding more pay than SAS now. The combination of Python+R pays higher than the combination of SAS+R and SAS+Python.
- IT professionals can increase their salaries by upto a third through analytics upskilling.

ANALYTICS UPSKILLING CAN HELP INCREASE **IT** PAY PACKAGES

INTRODUCTION

GET SKILLED IN ANALYTICS, BIG DATA AND MACHINE LEARNING FOR THE BEST PAY PACKAGES

CHANGING TRENDS

Up until last year, Big Data was THE buzz word when it came to hiring. While it's still on the radar, Machine Learning has emerged as the most sought after skill in 2017. The Big Data industry is not showing signs of slowing down – in fact, it is purported to grow to a whopping $16 billion industry by 2025.

Companies are moving to consolidate and democratize Artificial Intelligence, a big part of which is Machine Learning. Industry experts predict that by 2020, servers would be running data analytics more than any other workload. Automation in repetitive tasks is increasingly being adopted and implemented. Getting skilled in the big 3: Analytics, Big Data, and Machine Learning is what could get you hired with an incredible pay package.

R	26%
PYTHON	23%
SAS	20%
TABLEAU	17%
SPARK	14%

IN DEMAND ANALYTICS TOOLS

Top Tools for Analytics

If you are looking to enter the field of analytics, these are the top 5 tools that will help you build your case. For the first time, open source tools top the list, with R and Python being the top two tools. These tools are popular among analysts and developers for Machine Learning tasks as well. Tableau leads the race among data visualization tools and Spark is the top pick for Big Data.

Popularity of Analytics Tools

R has emerged as the most popular analytics and data science tool. While SAS is still widely used, it is no longer the top choice. Another tool that has seen increased adoption in the analytics community is Python, with many analysts and developers picking it up for analytics and Machine Learning tasks.

BECOME A BIG DATA UNICORN

Big Data has graduated from simple descriptive analysis or clustering analysis to Machine Learning techniques and visualization. Spark provides the ability to run Machine Learning algorithms in a "not-so-difficult" manner on large data sets while Tableau provides the ability to create powerful visualizations easily with data sets of any size.

The top Big Data skills that recruiters look for in the right candidate are:

Apache Hadoop

Apache Spark

NoSQL Databases
(MongoDB, Cassandra etc.)

Machine Learning

Data Visualization

POPULAR ALGORITHMS YOU MUST MASTER

Machine Learning algorithms are dominating business landscapes with Logistic Regression as the lone crusader for traditional statistical techniques.

Machine Learning algorithms stand out as the **must know algorithms.**

- Logistic Regression
- **Decision Trees**
- **Random Forest**
- **Support Vector**
- **K-means**
- OLS Regression
- Time Series
- **Neural Networks**
- Principal Component Analysis
- Monte Carlo simulation
- **Boosting and Bagging**

GET SKILLED IN BOTH MACHINE LEARNING AND BIG DATA TO EARN AN ENVIOUS PAY PACKAGE

MONEY MAKING IN THE MAJOR LEAGUE

Salary in lakhs per annum

BIG DATA	9.93 L
MACHINE LEARNING	10.43 L
MACHINE LEARNING + BIG DATA	13.94 L

Big Data salaries see only a slight bump as compared to 2016, whereas the new entrant, Machine Learning, pays better than Big Data.

It is not enough to level up on just Machine Learning though, as combining that with Big Data skills makes it the best paying skillset.

Machine Learning and Big Data skills together can fetch you a neat Rs. 13.94 LPA pay package.

DOUBLE YOUR SKILLS TO EARN 13.94 LPA

MORE TOOLS, MORE REWARDS

Salary in lakhs per annum

SAS	9.54 L
PYTHON	10.12 L
R	10.40 L
SAS+R	10.67 L
SAS+PYTHON	10.88 L
R+PYTHON	11.26 L
SAS+R+PYTHON	12.91 L

As a single skill, R pays the most. The demand for R and Python has spiked as compared to last year, indicating the arrival of open source tools as the top and best paying skills to have.

It is the combination of skills which pays better figures. Ability to work with multiple tools pays better than knowing just a single tool.

The best pay is for the blend of SAS+R+Python, at Rs. 12.91 LPA. This figure has gone up from last year's number.

COMBINE YOUR SKILLS TO EARN MORE

Hadoop, in combination with Spark and Tableau, along with knowledge of popular databases like Mongo and Cassandra, will make you that rare **Big Data Unicorn**.

WHERE SHOULD YOU WORK?

Salary in lakhs per annum

CHENNAI	9.44 L
KOLKATA	9.50 L
HYDERABAD	9.78 L
PUNE	10.25 L
DELHI NCR	10.69 L
BENGALURU	10.95 L
MUMBAI	12.39 L

Mumbai is the stronghold when it comes to pay. Bangalore, the IT capital, comes in second, followed closely by Delhi NCR.

Pay in all cities has seen growth while Chennai is stagnant.

MUMBAI TOPS THE PAYCHART AMONGST ALL CITIES IN INDIA

EXPERIENCE & PAY PACKAGES

Salary in lakhs per annum

0-3 YEARS	6.4 L
3-7 YEARS	11.3 L
7-10 YEARS	21.4 L
10+ YEARS	> 30 L

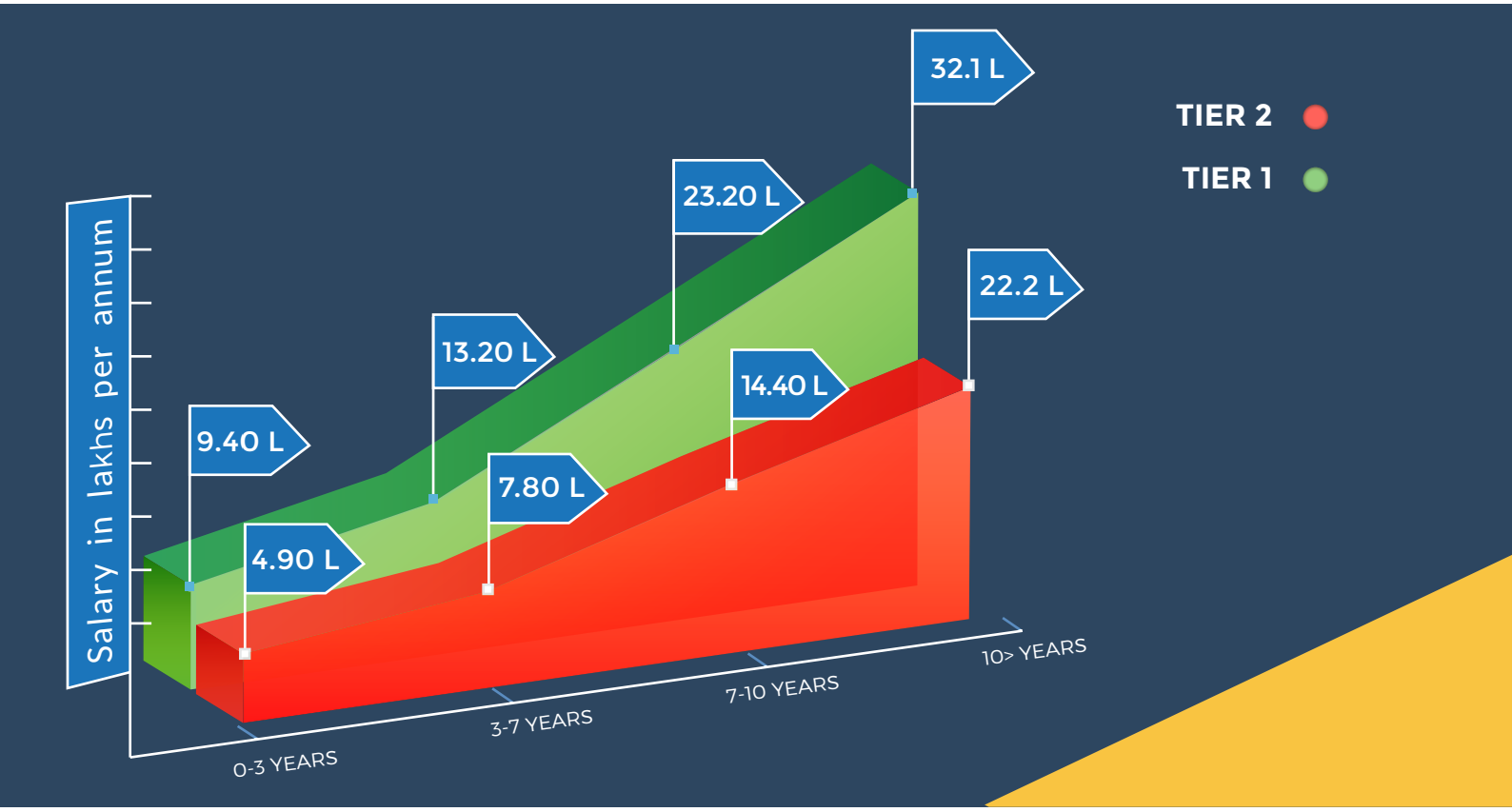
Freshers in analytics are paid well above other industries, with an average pay package of Rs. 6.4 LPA.

The 7-year mark sees a huge change for analytics professionals. The average pay jumps from Rs. 11.3 LPA before the 7-year mark to Rs. 21. 4 LPA after.

Analytics professionals with over 10 years of experience in the field can easily command over Rs. 30 LPA.

HAVE 10 YEARS OF EXPERIENCE? EARN 30 LPA WITH ANALYTICS

BIG CITY, BIG BUCKS



The starting salaries in Tier 1 cities beat those offered in Tier 2 cities by a long shot, by a 91% margin. While this difference reduces with experience, the lowest it hits is 44% at the higher end of the experience spectrum.

Throughout their careers, analysts in Tier 2 cities earn Rs 4.5 LPA to Rs. 9.9 LPA lesser than their Tier 1 counterparts on an average.

BIG CITY EQUALS BIG PAY

Easy access to Big Data and massive processing power has made Machine Learning techniques more popular than ever before among data scientists.

BEST DOMAIN FOR FRESHERS

Salary in lakhs per annum

ANALYTICS SERVICE PROVIDER
INFORMATION TECHNOLOGY
TRADITIONAL INDIAN BUSINESSES
E-COMMERCE

For an entry level analyst, e-commerce is the most rewarding sector, with an average salary at Rs 8.4 LPA, which is well above the other sectors.

Analytics service providers offer the lowest pay to freshers (at Rs 6.3 LPA), who get slightly better remuneration at IT companies and traditional Indian businesses.

DATA DRIVEN, ANALYTICS FOCUSED DOMAINS A MUST FOR FRESHERS

BEST CITIES FOR FRESHERS

Salary in lakhs per annum

- KOLKATA
- PUNE
- HYDERABAD
- CHENNAI
- BANGALORE
- DELHI NCR
- MUMBAI

Mumbai is a well-paying city for freshers as well. Delhi NCR beats Bangalore by a slight margin when it comes to paying freshers, with analysts in Delhi NCR being paid 4.5% more than their Bangalore counterparts.

Hyderabad, Pune and Kolkata offer a higher average pay than Chennai, but Chennai is the more attractive option for freshers.

MUMBAI OFFERS BIG BUCKS, BUT CHENNAI IS A BETTER OPTION

METHODOLOGY

The information gathered is from 65,000 advanced analytics profiles. The sources of data points include, but are not limited to:

- Application and employment data on Analytics Vidhya
- Searches on Analytics Vidhya
- Job sites listing analytics roles
- Data from Jigsaw Academy sources

For this study, only core analytics roles have been considered and the profiles with experience in purely BI and MIS have been excluded, to prevent skewing of the end data.

The findings are open to biases arising because of the nature of jobs/competitions hosted on Analytics Vidhya's website. However, we believe that even with this bias, this study of the Indian Analytics industry and the thousands of analytics professionals it employs, reveals many fascinating ground realities.

DATA IS THE NEW CURRENCY

KEY INSIGHTS

The skills needed by organizations has seen a rapid transformation. While earlier there was a need to be able to work on different aspects of analytics, now there is greater consolidation in job roles and descriptions.

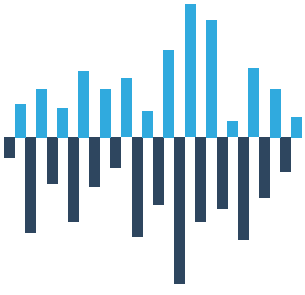
This is the age of the analytics specialist. Organizations are on the lookout for people with subject matter expertise within an area of analytics and the domain knowledge in their specific sector to set the business context. With this trend, the current set of skills that employers are looking for is quite different from what was needed a year ago.

IN-DEMAND SKILLS

Machine Learning

Machine Learning has seen a meteoric rise in terms of industry application in the last few years. Companies are embracing it to automate their iterative tasks, build AI applications, predict user behaviour with greater accuracy. Among its more interesting and futuristic applications are self-driving cars, fully automated homes, natural language processing (NLP), predicting and trading stocks and virtual assistants.

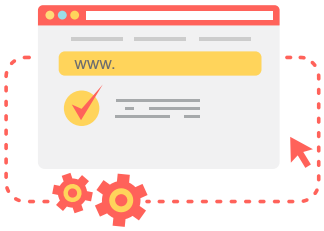
Data from the jobs portal *Indeed* shows that Machine Learning job listings outweigh the Machine Learning job searches by a ratio of 3:2. **This points to a shortfall of 33% in the jobs needed to be filled and the growing demand for people with Machine Learning skills.**



Data Visualization and Storytelling

Organizations have come to realize that it is not only about analysing the data, but also about how you present it that gets the work done. Data Visualization and Storytelling set the business context of what the data is saying and makes it simpler for the management and non-analysts to understand the model to make decisions based on it.

Data visualization is going to revolutionise how we work with data. Because it compresses information quickly, we can get better insights, faster. It also helps us learn to look at data more creatively, more imaginatively and more holistically.



Domain Knowledge

It is not enough to know how to analyse the data, but there is also a need to understand how the analyses apply to a business problem in a domain. Companies need analysts who have a strong business understanding, without which the analyses are just numbers and models without an application to the end game. **Business domain knowledge has become a pre-requisite for many analytics roles now.**

More domains are opening-up to analytics and Machine Learning, with the below domains in the need for skilled analytics professionals:

- Supply chain
- Social media & monitoring
- Text mining & NLP
- Internet of Things
- Credit risk & fraud

AUTOMATION IS DRIVING HUGE CHANGES IN EVERY INDUSTRY

Automation has started a new era in terms of the way we work. The execution of iterative tasks is being taken over by software and machines, leaving little scope for human intervention or need. This wave of change can be seen across sectors, notably in manufacturing, retail, IT services, supply chain and finance.

The effect is already being felt worldwide and more so in India with numerous tech giants, which are the largest employers in the country, on a continuous downsizing mode with frequent news of layoffs and hiring freezes hitting the headlines. Visibly, it's the IT professionals who are feeling the heat of this movement towards automated processes.

What would take humans days or weeks is being done in hours by machines and programs. Many industry pundits predict that in the next 5 to 10 years, we will see quite a few jobs being lost to automation. Is this to say a human worker will become obsolete? Not really. While automation is cutting down the current job roles, it will give rise to new ones. When these job roles arise, we will need a new kind of worker with the skills to handle them.

With automation comes data and there will be a huge demand for people who can work with this data. It will not be just data analysts or data scientists, but everyone will need to be able to work with data in almost every role, as this is what will drive an organization's decision making.

It has become imperative that we ready for the future and upskill to stay relevant.

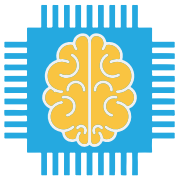
WHERE DO ANALYSTS COME FROM?

Analytics offers a significant jump in salary. The salary jump is higher for those with 1 to 5 years of experience. It is significantly lower in the short run for those with experience upwards of 5 years.

- Analytics is a popular option for Database Administrators, QAs and Testers who can see their salary increase by more than a third.
- Professionals in IT QA and Testing get the biggest pay rise when they move into analytics.
- Database Administrators get the best hike by moving into analytics.
- Contrary to popular belief, moving in from Software Development sees lower increase in pay, as compared to other streams.
- Senior IT professionals have the least chance of increasing their pay by a notable margin.

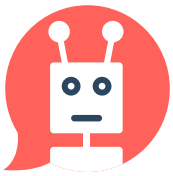
ROLE	% INCREASE IN SALARY
Database Administrator	18-35
Mainframes	12-22
Software Application Developer	12-18
QA, Testing	10-25
Sales, Business Development	5-15
Senior IT role	0-15

THE HOTTEST SKILLS FOR 2018



Artificial Intelligence

Singularity. This is what the world is moving towards. It's where we finally have a machine that functions on par with or exceeds the human brain and intelligence. Skills in Artificial Intelligence are being highly sought after for this exact reason.



Bots

Bots are on the rise. They perform special repetitive functions at a rate far higher than possible by a human. Web crawlers, internet bots, chatbots etc., are in high demand. The people who design them, even more so.

Internet of Things (IoT)

With a prediction of 50 billion connected devices by 2020 and a market value of $661 billion by 2021, IoT is the hottest skill right now. IoT in combination with Big Data and Analytics will create huge opportunities for both organizations and professionals.

Deep Learning

Deep Learning is the next step in Machine Learning and a step closer to Artificial Intelligence. Deep Learning will drive research to far more advanced levels and produce varied real time business and scientific applications in the coming future.

FUTURE FORWARD

The analytics industry is a lot more consolidated as compared to the scenario even 5 years ago. Specialists with functional and domain knowledge rank prominently in the recruiters' radar. Hiring pages now list specific job roles and requirements when looking for potential candidates. Newer and more concrete roles have emerged in the analytics industry, namely:

- Business Analyst
- Data Scientist
- Big Data Analyst
- Machine Learning Specialist
- Data Visualizer

WHAT THE FUTURE LOOKS LIKE

Gaurav Vohra,
CEO &
Co-founder
Jigsaw Academy

These are turbulent times. The Indian IT industry is facing a turmoil and the ripple effect can be felt in many places including, and especially, analytics. Faced with a stagnating demand and job losses due to automation, the IT industry has been looking to reinvent itself. Analytics and Big Data are booming fields with potential for high growth. Further, with a quant-oriented talent pool and long experience in providing analytics services to global clients, India has the potential and opportunity to become the global analytics hub - a destination of choice for data-centric services for businesses around the globe.

Indian IT companies have realised this and they are making the right moves. Whether this realisation has come in time or if they missed the bus already - time will tell.

Within the analytics industry itself, we have seen two big upheavals this year. I remember a time, not long ago, when a few tools dominated the analytics industry - all proprietary and all very expensive. The cost of dominant analytics tools was prohibitive and out of reach of all but the largest of the companies. Weka was a poor open source substitute for SAS, used by only the most desperate of businesses. R was struggling to gain a foothold outside of the research world. Access to the right tools was a major bottleneck in doing any analytics project.

Therefore, it is extremely heartening to see, for the first time, two open source tools (R and Python) dominating the analytics landscape. R and Python, along with open source Big Data tools like Spark, have transformed the space. They have become the tools of choice for data

ANALYTICS IS NOW OPEN SOURCE AND OPEN FOR ALL

scientists across the globe - not just for their low (or no) cost but simply because they are faster, better and more efficient than most tools out there today. Open source tools are a big reason why analytics adoption has shot up in recent years and I hope this trend continues for many years to come.

The other major upheaval in analytics is around the kind of analytics being performed in business projects. Easy access to large scale storage and massive computing power has brought Machine Learning into the limelight. Data scientists have always known the power of Machine Learning algorithms - they typically provide a higher accuracy than statistical models. However, they also need large amounts of data and are computationally intensive.

With cheap storage and cheaper processing power, there are no hurdles remaining now. And therefore, we are seeing the meteoric rise for Machine Learning. Neural networks, random forests, support vector machines - all these algorithms have become much more common now. The elegance of traditional statistical models is being replaced by brute computing power. As we move into the world of Deep Learning and AI, we will be placing increasingly more faith in the machines.