

Data Analytics Industry Guide

OVERVIEW

The Institute for Operations Research and the Management Sciences (Informs), a professional organization for those working in operations research (O.R.), management science, and analytics, defines analytics as “the scientific process of transforming data into insight for making better decisions.”

Analytics uses techniques such as mathematical modeling, data simulation, and probability and statistics to mine complex data sets for answers to complicated business questions. Data analytics is the process of examining big data to uncover hidden patterns, unknown correlations and other useful information that can be used to make better decisions across multiple industries. What this means for you is that industries are hiring across the board, and data analytics professionals are in demand.

Unlocking value from a tsunami of data — be it human or machine-generated — is the challenge facing organizations. Eventually, every aspect of our lives will be affected by big data. For instance, analysis of organizational databases, social networks, email feeds and geospatial data sourced from smartphones or sensors are allowing health practitioners to identify and corral disease outbreaks; providing better information to guide emergency services after a natural disaster; and delivering governments with better insight regarding citizen needs. Banks and retailers meanwhile, benefit by being able to predict what their customers want and to tailor products and services accordingly, while other sectors embrace the opportunity big data presents for growing revenue and reducing customer churn.

According to [Bernard Marr](#), one of the world’s top 5 business influencers, here are 5 ways we see big data analytics being used most frequently:

1. Understanding and Targeting Customers

Companies are keen to expand their traditional data sets with social media data, browser logs as well as text analytics and sensor data to get a more complete picture of their customers.

For banks it is about a finer grained understanding of the customer base and recommending cross-sell products;

For healthcare professionals it’s about understanding how to best treat a patient by analyzing similar cohorts elsewhere;

For retailers it’s about positioning products or offering highly targeted discounts to drive revenues;

For marketers in every business it is about extreme segmentation to ensure that marketing dollars are well directed and engender loyalty.



The big objective, in many cases, is to create predictive models. In predictive analytics, data analytics methods are being used to predict what consumers want based on many inputs. You might remember the example of retailer Target, who is now able to very accurately predict when one of their customers will expect a baby. Using big data, Telecom companies can now better predict customer churn; Wal-Mart can predict what products will sell, and car insurance companies understand how well their customers actually drive.

2. Understanding and Optimizing Business Processes

Big data is also increasingly used to optimize business processes. Retailers are able to optimize their stock based on predictions generated from social media data, web search trends and weather forecasts. One particular business process that is seeing a lot of big data analytics is supply chain or delivery route optimization. Here, geographic positioning and radio frequency identification sensors are used to track goods or delivery vehicles and optimize routes by integrating live traffic data, etc. HR business processes are also being improved using big data analytics. This includes the optimization of talent acquisition, as well as the measurement of company culture and staff engagement using big data tools.

3. Personal Quantification and Performance Optimization

Big data is not just for companies and governments but also for individuals. Data generated from wearable devices such as the Fitbit and the Up band from Jawbone, collects data on activity levels and sleep patterns. Most online dating sites also apply big data tools and algorithms to find users the most appropriate matches.

4. Improving Healthcare and Public Health

The computing power of big data analytics enable entire DNA strings to be decoded in minutes and will allow new cures and better understanding and prediction of disease patterns. Big data analytics also allow monitoring and predicting the developments of epidemics and disease outbreaks, by integrating data from medical records with social media analytics.

5. Improving and Optimizing Cities and Countries

Big data is also used to improve many aspects of living in cities and countries. For example, it allows cities to optimize traffic flows based on real time traffic information as well as social media and weather data. A number of cities are currently piloting big data analytics with the aim of turning themselves into Smart Cities, where the transport infrastructure and utility processes are all connected, such as monitoring traffic signals to predict traffic volumes and to minimize traffic jams.



How do firms use graduate level skills?

How are these exactly done? Much of the current enthusiasm for big data focuses on technologies that make taming it possible, using open-source, cloud computing, and data visualization tools such as R, Python, SAS, STATA, Tableau, SQL, Orange and Hadoop (the most widely used framework for distributed file system processing).

For graduate students, many of these skills may already be in your professional toolkit. However, what is important is not only mastering specific tools like SAS but the investigative mindset and techniques that can be used with any tool. It is important not to get tool-minded but to get process-minded.

For example, let's say that a data analyst job description stresses SQL Server Reporting Services skills and you only have knowledge of Microsoft Access. What you can do is let the job interviewer know that you have:

1. strong data analysis skills and
2. will be comfortable working on new tools.

You can achieve this by:

- stressing your data analysis experience by talking about your data validation experience,
- discussing how you have analyzed large datasets,
- drawn your own inferences and
- presented them successfully to management using a reporting tool.

Then you emphasize the strength or advantages of your data analysis background and repeat that you are willing to learn the data analysis tool used by the employer in question (and possibly, illustrate how fast you pick up new tools as well).

This is one way of showing transferable skills! You may also wish to point out other tools you have picked up on your own, such as by taking on MOOCs on Coursera, EdX or Udacity, or additional certifications, in order to demonstrate your interest and initiative.

What other experiences can graduate students bring to the table?

There are other key areas of transferability that you can bring to the world of big data analytics. You can guide interviewers towards areas of work that you have covered academically and professionally - be it your coursework, project work, independent consulting work, and previous work experience.



For instance, have you:

- Utilized any statistical and visualization tools through your coursework and project work that you can offer prospective interviewers a look into the way you think and create?
- Have you perhaps, through independent consulting work, covered a real-life problem involving a corporation, organization or institution, in which you helped to problem solve an issue that you can talk specifically about?
- How has your previous work and internship experience helped you overcome specific work challenges and how can these experiences be harnessed when you use them for behavioral based interviewing?

Skills to develop for a career in Data Analytics

The successful data scientist is one part programmer, one part statistician, one part creative, and thinks both like a CEO seeking solutions to business problems and a research scientist experimenting with the cyber world.

Data analytics is highly nuanced and requires discrete competencies — simply hiring someone with Hadoop experience is no guarantee of any sort of success. It is acknowledged that data analytics require a blend of technical analytical capability, along with business-side interpretation. To sum it up, Dave Holtz, ex-data scientist at Airbnb and current instructor of Udacity's Intro to Data Science course, shares a core set of [eight data science competencies](#) you should develop.

	Data Analyst	Machine Learning Engineer	Data Engineer	Data Scientist
Programming Tools	Very important	Very important	Very important	Very important
Data Visualization and Communication	Very important	Somewhat important	Somewhat important	Very important
Data Intuition	Somewhat important	Very important	Somewhat important	Very important
Statistics	Somewhat important	Very important	Somewhat important	Very important
Data Wrangling	Not that important	Not that important	Very important	Very important
Machine Learning	Not that important	Very important	Not that important	Very important
Software Engineering	Not that important	Somewhat important	Very important	Somewhat important
Multivariable Calculus and Linear Algebra	Not that important	Very important	Not that important	Somewhat important

Source: Udacity - What is Data Science? 8 Skills That Will Get You Hired in Data

Not that important

Somewhat important

Very important



Samples of Alumni Profiles

1. Akshay Chhabra <https://www.linkedin.com/in/akshaychhabra/>
2. Abhilasha Kamath <https://www.linkedin.com/in/abhilashakamath/>
3. Ed Levinson <https://www.linkedin.com/in/ed-levinson-7733b77/>
4. Rob McElherne <https://www.linkedin.com/in/robertmcelherne/>
5. Xingqi Shi <https://www.linkedin.com/in/xingqishi/>

Links to resources to learn more

What is Data Science & Analytics:

<https://datascience.berkeley.edu/about/what-is-data-science/>

<https://www.coursera.org/learn/data-scientists-tools>

<https://insidebigdata.com/2017/06/03/difference-data-science-data-analytics/>

Data Science & Analytics Interviews:

<https://www.thedsinterview.com/>

<https://www.analyticsvidhya.com/blog/2018/06/comprehensive-data-science-machine-learning-interview-guide/>

<https://in.udacity.com/course/data-science-interview-prep—ud944>

Other resources:

Code Academy <https://www.codecademy.com/>

Data Inclubator <https://www.thedataincubator.com/>

Data Fellowship <http://www.dssgfellowship.org/>

General Assembly (paid bootcamp) <https://generalassembly.ly/>

GitHub <https://github.com/>

Kaggle <https://www.kaggle.com/>

Lynda <https://lynda.uchicago.edu/>

