

: *What are examples of data science jobs?*

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Data scientist is the "new", "hot", "sexy" and high paying job associated with decision support and analytics. Why? Because data scientists are "the key to realizing the opportunities presented by big data" (Davenport and Patil, 2012). Data scientist is an evolving job category and there are a range of related data science jobs. To better understand the preparation needed for the job(s), it seems appropriate to briefly summarize some job titles, background requirements and job duties. Job duties determine the skills, knowledge and experience needed and hence are the most important topic to analyze. The following is an unscientific, anecdotal review derived from "big data".

A Google search on the 3 word string "data science jobs" on February 15, 2014 returned about 967,000,000 results. On the first page of results is an ad for data science job openings at Boeing, an ad for a job search web site and an ad for EMC data science certification. The first unpaid result is to the IBM page "What is a data scientist".

From a broad perspective, IBM answers the question "What is a data scientist?" IBM's answer: "A data scientist represents an evolution from the business or data analyst role. The formal training is similar, with a solid foundation typically in computer science and applications, modeling, statistics, analytics and math. What sets the data scientist apart is strong business acumen, coupled with the ability to communicate findings to both business and IT leaders in a way that can influence how an organization approaches a business challenge."

According to Jeanne G. Harris, Nathan Shetterley, Allan E. Alter and Krista Schnell in the CIO Journal, "Data scientists are in high demand, but our research has found there is simply not enough PhD talent to fill the jobs." The solution? "It takes teams to solve the data scientist shortage."

Based on a quick search of web-based job sites, the following paragraphs summarize some job duties starting with a more senior managerial position, then looking at the job "data scientist", and finally examining an entry level support job. The following descriptions are a composite of job ads.

Head of Predictive Modeling and Advanced Analytics

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In reality, new teams and business units are often created for data science and data analytics. The manager of such a unit might be hired with a title similar to Head of Predictive Modeling and Advanced Analytics. The title suggests supervising people working on predictive modeling.

So what would the person do? One job ad specifies tasks like: 1) develop a team of top notch data scientists. The group is tasked to design, develop, and field data mining solutions that have direct and measurable impact on marketing effectiveness. The role requires both a broad knowledge of existing data mining algorithms and creativity to invent and customize when necessary as well as experience in creating a team from the ground up and developing a new practice area with strong ties with the business. This is an outstanding opportunity for a dynamic and creative leader that wants to make a difference and help transform the company.

This manager would work in an environment that "includes a Hadoop based data warehouse and SAS/SPSS or R predictive modeling application." In particular this person would be responsible for:

- Building statistical models (both predictive and descriptive) for Campaign targeting prioritization, Nurture stream design and optimization, Response management prioritization, Analytics lead scoring, Account modeling, customer value migration, cross sell, churn or any other models meeting a specific business need
- Develop the organization's understanding of the business impact and usage of advanced modeling techniques
- Serving as the methodology "guru" across Marketing to identify and implement statistical models, techniques, tools and methodologies that improve our efficiency and effectiveness
- Work with the key business stakeholders (marketing, sales, channel, etc.) in understanding customer analysis needs and ensuring key requirements and objectives are addressed and achieved
- Contribute to the development of the market intelligence methodologies including data set requirements & specifications.
- Conduct data sourcing and integration and build predictive models to analyze customer purchase value, propensity and behavior.
- Analyze install base to identify migration, up sell and cross sell opportunities.
- Provide required support to operations and IT organizations to implement predictive models in operational systems

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Requirements: Undergraduate degree and above in Statistics, Computer Science, Information Engineering or a related field. 8-10 years' experience in data mining, customer analytics, or big data analytics in a well-known firm and/or an equivalent position in a major High Tech industry player. Familiar with data mining technology: regression, segmentation, association, decision tree, time series, neural network, association modeling, clustering, text mining, hypothesis testing - being able to develop hypotheses and test them with careful multivariate experiments and big data analytics. Strong knowledge of SAS Base, SAS-STAT, SPSS, R, Matlab and SQL , Hadoop / Hive / map reduced query skills. Open and creative mind-set. Excellent communication, writing skills and presentation skills. Experience hiring in the field with strong network and with ability to attract top talents. Team management experience including remote members. Willingness to adapt to flexible working hours necessary for a global role.

Data Scientist

This person will extract insights from data sets for product development, and to evaluate, and identify strategic opportunities. He/she will become the expert for digital metrics within the company. He/she will have a unique blend of thoughtful data-driven curiosity and pragmatism, and clearly know the difference between game-changing ideas and time sucking activities.

Essential Duties Include:

- Understand the data flowing through the organization and determine all parameters for analysis
- Create an information strategy for cross-platform analytics
- Assure data quality and integrity of digital metrics systems
- Actively troubleshoot data issues and collaborate with developers and vendors to resolve data issues and upgrade systems
- Create meaningful dashboards for executives, content leaders and digital newsroom staff, including historical reporting
- Mentor junior researchers and train colleagues in analytic techniques
- Independently perform data mining techniques and statistical analyses on large data sets to uncover critical patterns and predictive models
- Collaborate with product team to implement user testing and experiments
- Develop metrics to measure business performance

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- Build models to understand media behavior online to discover actionable insights
- Communicates on small teams, formal presentations and at business unit events
- Develop written communications to address varied styles and information needs
- Assess existing systems and recommend enhancements
- Build strong working relationships at all levels with clients and build problem-solving partnerships with clients and colleagues

Data Scientist

As a member of the data science team, he/she will develop and investigate hypotheses, structure experiments and build mathematical models to identify game optimization points that will encourage users to play our games more often, over longer periods of time, resulting in higher lifetime values. We are looking for a sharp, disciplined, and highly quantitative individual who has a passion for mobile gaming, data mining and mathematical modeling.

Responsibilities:

- Build mathematical models and automated machine learning tools to analyze and optimize all aspects of digital products, providing actionable insights in real time
- Design and implement statistical tests to verify the models
- Collaborate with data warehouse engineers on data selection, preprocessing and formatting for analysis
- Influence development teams to implement tools, features and/or designs

Data Scientist

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The following is a list of skills requirements: 1) Comfortable working with large, complex data sources; 2) knowledgeable of large scale data aggregation and processing; 3) Modeling and data mining within marketing; 4) Translating analytic insights into sharp, actionable business and marketing implications, 5) Advanced quantitative reasoning, 6) Ability to partner with internal and external clients, 7) Verbal reasoning and communication skills, 8) Strategic thinking and problem solving; 9) Attention to detail; 10) Project management; 11) Ability to apply skills to solve weakly structured business problems; 12) Expert knowledge of SAS, R, Stata, SPSS, Python, C++; 13) Expert skills in SQL and experience in using databases from within SAS; and 14) Experience with Windows and UNIX/Linux operating systems.

Watson Data Scientist

IBM is hiring software engineers into the Watson Solutions team which is responsible for building and extending the Watson technology into new market segments. You will join the team of professionals who are applying this exciting, ground-breaking natural language processing and machine learning technology to some of the most complex and demanding challenges faced by humanity. The commercial Watson platform is based on technology created by IBM Research and is an offering which is very different from most common software/hardware platforms in that it involves an uncommon and complex system of systems. This new product offering will meet the requirements of an emerging market for Learning and Reasoning Solutions. The capability is based on [UIMA](#) an Open Source framework for deployment of a highly parallel, probabilistic infrastructure running across dozens of Linux nodes.

As a Data Scientist, you will be responsible for understanding ground truth, creating training models, devise new statistical models, focus on big data using machine learning techniques around domain specific and domain independent data. You will be exposed to some of the latest tools and technologies within IBM. At the same time, your open minded, innovative, hacker mind set along with basic mathematical and statistical thinking is highly essential. Join us! Interested in learning more about IBM? Check out the IBM Jobs Blog- <http://blog.ibm.jobs/>

Requirements: 1) Master's Degree; 2) At least 4 years experience in Statistics and Statistical Data Modeling; 3) At least 4 years experience in Math (Probability, Linear Algebra, Correlation, Vector Manipulation etc.); 4) At least 2 years experience in Various statistical models (Naive Bayes, Logistic/Linear Regression, SVM, etc.); 5) At least 2 years experience in Big data (focussed on structured and unstructured); 6) At least 1 year experience in Text and Entity Analytics; 7) At least 4 years experience in Java, Python, PIG (Hadoop); 8) At least 6 months experience in Scripting: Perl, SQL, Triple, Graph; 9) At least 4 years experience in Tooling: SPSS, WEKA, SAS.

Business Intelligence Quantitative Analyst

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The Quantitative Analyst plays a key role in one of the most strategic areas of the company. You must be passionate about using data to answer complex questions. You will work cross-functionally to define meaningful success metrics for the company, use statistical analysis and data mining techniques to better understand user behaviors and influence product features. Key tasks: 1) Conduct proactive in-depth analysis and modeling to uncover hidden opportunities; 2) communicate insights to product, engineering, and management teams; 3) Build and maintain complex statistical models that learn from and scale to millions of users; 4) Collaborate with engineering on design and implementation of data infrastructure to support analytics needs; and 5) Work with business teams on requirements and goals for ad-hoc analysis.

So what is a data scientist? A research scientist with a Ph.D. who has industry experience and managerial skills. What are examples of other data science jobs? Statistical and quantitative analyst, Data analyst, and Data modeler. Data scientists are smart people with broad, general knowledge and outstanding computing, reasoning and quantitative and statistical analysis skills. Data science jobs at all levels require extensive formal academic training.

A promotional web page for Harvard data science extension training with the headline "Why Data Science Jobs Are in High Demand" recommends "if you are looking for data science training opportunities, search for options that provide these complementary skills. A good model is the Harvard Data Science course, which lists on its syllabus the following tangible lessons:"

- **Wrangle the data** (gather, clean, and sample data to get a suitable data set).
- **Manage the data** in a way that gives you access to big data quickly and reliably.
- **Explore the data** so you can generate a hypothesis.
- **Make predictions** using statistical methods such as regression and classification.
- **Communicate the results** using visualization, presentations, and interpretable summaries.

Most business, social and physical science Ph.D.'s who have conducted empirical research with large data sets have had to master the above skills. Check my column "What universities offer masters degrees in analytics and data science?" to find education opportunities. If you have an analytical Masters or research Ph.D. and want to update and expand your skills, check Amy's blog from togaware titled "One Page R: A Survival Guide to Data Science with R". Gaining the new technical skills is easier than developing the "soft skills" desired in the above job summaries. Training data scientists will be costly and challenging, but more qualified people are needed in

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business and government to analyze the massive amounts of data that our activities generate.

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