

Exploring Professional Data Science / Analytics Skills

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Abstract

As 2.5 quintillion bytes (1 with 18 zeros) of new data are created each and every day, the age of big data has taken on new meaning with a renewed sense of urgency to prepare students, young professionals, and other professionals across job functions for today's and tomorrow's analytics-roles along with the necessary skills to tackle growing data demands. With the number of organizations embracing Data Science / Analytics skills, the Bureau of Labor Statistics (BLS) projects the employment of computer and information research scientists with skills in data science, big data analytics, machine learning, AI, robotics, and programming will grow 16% from 2018 to 2028, much faster than the average for all other professions. ZDNet (Dec 2019); a website devoted to news coverage and analysis on the trends, technologies, and opportunities that matter to IT professionals and decision makers; found that data know-how is in demand and that Data Science dominates LinkedIn's emerging jobs rankings.

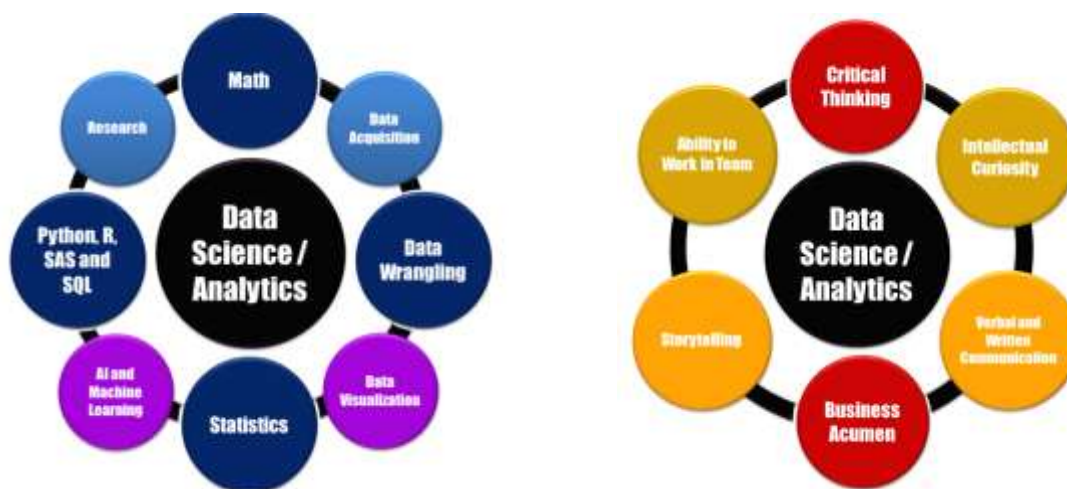
To help professionals acquire the data know-how skills needed in 2020 and beyond, many colleges, Universities, training organizations and educators/providers offer flexible on-site and online degrees, certificate programs and training. This presentation provides a current assessment of the Data Science / Analytics profession by exploring the skills many professionals have and/or may want to develop including an understanding of statistics; statistical programming languages such as SAS®, R or Python; Structured Query Language (SQL); Microsoft Excel; data visualization; communication; critical thinking; among others.

Introduction

Data science and analytics is a multidisciplinary field of study and is rapidly gaining dominance as the "go to" profession sought after by students. And, universities and colleges are taking notice of this demand by offering bachelor, master and doctorate degree programs along with a number of certifications to choose from. This paper highlights numerous areas of importance to aspiring data scientists and analytics professionals, including growth and salary projections, a list of universities and colleges offering degrees and certifications in data science and analytics, and the technical and non-technical skills needed for success.

The Multidisciplinary Field of Data Science / Analytics

Data is everywhere. And because data has found its way into virtually every aspect of our lives, the multidisciplinary field of data science / analytics is experiencing huge growth, soaring expectations, and interest from students, academics, industry, Government, and the world in general. As a multidisciplinary field, data science / analytics requires technical skills in mathematics; statistics; programming languages such as Python, R and SAS; SQL; data acquisition, cleaning, transformation, and visualization; research; AI; and machine learning. Non-technical skills include critical thinking; intellectual curiosity; verbal and written communications; business acumen; storytelling; and ability to work in teams (collaboration).



Projections for the Data Science / Analytics Profession

Data science – analytics jobs are everywhere. According to Weldon (2020), the best job market for data science jobs can be found at, “smaller companies who are starting to put their toe in the water to see how data scientists can improve their organizations.” Weldon’s comment is reinforced by any job seeker who has performed a job search by entering the term, “data scientist” at one of the many employment search websites like LinkedIn.com, Indeed.com, Glassdoor.com, Monster.com or Dice.com.

Average Annual Base Salaries

City	Salary
San Francisco	\$142,338 / year
Seattle	\$129,332 / year
Los Angeles	\$120,189 / year
New York	\$115,815 / year
San Diego	\$114,637 / year
Boston	\$112,059 / year
Houston	\$110,284 / year
Chicago	\$106,135 / year
Denver	\$106,025 / year
Washington, DC	\$105,975 / year
Phoenix	\$104,502 / year
Philadelphia	\$103,995 / year
Austin	\$102,470 / year
Dallas	\$101,208 / year
Miami	\$99,167 / year
Atlanta	\$98,202 / year
Raleigh	\$98,091 / year
Charlotte	\$97,935 / year
Indianapolis	\$96,778 / year
Jacksonville	\$96,764 / year
Cincinnati	\$96,229 / year
Tampa	\$95,752 / year
San Antonio	\$95,255 / year
Orlando	\$95,092 / year

Salary Information from www.Glassdoor.com (September 2019)

In Merrimack College’s article on “Data Science and Analytics Trends for 2019”, they project that “The Federal Government will experience a 19% growth rate in the field of computer and information research scientists by 2026.”

Cited by many job websites in 2019, Data Scientists with data science skills are highly sought after with demand experiencing an exponential rate of growth while the supply of skilled applicants is growing at a much slower pace.

Universities and Colleges with Data Science / Analytics Programs

A sampling of campus-based (brick and mortar) and online-based data science / analytics / big data analytics programs is displayed (in alphabetical order), below.

American University	Elizabethtown College
Arizona State University	Elmhurst College
Arkansas Tech University	Fairfield University
Assumption College	Fisk University
Auburn University	Florida State University
Babson College	George Mason University
Bay Path University	Georgetown University
Bellevue College	Georgia Tech
Boise State University	Golden Gate University
Boston College	Harvard University
Boston University	Husson University
Brigham Young University, Idaho	Iowa State University
Buena Vista University	Illinois Institute of Technology
Cabrini University	Immaculata University
California Institute of Technology	Indiana University, Bloomington
California State University, East Bay	Iowa State University
California State University, Fullerton	John Carroll University
Calvin College	Johns Hopkins University
Carlow University	Lewis University
Carnegie Mellon University	Lipscomb University
Carroll College	Louisiana State University
Central Connecticut State University	Luther College
Chaminade University of Honolulu	Marist College
Champlain College	Marquette University
Chapman University	Maryville University
Chatham University	Massachusetts Institute of Technology
City University of Seattle	McKendree University
Clarkson University	Mercyhurst University
College of Charleston	Metropolitan State University
College of Mount Saint Vincent	Millikin University
Colorado State University	Mills College
Colorado Technical University	Missouri University of Science and Technology
Columbia University, New York	Montana Tech of the University of Montana
Concordia College, Minnesota	Montclair State University
Cornell University	Neumann University
CUNY School of Professional Studies	New York University
Daemen College	North Carolina A&T State University
Dakota State University	North Carolina Central University
Daytona State College	North Carolina State University
Delaware State University	North Dakota State University
Denison University	Northeastern University, Boston
DePaul University	Northern Arizona University
Drexel University	Northern Kentucky University
Duke University	Northwest Missouri State University
Eastern Michigan University	Northwestern University
Edinboro University	Nova Southeastern University

Ohio Christian University	University of California, San Diego Extension
Oklahoma State University	University of California, Santa Barbara
Olivet Nazarene University	University of Chicago
Pace University	University of Cincinnati
Pennsylvania State University	University of Denver
Presbyterian College	University of Evansville
Purdue University	University of Georgia
Quinnipiac University	University of Houston, Downtown
Regent University	University of Iowa
Regis University	University of Kansas
Robert Morris University, Pennsylvania)	University of Massachusetts, Amherst
Roosevelt University	University of Massachusetts, Dartmouth
Rutgers University	University of Michigan, Ann Arbor
Saint Joseph's University	University of Michigan, Dearborn
Saint Louis University	University of Minnesota
San Diego State University	University of Missouri, Columbia
San Jose State University	University of Nebraska, Lincoln
Simmons College	University of New England
Slippery Rock University	University of New Hampshire
Smith College University	University of North Dakota
Southern Methodist University	University of Notre Dame
St. Catherine	University of Rhode Island
St. Michael's College	University of Rochester
Stanford University	University Saint Joseph
State University of New York, Potsdam	University of San Francisco
Stephen F. Austin State University	University of South Florida
Suffolk University	University of Southern California
Syracuse University	University of St. Thomas, Minnesota
Temple University	University of the Sciences
Tennessee Technology University	University of Virginia, Charlottesville
Texas A&M University	University of Washington
Texas Woman's University	University of Wisconsin, Madison
The Ohio State University	University of Wisconsin, River Falls
The State University of New York, Albany	University of San Francisco
Tufts University	Villanova University
University of Alabama	Virginia Tech
University of Arkansas	Washington State University
University of Baltimore	Westmont College
University of Bridgeport	West Virginia University
University of California, Berkeley	Winona State University
University of California, Davis	Xavier University of Louisiana
University of California, Irvine	Yale University
University of California, San Diego	

Data Science / Analytics Skills

After spending hours and hours reviewing each individual university and college data science and analytics programs, program requirements and specific courses from those listed above, I attempted to identify and list the common thread between most, if not, all of them. The following list of technical and non-technical skills highlights the common (or core) elements / skills deemed as essential building blocks for students seeking degrees and certifications from these institutions.

Technical Skills:	<ul style="list-style-type: none"> Programming including R, Python and SAS SQL Statistics – Descriptive and Inferential techniques Mathematics Ability to Work with Structured and Unstructured Data Data Wrangling Data Visualization Knowledge of Machine Learning, AI and Deep Learning
Non-Technical Skills:	<ul style="list-style-type: none"> Critical Thinking Intellectual Curiosity Business Acumen Verbal and Written Communication Storytelling Ability to Work in a Team (Collaboration)

Conclusion

As a multidisciplinary field of study, data science and analytics is rapidly gaining dominance as the “go to” profession sought after by students. As a result, universities and colleges offer bachelor, master and doctorate degree programs along with a number of certifications to choose from. This paper attempts to highlight numerous areas of importance to aspiring data scientists and analytics professionals, including growth and salary projections, a list of universities and colleges offering data science and analytics degrees and certifications, and the technical and non-technical skills needed for success.

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