# WHY CAREERS IN **DATA SCIENCE** ARE SMOKING HOT RIGHT NOW

## and 3 Industries Where They Can Offer Even More Job Satisfaction

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# Introduction

**When the amount of data started exploding exponentially a few years ago, some interesting things shot out of the big bang and captured everyone's attention: dollar signs. There's a lot of money to be made from the data explosion.** There's also a lot of money that companies leave on the table when they don't know how to exploit the customer data they have. And the people who do know how to exploit the data? They get paid a lot to do it.

That's where data science programs come in — to train professionals who know how to extricate every bit of profit-making potential lying deep within Data Mountain. Students are looking at the careers they can have in data science and thinking, "Sure, I'll do that for $150 grand a year." But do they know what they're getting into?

Both engineering colleges and business colleges are deep into data-focused programs these days, and many of their programs overlap. The difference between the two colleges is the level of sophistication. Business students are trained in analytics, in interpreting and in translating customer data for senior executives so that they can make business decisions based on it.

Data science engineering students, on the other hand, use more advanced methods and are expected to understand those methods from the ground up. They are the ones who find and write algorithms for issue-specific applications, many of which — through the use of machine learning — can predict an outcome. An example of such an application could be: *How much money can you make from this individual customer alone?*

**In terms of where the jobs for data scientists are,** Keith Dillon, assistant professor in the Tagliatela College of Engineering at the University of New Haven and program coordinator of their M.S. in Data Science program, says that the oldest applications are in marketing, advertising, and finance, including banking. "They have tons of databases of customer trends that need to be tapped and exploited," he explains. "If they can predict more accurately how much more a person will spend, they can adjust their business to optimize that."

Those areas are still hot, according to Dillon, but he is concerned that students will flock to data science programs for the high salaries that will ensue without putting enough thought into what sorts of companies or organizations they want to work for.

"A lot of people are chasing the money, but you have to remember: Things change. A hot company today may not be hot in five or ten years," he cautions.

"What's really important," he continues, "is where do you want to make an impact in society? You might as well pick something that you really believe in, where you want to contribute."

He mentions three areas where students can have the best of both worlds — data-science career success and employment in an area they may not have thought of but that would be personally rewarding:

## Healthcare

When most people consider how data science can be applied to healthcare, data such as personal medical history or family history of diseases tend to come to mind. Insurance company actuaries have those kinds of data, too, because they're all about statistics and potential risk.

**However, a lot of research has been conducted in the last ten years on how to make the best use of the massive amounts of data that are gathered when a person lands in the intensive care unit in a hospital.** Think of all the machines that are hooked up to an individual there. And every year, there's a new, more sophisticated machine. These machines gather massive amounts of data — terabytes of it. Data scientists are working on an algorithm that, based on this data, could predict what could go wrong next with the patient — before it's too late. Using that prediction, doctors could then customize a treatment approach for the individual.

**Mental health is another area where data scientists could make a huge impact.**
There's a colossal amount of data from brain imaging, questionnaires, discussions with patients, and observations by both psychiatrists and psychologists. But, unlike the straightforward, objective data gathered in a hospital ICU, mental health data is hard to use because it's much more complex, and two people with the same mental illness may exhibit very different symptoms. Mental diseases can have 5,000 variables. It would take one mental health professional an entire career to learn enough about them.

But what if an algorithm churned that data so that patterns could emerge, enabling psychiatrists and psychologists to arrive at a better diagnosis and treatment?

Dillon, whose own research focuses on the application of data science to the area of mental health, is enthusiastic about its potential. "They are finding a lot of pay dirt" he remarked. "With the old way of advancing you find one fact after another. But you need thousands and thousands of facts put together. Now we can run algorithms day and night on a whole parallel bunch of workstations, as if you had a hundred people."

# Security

**The brain of an AI system can be hacked. A black-hat hacker could give fake data to a machine and cause it to make bad decisions.**

For instance, data scientists have demonstrated the ease with which the brain of a self-driving car can be "confused." They've shown that you can put up signs with weird symbols and patterns on them that will cause the car to turn the wrong way. Lawsuit, anyone? You could spend an entire day imagining the various disaster scenarios that could play out.

Needless to say, a company like Uber, which is envisioning an entire fleet of self-driving cars, is extremely interested in data scientists who specialize in security. In fact, the company is investing heavily in it, and, just like Google, they have their own research group. It's pure survival. Any accident involving self-driving cars would mean an automatic mega-lawsuit, since victims have a billion-dollar company to blame instead of just the other driver, as in a conventional motor vehicle accident.

**In fact, any organization that employs AI will need security against black hats, so the possibilities for data scientists interested in this career application are nearly endless.**

The FBI is one of those organizations. The agency is moving its enormous databank to the cloud and has the funding to hire data experts in all 56 of its field offices. Right now, they're searching for interns in data science — in addition to criminals — and hoping that one will help them find the other.

John Adams, the executive assistant director of the FBI's information technology branch, stated, "We've actually done a big recruiting event, leveraging not only LinkedIn but having our field offices going out to targeted colleges and universities that have strong programs in data science. We believe that this is absolutely an area that is holding our organization back, with the amount of data that we are taking in and the lack of talent to actually help make sense of that vast amount of data."[1]

# Energy

**Fossil fuels and alternative energy are powering careers for more and more data scientists. Whether it's oil, natural gas, wind, or solar, they can all be better managed by strategic use of data science.**

Cutting costs through improved maintenance and equipment monitoring and reducing risk to the public through improved oversight are two of the biggest benefits.

"The energy industry has recently started to adapt the survival analysis concept from the medical field," stated Francisco Sanchez, president of Houston Energy Data Science. "In medicine, survival analysis is a statistical method to estimate survival rates for patients based on their condition, treatments, and related matters. In the oil and gas sector, this concept has been applied to field equipment."[2]

What's more, companies such as Chevron and BP have already digitalized their oil fields to collect data on temperature, pressure, volume, vibrations, and shock so that they can monitor every step of the production process. Every machine in the field is in constant communication with every other machine, and they're all sending data to company headquarters.

Seismic monitoring in the discovery of new deposits is another way that data science can make a huge impact in the fossil fuel sector. Through the use of monitoring tools, energy companies can properly assess the profit potential of a new find — that is, the amount of oil or gas that can be extracted from a site.

Of course, extraction disasters are always a worry that's top of mind, but data science can intervene here as well, detecting risks and thereby averting spills and other potential catastrophes that impact the environment and everyone and everything in it.

**Not to be outdone on the tech front, renewable energy is keeping pace with the fossil fuel sector in using data science to become more efficient and boost production.**

Sensors placed on wind turbines collect data such as wind speed, pitch, and yaw degree. By adding that information to data on how well the turbine is functioning and its history of repairs and productivity, companies can see exactly where they can improve output and cut costs.

What about solar energy? It's safe to say that the impact of data science here is going to be near-revolutionary. That impact will be felt especially in lowering the cost of solar panels and even in how solar panels are sold.

Attila Toth, CEO of PowerScout, a start-up that is using big data, analytics, and e-commerce to find better ways to sell solar panels, explains that solar is "still being sold door-to-door, just like vacuum cleaners in the 1950s."[3] The upshot of such a time- and labor-intensive sales practice is that consumers end up paying for it as part of the price of the panels.

The company uses machine learning to predict which people in their enormous database of current and prospective solar customers are apt to purchase solar panels. The manpower and time saved by quickly zeroing in on the most likely buyers could finally make solar panels competitive with fossil fuels in terms of price.[4]

Other solar technology companies are using machine learning to monitor and maintain panels for greater efficiency as well as to forecast atmospheric conditions up to 30 days out. Again, lower operating costs and higher output trigger the trickle-down effect of lower costs for consumers.

Of course, with all energy resources, a good deal of the savings in process and production can be wiped out by wasteful consumption on the part of end-users — individuals and industries alike. Data scientists are riding to the rescue here as well. Their mission: Analyze the vast deposit of consumption data and come up with ways for people to use less energy instead of companies having to produce more of it.

### Sources

[1] "FBI Faces 'Recruiting Challenge' in Plan to Hire Data Scientists at All Field Offices" by Jory Heckman, Federal News Network

[2] "How Data Science Is Changing the Energy Industry," by Bruce Harpham

[3] "How Data and Machine Learning Are Changing the Solar Industry," by Katie Fehrenbachers

[4] Ibid.

## Intrigued by the more unconventional career possibilities you can pursue with a data science degree?

Prepare to be a highly paid, in-demand data scientist in some of today's most important — and rewarding — job markets with an M.S. in Data Science from the University of New Haven.

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