Data Science vs. Software Engineering

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When you first begin your research in the tech field, you're likely to come across a vast array of different specialties and careers. Two of the most popular options out there are data science and software engineering. Both of these fields come with their own sets of pros, cons, similarities, and differences. Although they're both part of the tech industry, they're definitely two very different paths to go down. So how do you choose between the two? Which one is right for your interests? In this [Career Karma](#) article, we hope to help clear up any confusion between these two careers and help you decide whether either of them are the right choice for you.

What is Data Science?

Data science is a highly technical field that deals with interpreting information from structured or unstructured data sets. The information from these data sets is often extracted through a variety of different algorithms and scientific methods. In data science, the goal is to take these large sets of data, find patterns in the data, and interpret it in a way that allows a business to make actionable decisions based on what was found. A data scientist will be responsible for this, as well as creating new algorithms and systems to better interpret and analyze the data sets.

Data science is a highly valuable, in-demand field. The field continues to grow and there is plenty of opportunity out there if you have the right skills and experience.

What is Software Engineering?

Software engineering is another huge field in the tech industry. Software engineering has a fairly apt and self-explanatory title: it's using programming and engineering skills to create and develop new software. In software development, the goal is to create new programs, applications, systems, and even video games. Another goal is to constantly patch and develop existing software to make it better and ensure it performs at peak efficiency.

Software engineering is also a very valued field, and the benefits of a good software engineering skill set are well known. If you have software development skills, you're sure to find someone out there who would want to utilize them.

What are the Differences?

Although these are both highly technical fields, they are quite different in a variety of ways. They both have similar skill sets, but the way these

skills are applied is where these two diverge.

For the most part, a data scientist uses their skills to sift through data, interpret it in meaningful ways, find patterns in the data, and use what they've learned to help a business make a decision or learn how to be more efficient. They use coding and algorithms to organize all of the raw data they're given and make sense of it. In short, data science is much more analytical in practice.

Software engineering, on the other hand, is focused on creating systems and software that is user-friendly and that serves a specific purpose.

Let's look at an example:

If you're reading this on your Google Chrome app on your phone, a software engineer developed that app, and they continue to update and patch that app to ensure it works well with your new phone or new software update.

Now let's say you hop on your Google Chrome app to search "Best Coding Bootcamp for 2019." You'll see some pretty relevant results to what you've searched, and you're likely to find exactly the type of article you're looking for within the first few links. This is the power of a data science algorithm. The algorithm is able to sift through a huge data set; in this case finding articles about the best coding bootcamps, and the most relevant results for you. This saves you an immense amount of time because you don't have to endlessly search for a well-written, well-curated article. The algorithm has already done that for you.

So now maybe it's easier to see why these two fields are important and what they're capable of, but it's probably not enough to help you pick between the two. Let's look at each of these fields even closer.

Impact

When considering the importance and impact of these two fields on the tech industry, it's hard to quantify. Obviously, both of them have immensely and irreversibly changed daily life as we know it. Many of us can hardly remember a time where you couldn't just ask Siri to give you directions to the nearest coffee shop, or if you do remember those times you probably don't want to go back to them.

This is just another example of how huge of an impact these two fields have had on us. They literally effect our day to day lives. You don't have to drive around searching for a coffee shop when you need a quick caffeine jolt. You just ask your phone assistant, an app developed by a software engineer, to find one for you. Then, using an algorithm developed by a data scientist, it searches your query and finds you a coffee shop just one mile away. It then opens up your map application, developed by a software engineer, to tell you exactly where to go.

And that's just how it affects our personal lives. Software engineering and data science have had an equally tremendous impact on how businesses operate. Using software and big data, businesses are able to operate and make decisions informed by data. With these changes, businesses are able to better cater to their audience, making more revenue. Thus, these businesses are able to continue operating and creating new products and services tailored to their niche.

Methodology

Software engineers and data scientists have very different methodologies. Let's look at data science first.

Data science primarily uses the ETL methodology, which is short for Extract, Transform, Load. In short, this means the data, structured or unstructured, is extracted from a database. The data is read at this stage and is often pulled from multiple sources. The data is then transformed

into whatever format is needed and is then loaded into a different database. Probably one that is more specific and structured than the original. At this stage, the data can be more closely analyzed since it is now consolidated.

Software engineering, on the other hand, uses a methodology called SDLC, or the software development life cycle. This methodology is used to develop and maintain software. The steps in the software development life cycle include planning, implementation, testing, documentation, deployment, and maintenance. In theory, following one of the various SDLC models will lead to the software running at peak efficiency and will improve any developments in the future.

Approach

Another big difference between data science and software engineering is the approach they use for their ongoing work.

Data science is a much more process-oriented field. They use processes and algorithms to come to their conclusions and learn what they need to from their data sets. Once they recognize the patterns through their processes, then they can run the numbers and help inform any future decisions.

Software engineering, on the other hand, approaches their work with existing frameworks and methodologies. The Waterfall model, for instance, is a framework they might use to complete their work. The Waterfall model operates under the rule that a phase of the software development life cycle must be completed and reviewed before moving on to the next phase of the life cycle. If progress is deemed to be feasible under the current conditions, only then will the next phase begin. Some other frameworks used in software engineering include Agile, the V-shaped model, and Spiral.

Tools

Data scientists and software engineers use a wide variety of industry tools to do their jobs effectively and efficiently. Let's take a look at some of the tools that these two use in their daily activities.

A data scientist primarily has data analytics, algorithms, data visualization, and database tools in their toolbox. They use these tools to extract, analyze, and interpret the data they need. Some common data science tools include Algorithms.io, BigML, Cascading, Apache Giraph, Apache Spark, Apache Storm, and much more. As a data scientist, it's important to have the best tools for the job you're doing and to know how to use them.

A software engineer utilizes tools for software design and analysis, software testing, programming languages, web application tools, and much more. Some commonly used software engineering tools include Atom, Linx, Github, Bootstrap, and Codenvy. Of course, there are plenty of other tools out there. Which ones end up being in your toolbox will depend on the type of work you're doing.

Required Skills

It should come as no surprise, but software engineers and data scientists get paid quite well. Their pay figures are no accident, they need to master highly technical skills in order to excel and succeed in their careers. Plus, they need to continually learn as the technology and methodology for both fields evolve. That being said, let's look at some skills you need to master if you want to be a data scientist or software engineer.

The most important skills you'll need to know to become a data scientist include but aren't limited to programming, machine learning, statistics, data visualization, and a willingness to learn. Different positions may require more than these skills, but it's safe to say these are the bare

minimum when pursuing a career in data science.

If you're interested in software engineering, many of your required skills will be a little more intangible. Of course the ability to program and code in multiple programming languages will be required, but you also need to be able to work well in teams, problem solve, adapt to different situations and have a willingness to learn. Again, this isn't an exhaustive list of the skills you'll need, but these skills will certainly serve you well if you're seriously interested in this career path.

How to Become a Data Scientist

In the tech field, data scientists is one of the career paths were graduate levels of education are most valued. If you want to become a data scientist, your first step should be to see if programming and data interpretation is even something you're interested in. You can learn some basic coding and take an introductory data science course to see if it's right for you. Next, you'll want to get your undergraduate in data science or a related major. During your studies, it's highly recommended to make connections and undergo internships. After graduating, hopefully you can leverage your connections into an entry level job. To move up in your company or get a better job, you may need to pursue a Master's degree or even a PhD.

The barrier to entry for data science may be high, but the above path isn't necessarily the only way to break in. With data science bootcamps, you can have a chance of getting into the data science industry without needing to go through years of school. That doesn't mean you won't be continuously learning for years to come, but you can perhaps get your foot in the door much sooner. This is the expedited path to a career in data science, but it certainly isn't an easy one. Hard work and dedication will be required on this path.

How to Become a Software Engineer

Software engineers often don't require quite the same level of education that data scientists do, and many are even self-taught. Completing a two or four year degree is the more traditional path to becoming a software engineer, but coding bootcamps are another viable option here. If you want to become a software engineer, you'll need to be proficient in at least one programming language, preferably more. The more languages you're proficient in, the more jobs you'll be able to qualify for when you begin searching. Again, becoming a software engineer requires hard work and dedication. But if you're willing to put that work in, you can break into this field and have a successful career. Keep in mind, the barrier to entry for software engineering isn't quite as high as data science, so this might be something you want to keep in mind when making your decision.

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