

# the BIT

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# On Creative Desk

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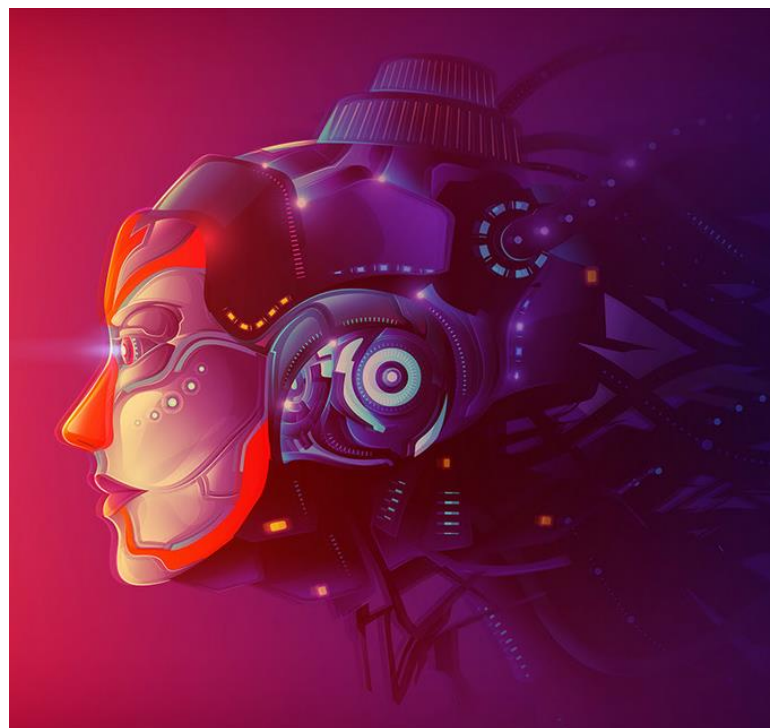
# EDITORIAL

There will never be been a more brilliant viewpoint for youthful software engineering studies than today. As these new details show, software engineering graduates have probably the most elevated beginning salaries out there and are in such appeal that they can stand to be choosy about the kind of work and industry they decide on. Also, it's not difficult to perceive any reason why. Innovation has been developing so dramatically over late years, there has been a consistently expanding interest for bright graduates to come in and help to change territories going from information foundation to network protection. Innovation is continually refreshing at such a quick speed that it appears it may be quicker than light! An innovation or a programming language that is getting out and about this week might be old by the following not many days! As an ever increasing number of assets are put into innovative work, researchers and experts are continually tweaking and improving existing advances to capitalize on them. On the off chance that you are keen on seeking a profession in IT, it's essential to stay up to date with the most recent patterns in software engineering research, to settle on an educated decision about where to head straight away. Extending your stockpile of tools additionally improves your worth as an expert in your profession. Check out these trends storming the tech industry.

## ARTIFICIAL INTELLIGENCE AND ROBOTICS

A huge part of this development is down to the strength of premium and interest in computerized reasoning (AI) – quite possibly the most controversial and captivating regions of IT research. The innovation is as yet in its beginning phases, however tech monsters like Facebook, Google and IBM are putting away enormous measures of cash and assets into AI research. There's surely no deficiency

of freedoms to grow genuine uses of the innovation, and there's a huge degree for getting through minutes in this field. By 2030, AI mechanization is required to make in excess of 70 million positions. The pitiful actuality



is that AI may clear out in excess of 23 million positions by a similar time period. Simulated intelligence will make occupations in regions like testing, support, upkeep, programming and information science.

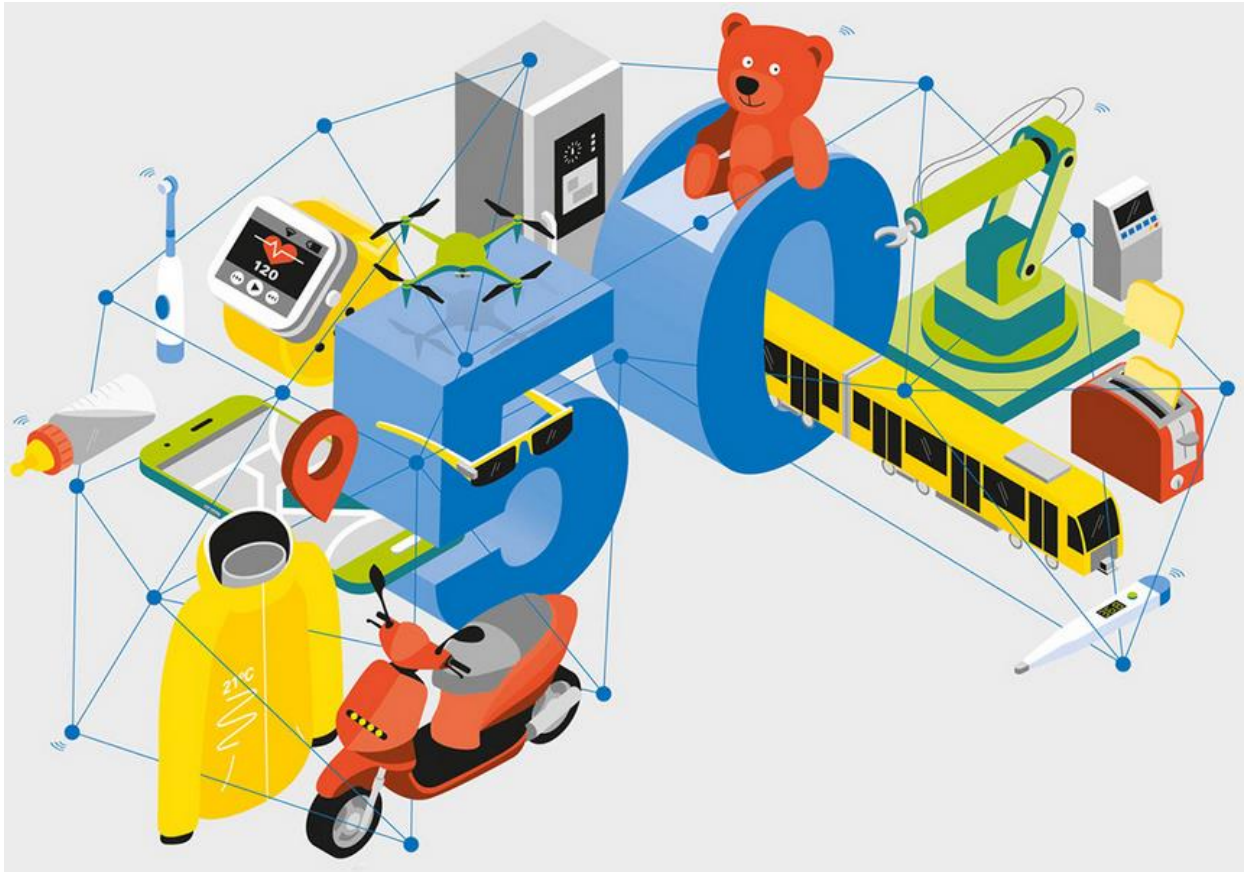
## **DATA SCIENCE**

Data Science is the innovation that assists with sorting out complicated information. You realize that information is created in a humongous sum each day by organizations. This incorporates business information, sales information, client profile data, worker information, and monetary figures.

The vast majority of this information is as gigantic informational collections that are structured or unstructured. The part of information researchers is to change over these unstructured informational indexes into organized datasets. At that point, these informational collections can be examined to distinguish patterns and trends. These patterns are valuable for understanding the organization's business execution, client maintenance, and how these areas can be improved. Future scope of data science is bright which will create opportunities for the following career roles: Data Scientist, Data Architect, Business Intelligence Manager, Data Engineer, Data Analyst, and Business Analyst.

## **INTERNET OF THINGS**

The IoT (Internet of Things) is a network of gadgets that are connected with one another. Their gadgets will interact and offer information with one another. These gadgets might be associated by means of WiFi, and they share information about their surroundings and how they are being utilized. These gadgets have a central processor that encourages this trade. IoT empowers the association between various gadgets as well as their remote access. For instance, you lock doors of your vehicle distantly, preheat your ovens, ac's and geysers. The smart watches that you use for tracking the calories you burn also run on IoT technology.



IoT chips installed on machines assist organizations with evaluating the presentation of those machines and aid their support. Learning this most recent innovation will help you secure positions, for example, IoT Software Developer, System Design Engineer, IoT Product Manager, IoT Research Developer, IoT Solution Architect.

## VIRTUAL REALITY

VR is simply the innovation by which you can inundate yourself in a climate that appears to be amazingly reasonable. It is the utilization of innovation for establishing a reproduced environment. It is prevalently utilized for playing PC games. Dissimilar to conventional games where you experience the gaming environment by viewing it on the screen, you are directly positioned in the environment! Senses like touch, hearing, smell, and vision are reproduced in these environments. Utilizing VR gear like headsets, you can stroll around and play the game in that 3D world. Augmented Reality (AR) is the innovation utilized for improving this virtual climate. The major organizations in this field are Facebook's Oculus Rift, Sony's PlayStation VR (PSVR), and the HTC Vive. The VR innovation isn't



just utilized for entertainment, yet it is additionally utilized by the U.S. Naval force and Coast Guard for training staff. They utilize a VR game called VirtualShip. AR and VR are utilized by specialists while doing a medical procedure. Guests in a carnival or a gallery can likewise utilize the innovation to improve their experience. Here are some VR work positions you can pay special attention to: Content Producer, AR and VR Content Writers, Product Management, Software Engineer, UI and UX Design, Quality Assurance.



**Dr. Neeba E. A.**

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## **DATA IS THE NEW OIL**

Data in the 21st Century is like Oil in the 18th Century: an immensely, untapped valuable asset. Like oil, for those who see Data's fundamental value and learn to extract and use it there will be huge rewards. We are in a digital economy where data is more valuable than ever. It's the key to the smooth functionality of everything from the government to local companies. Without it, progress would halt.

For many companies, their data infrastructure is still a cost center nowadays and should become a profit center by using the data to improve everything, day by day. Companies must begin treating data as an



enterprise wide corporate asset while also managing the data locally within business units.

This enables sharing of data about products and customers – which provides opportunities to up sell, cross sell, improve customer service and retention rates. By using internal data in combination with

external data, there is a huge opportunity for every company in the world to create new products and services across lines of business.

When your business is growing, more and more people have opinions about which steps need to be taken. It helps to work with a ‘good data beats opinion’ philosophy. Almost everything can be tested, measured and improved. If you can measure it, you can improve it. Inspire people to come up with new ideas and pick up new opportunities and just test it and see what the impact is. A test which you’re measuring is never worthless. At least you get new insights about if it’s working or not (and why) and in the best case, you got insights and improved your business directly.

you’ve real time access to the most important data in your business. Only knowing your total revenue, profit or costs is not enough. Knowing which KPI’s influence them and other business goals is much more important, because you learn how to improve your business. In fact, the value lies in micro data, not in macro data. Data is an essential resource that powers the information economy in much the way that oil has fueled the industrial economy.

Once upon a time, the wealthiest were those with most natural resources, now it's the knowledge economy, where the more you know is proportional to more data that you have. Information can be extracted from data just as energy can be extracted from oil. Traditional Oil powered the transportation era, in the same way that Data as the new oil is also powering the emerging transportation options like driver



less cars and hyperloop (1200km/hr) which are based on advanced synthesis of data informed by algorithms and cognitive knowledge without use of fossil fuel. Traditional oil is finite, Data availability seems infinite. Data flows like oil but we must “drill down” into data to extract value from it. Data promises a plethora of new uses — diagnosis of diseases, direction of traffic patterns, etc. — just as oil has produced useful plastics, petrochemicals, lubricants, gasoline, and home heating. Oil is a scarce resource. Data isn't just abundant, it is a cumulative resource. If Oil is being used, then the same oil cannot be used somewhere else because it's a rival good.

This results in a natural tension about who controls oil. If Data is being used, the same Data can be used elsewhere because it's a non-rival good. As a tangible product, Oil faces high friction, transportation and storage costs. As an intangible product, Data has much lower friction, transportation and storage costs. The life cycle of Oil is defined by process: extraction, refining, distribution. The life cycle of Data is defined by relationships: with other data, with context and with itself via feedback loops.

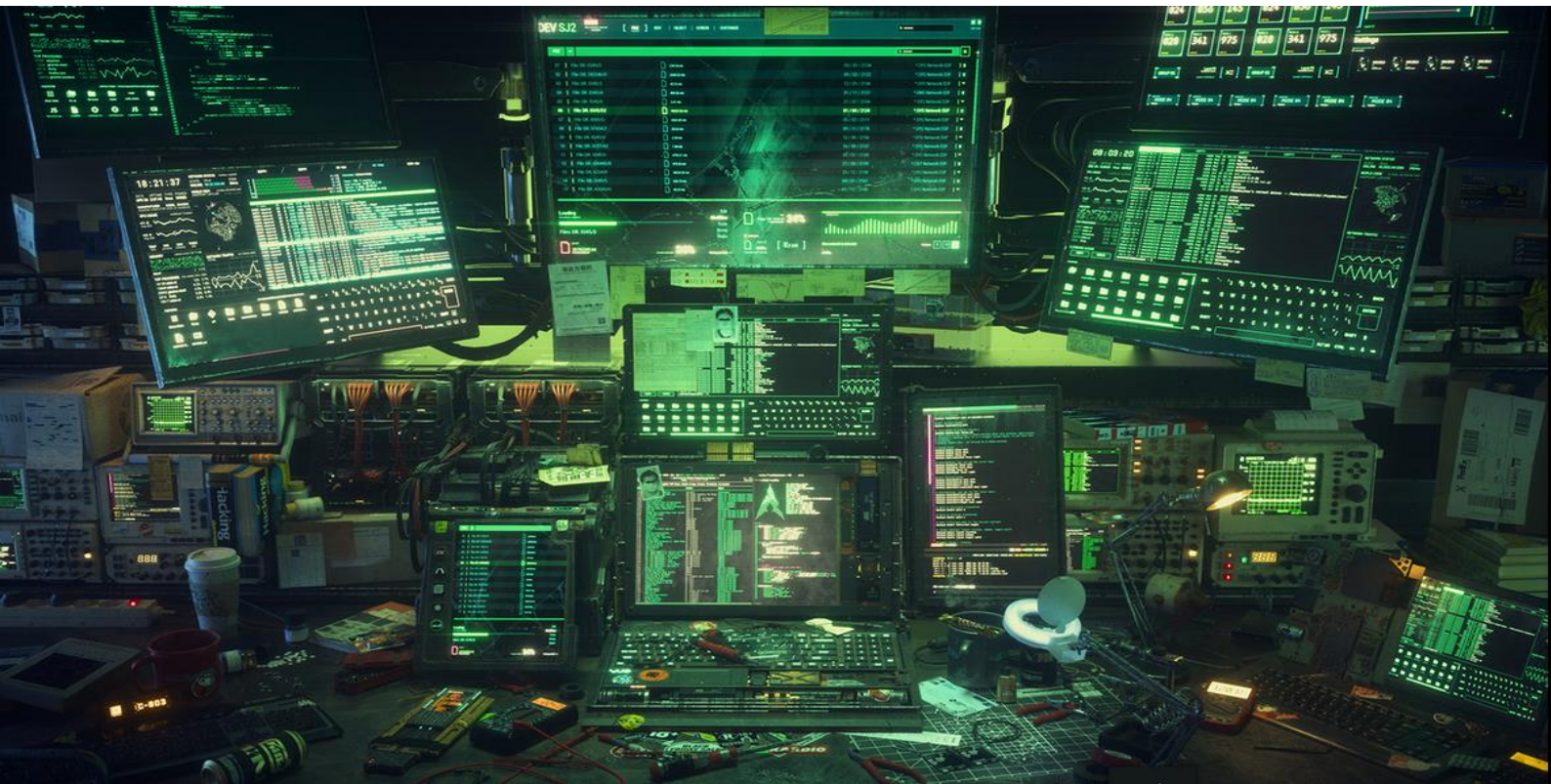


Despite data's immense value, companies should also be sure to identify weak spots in data strategies. One of the most important questions to ask is this: What are you trying to do with all this IoT data? If you can't answer that question, you'll often become misaligned.

This value-based question plays out in industries across the board, but agriculture presents a particularly good example. IoT represents a \$4 billion market opportunity for this industry in the future, but only 10% to 15% of farmers use the technology now. Among those who are using it, though, there are some fascinating use cases. Because agricultural technology is so tied to outcomes, the value of IoT data here is easy to define. For example, IoT integrated into a combine can give a farmer an approximation of yield almost instantly. This is a far cry from waiting through the standard drying and weighing process to see whether the harvest meets expectations. In this instance, IoT-driven data is easier to handle because it's trained with a coherent goal in mind: Getting the farmer the information necessary for a specific output as soon as possible.

**Mr. Mathews Abraham**

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## UNHACKABLE INTERNET

An internet based on quantum physics will soon enable inherently secure communication. A team led by Stephanie Wehner, at Delft University of Technology, is building a network connecting four cities in the Netherlands entirely by means of quantum technology. Messages sent over this network will be unhackable.

In the last few years, scientists have learned to transmit pairs of photons across fiber-optic cables in a way that absolutely protects the information encoded in them. A team in China used a form of the technology to construct a 2,000-kilometer network backbone between Beijing and Shanghai—but that project relies partly on classical components that periodically break the quantum link before establishing a new one, introducing the risk of hacking.

The Delft network, in contrast, will be the first to transmit information between cities using quantum techniques from end to end. The technology relies on a quantum behavior of atomic particles called entanglement. Entangled photons can't be covertly read without disrupting their content. But entangled particles are difficult to create, and

harder still to transmit over long distances. Wehner's team has demonstrated it can send them more than 1.5 kilometers (0.93 miles), and they are confident they can set up a quantum link between Delft and the Hague by around the end of this year. Ensuring an unbroken connection over greater distances will require quantum repeaters that extend the network.

Such repeaters are currently in design at Delft and elsewhere. The first should be completed in the next five to six years, says Wehner, with a global quantum network following by the end of the decade.



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## DIFFERENTIAL PRIVACY

In 2020, the US government has a big task: collect data on the country's 330 million residents while keeping their identities private. The data is released in statistical tables that policymakers and academics analyze when writing legislation or conducting research. By law, the Census Bureau must make sure that it can't lead back to any individuals.

But there are tricks to "de-anonymize" individuals, especially if the census data is combined with other public statistics.

So the Census Bureau injects inaccuracies, or "noise," into the data. It might make some people younger and others older, or label some white people as black and vice versa, while keeping the totals of each age or ethnic group the same. The more noise you inject, the harder de-anonymization becomes.



Differential privacy is a mathematical technique that makes this process rigorous by measuring how much privacy increases when noise is added. The method is already used by Apple and Facebook to collect aggregate data without identifying particular users.

But too much noise can render the data useless. One analysis showed that a differentially private version of the 2010 Census included households that supposedly had 90 people.

If all goes well, the method will likely be used by other federal agencies. Countries like Canada and the UK are watching too.

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**INTERNET OF BEHAVIOUR**



## WHAT IS INTERNET OF BEHAVIOUR?

To put it in layman's terms what IoB does is connect data over the internet (i.e. maybe the activities of purchasing a product or searching for a product) to human behaviour.

## IS IOT AND IOB THE SAME?

The IoT is a network of interconnected physical objects that gather and exchange information and data over the internet. What the IoB does is make sense of this data and attach it to specific human behaviors such as purchasing, or following a specific brand online. Consider the IoT the bottom of this pyramid, gathering the data and perhaps turning it into information. The IoB, then, attempts to turn that information into knowledge.

## UNDERSTANDING IOB WITH AN EXAMPLE

IoB is a combination of TECHNOLOGY, DATA ANALYTICS AND BEHAVIOURAL SCIENCE. We can break behavioral science into four areas we consider when we use technology: emotions, decisions, augmentations, and companionship.

As companies learn more about us (the IoT), they can affect our behaviors (the IoB). Consider a health app on your smartphone that tracks your diet, sleep patterns, heart rate, or blood sugar levels. The app can alert you to adverse situations and suggest behavior modifications towards a more positive or desired outcome.

## BENEFITS OF IOB



Analyze customer buying habits across platforms



Study previously unobtainable data about how customers interact with devices and products



Gain deeper insights into where a customer is in the buying journey



Provide real-time point-of-sale notifications and target ads



Quickly resolve issues to close sales and keep customers happy

## DOWNSIDE OF IOB

Initially, IoT devices itself is a bit problematic. A lot of information is gathered through the source which primarily is a good thing because people get to benefit from the setup. But what is getting at most concern is the way the information is gathered, navigated and used, particularly at large scale.

Cyber criminals can hack into sensitive data and exploit it to use it against individuals personally or even against the companies.

## OTHER CASES OF USING IOB

- During the pandemic, using computer vision organizations began to use IoB to recognize whether a person was wearing a mask or not. Also, in some cases, thermal imagers were used to identify people with increased body temperature.
- Using a smartphone allows you to track a person's geographical position, so the system understands whether you have visited a supermarket or a beauty salon, as well as the length of your stay. This is how Uber uses IoT data to analyze its audience's preferences and find new approaches to customers. Today, Big brands know almost everything about consumers, from interests to the logic that customers use when making purchases.

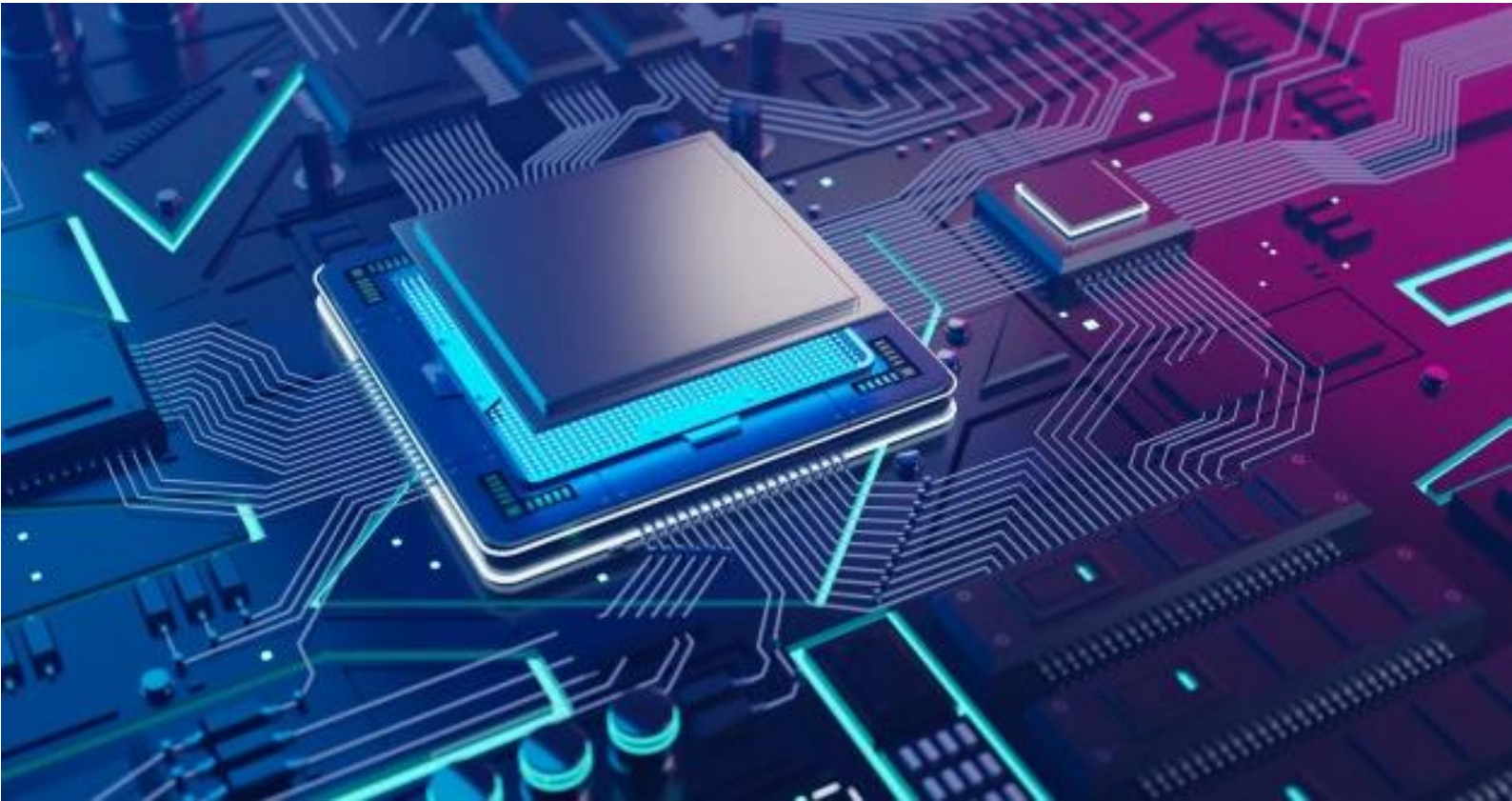


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# SYSTEM ON A CHIP: THE FUTURE?



What is a system on the chip? The term system on a chip has been used by many manufacturers as a big revelation over the past few years, but what is it really? A system on the chip is basically a single chip that houses all the essential components of a computer or device. Over the years chip manufacturers and computer manufacturers have discovered ways to put more transistors and more components into smaller spaces, and a system on a chip as one of those inventions. But why do manufacturers do this, wouldn't it be easier to have all the chips spread out over a single board and have each chip perform a specific function. This is why things become clear as to why manufacturers created the system on a chip.

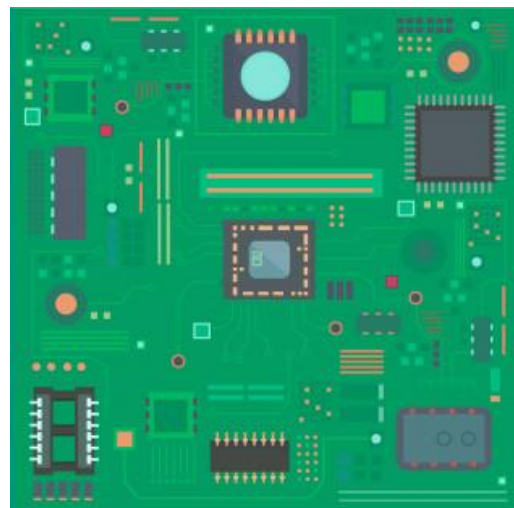
There are many upside to having a system as a system on a chip, one of the main advantages is the smaller footprint of the chip helping make more compact devices and compact boards that can perform all the functions that an ordinary system could do. Generally a system on a chip is based on the ARM



architecture, that will help bring down the thermal load of the machine and avoid overheating with all these devices cramped up together. Another benefit of having a system on the chip is the proximity of all the memory and controllers to the processor which leads to more efficient communication between these components and allowing these components to work at the fastest level they possibly could.

A system on the chip is also relatively cheaper to make as the cost required for efficient buses between components is reduced as these components are tightly packed together within a single unit. A system on a chip can also work more efficiently as most of the power is consumed transferring data between one controller to another or between a processor and memory, the power consumption is reduced as all the components are close together requiring a lot less power to relay information between these components.

So now what are the drawbacks of the system, as is the last major everything that has an upside has to have a downside too, right? The problem with the system on a chip design is that if a single component fails inside the chip the entire board has to be replaced which leads to higher maintenance costs and repair costs for the device. Another major drawback is the design and creation cost which is extremely high if the chip is a low- volume product. Since a lot of components are cramped up inside a small chip, the complexity of the chip also increase making it difficult to find out a bug, if one exists. The ARM architecture and the compact design means that the chip would not perform well under power intensive tasks that require 100% engagement from the processor for extended periods of time.



So to answer the title, is the system on a chip the future? Yes, for most personal devices that require compactness and portability, whilst maintaining efficiency and performance, system on a chip will be a perfect fit. But, for a case where the user requires a lot of computational power for an extended period of time or is using a system for running processor intensive or graphics intensive tasks for hours at a time, System on a chip will be a disappointment due to its thermal design.

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