## VIDYAVARDHINI'S COLLEGE OF ENGINEERING AND TECHNOLOGY

THE TECHNICAL NEWSLETTER OF COMPUTER ENGINEERING DEPARTMENT.

STAFF INCHARGE: MR. VIKRANT AGASKAR
EDITORS: MS. SHRIYA CHITRE
        MR. SOHAM WAGHMARE
        MR. SHANTANU GONAKA
        MS. SHRADHA SANKHE

**RESEARCHER's FROM THE UNIVERSITY OF AUSTRALIA HAVE DESIGNED A COMPUTER VISION SYSTEM TO AUTOMATICALLY DETECT A TINY BABY's FACE.**

Using artificial intelligence-based software to detect human faces is now common with adults, but this is the first time that researchers have developed software to reliably detect a premature baby's face and skin when covered in tubes, clothing, and undergoing phototherapy.
Engineering researchers and a neonatal critical care specialist from UniSA remotely monitored heart and respiratory rates of seven infants in the Neonatal Intensive Care Unit (NICU) at Flinders Medical Centre in Adelaide, using a digital camera.

The 'baby detector' was developed using a dataset of videos of babies in NICU to reliably detect their skin tone and faces. Vital sign readings matched those of an electrocardiogram (ECG) and in some cases appeared to outperform the conventional electrodes, endorsing the value of non-contact monitoring of pre-term babies in intensive care.

The study is part of an ongoing UniSA project to replace contact-based electrical sensors with non-contact video cameras, avoiding skin tearing and potential infections that adhesive pads can cause to babies' fragile skin.

Infants were filmed with high-resolution cameras at close range and vital physiological data extracted using advanced signal processing techniques that can detect subtle colour changes from heartbeats and body movements not visible to the human eye.

UniSA neonatal critical care specialist Kim Gibson says using neural networks to detect the faces of babies is a significant breakthrough for non-contact monitoring.



"In the NICU setting it is very challenging to record clear videos of premature babies. There are many obstructions, and the lighting can also vary, so getting accurate results can be difficult. However, the detection model has performed beyond our expectations."

"Worldwide, more than 10 percent of babies are born prematurely and due to their vulnerability, their vital signs need to be monitored continuously. Traditionally, this has been done with adhesive electrodes placed on the skin that can be problematic, and we believe non-contact monitoring is the way forward," Gibson says.

**ALTERNATIVE TO GITHUB CO-PILOT**

GitHub Copilot - an AI tool for developers that autocomplete the code. GitHub only gave access to only a group of developers. Almost around 88,000 people have currently access to GitHub copilot preview build. And sadly, I am not one of them. I am still on the waiting list.

I tried searching for alternatives and found this crazy extension i.e., Clara Co-pilot. Yes, it is free and can be easily installed in Visual Studio Code. It is developed by BadBoy17G and contributed by Marxist-Leninist & sethupavan12.

It is an open-source tool and you can contribute here if you want
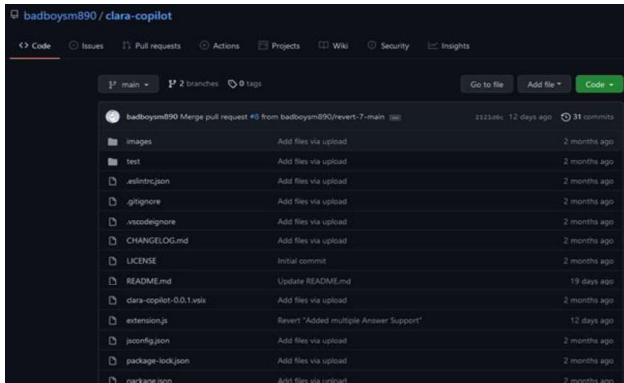
It's very simple to use. You just need install the extension -- type the snippet you want - eg : prime factor python -- press "**ctrl + shift + p**" and type search snippet and hit enter -- these is the result I got :



**Conclusion:** We don't know when we 'll get access to GitHub co-pilot, but you can give this tool a try till you get access and support the developers for creating such an amazing tool.
You can use these tutorials for installing the extension.
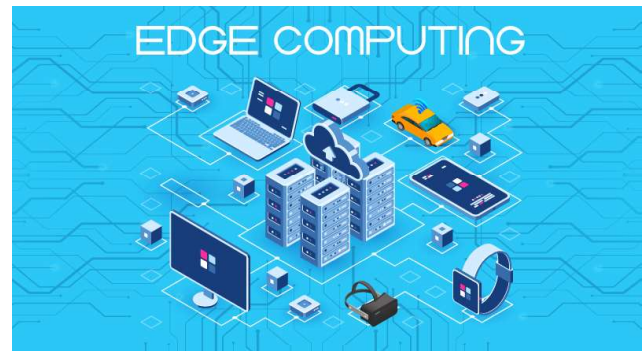
## WHAT IS EDGE COMPUTING?

Gartner defines edge computing as "a part of a distributed computing topology in which information processing is located close to the edge—where things and people produce or consume that information."

At its basic level, edge computing brings computation and data storage closer to the devices where it's being gathered, rather than relying on a central location that can be thousands of miles away. This is done so that data, especially real-time data, does not suffer latency issues that can affect an application's performance.  In addition, companies can save money by having the processing done locally, reducing the amount of data that needs to be processed in a centralized or cloud-based location.

Edge computing was developed due to the exponential growth of IoT devices, which connect to the internet for either receiving information from the cloud or delivering data back to the cloud. And many IoT devices generate enormous amounts of data during the course of their operations.

## THE POTENTIAL OF EDGE COMPUTING

At a base level, edge computing streamlines how much data businesses and organizations can process at any given time, and as a result, they are learning more and uncovering insights at an incredible rate. With more detailed data from a variety of multi-access edge computing locations, businesses are better equipped to predict, manage, prepare, and adapt for future demands using historical and near-real-time data and scalable and flexible processing without the costs and constraints of older IT options.



## EDGE COMPUTING USE CASES

Much of the technology we use today for entertainment and business, from content delivery systems and smart technology to gaming, 5G, or predictive maintenance, incorporates some form of edge computing technology.

Streaming music and video platforms, for example, often cache information to lower latency, offering more network flexibility when it comes to user traffic demands.

Manufacturers benefit from edge computing by keeping a closer eye on their operations. Edge computing enables companies to closely monitor equipment and production lines for efficiency and, in some cases, detect failures before they happen, helping avoid costly delays due to downtime. Similarly, you can also see edge computing being used in healthcare to look after patients, giving physicians more real-time insight into people's health without the need to send their information to a third-party database for processing.

Elsewhere, oil and gas companies can keep watch of their assets and avoid costly complications. Smart home construction uses edge computing solutions as well. More and more devices need to communicate and process data in a localized network, especially devices like voice assistants. Without the help of decentralized processing power, Amazon Alexa and Google Assistant would take far more time to find requested answers for users.

---

## WHAT IS 5G?

5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices.



5G wireless technology is meant to deliver higher multi-Gbps peak data speeds, ultra-low latency, more reliability, massive network capacity, increased availability, and a more uniform user experience to more users. Higher performance and improved efficiency empower new user experiences and connects new industries.

## WHAT MAKES 5G INTERESTING?

The most enticing case for 5G is hard to define: It's all the apps and gadgets that haven't been invented yet because 5G's unique properties may be what makes them possible. With 2G came text messaging, 3G ushered in the iPhone and 4G has enabled services such as Uber and Facetime. As for the business sector, 5G's security features, speeds and capacity for more devices may be beneficial in settings such as smart factories.

Faster speeds may be more compelling for advertisements and commercials, but the ability to reduce network congestion and accommodate a much greater number of users is the main reason the industry is excited. That's especially true for dense metropolitan areas such as New York, where I stood on a rooftop (photo above) on a recent sweltering day with AT&T's Carl Busseno to see 5G in action. Busseno is an engineer who has served as the wireless carrier's radio access network director for the New York and New Jersey markets since 2009. "The fundamental reason

for each G that's come out" — 2G all the way to 5G — "is more capacity," he said. "In New York City, you can never have enough capacity, so you want to have as much as possible." Some of the New York mobile-phone bustle took a breather during the Covid-19 lockdowns, but it's coming back as office workers and tourists return: Wireless-network traffic doubles during weekdays in Manhattan, he said.

---

## WHAT IS DOCKER?

Docker is a software platform for building applications based on containers—small and lightweight execution environments that make shared use of the operating system kernel but otherwise run-in isolation from one another. While containers have been used in Linux and Unix systems for some time, Docker, an open-source project launched in 2013, helped popularize the technology by making it easier than ever for developers to package their software to "build once and run anywhere."

## WHAT IS DOCKER TODAY?

Container usage continues to grow as cloud-native development techniques become the mainstream model for building and running software, but Docker is now only a part of that puzzle.

Docker became mainstream by making it easy to move the code for an application and all of its dependencies from the developer's laptop to a server. But the rise of containers led to a shift in the way applications are built—from monolithic stacks to networks of microservices. Soon many users needed a way to orchestrate and manage groups of containers at scale.
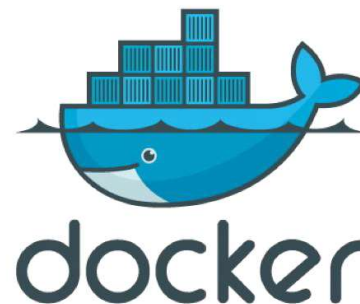


Born out of Google, the Kubernetes open-source project quickly emerged as the best way to do this, superseding Docker's own attempts to solve this problem with its Swarm orchestrator (RIP).

Amidst increasing funding trouble, Docker eventually sold its enterprise business to Mirantis in 2019, which has since absorbed Docker Enterprise into the Mirantis Kubernetes Engine.

The remains of Docker—which includes the original open-source Docker Engine container runtime, Docker Hub image repository, and Docker Desktop application—live on under the leadership of company veteran Scott Johnston, who is looking to reorient the business around its core customer base of software developers.

## CLOUD GAMING

Cloud gaming will be one of the "biggest use cases of 5G" as it offers a combination of high speed and low latency internet, Bharti Airtel chief technology officer Randeep Sekhon said. Homegrown telecom giant Bharti Airtel has successfully conducted India's first cloud gaming session in a 5G environment, it said.

Cloud gaming will be one of the "biggest use cases of 5G" as it offers a combination of high speed and low latency internet, Bharti Airtel chief technology officer Randeep Sekhon said. When games are streamed over the cloud, the time taken for data to travel from a server to the user's device, otherwise called latency, needs to be really low. One of the key benefits of 5G technology is the low latency.

In Airtel's test, the networks delivered latency in the range of 10 milliseconds and bandwidth of 1 Gbps over the 3,500 MHz spectrum. Airtel used its 5G test lab in Manesar in the national capital region area for the cloud gaming pilot, which also suggests that the industry in India is readying itself to take cloud gaming seriously.

Airtel used a game called Asphalt, which doesn't necessarily need very high computing resources, but the mere fact that the company tested this is significant.

## HOW AI AND MACHINE VISION IMPACT ROBOTICS?

Vision guided robots (VGRs) enable defect free production by providing important quality information, such as data about flaws and measurement tolerances, which a blind robot programmed to act within a coordinate system or stage cannot deliver. They can detect detects through inspection, which directly impacts quality. They can also use predictability, or a method where a robotic system stops due to a vision system erroring, thereby identifying an issue in the process, as an indirect form of quality. Both approaches use Industry 4.0 to identify and flag defective products, which makes it more effective. Vision systems can also record and upload quality data to an external system, which operators can use to predict and respond quickly to errors.

Machine vision, which is a form of artificial intelligence, is very prominent in robotics today, says Nick Longworth, senior systems application engineer, SICK Inc. The pandemic has only boosted its use as end users look to create more automated and flexible processes due to labor shortages.
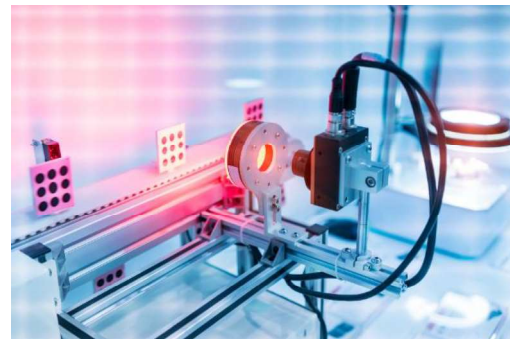
Just as humans need good data to make better decisions, so do AI systems. Additionally, these solutions also free up an operator or another resource to do something else. Manufacturers continue to turn to deep learning and 3D vision, and robots have also become easier to use. Both are becoming more affordable. Still, there is room for improvement.

Despite all the improvements made in the area of vision with 3D and deep learning and traditional high-accuracy 2D, the technology is still relatively lower down the S-curve compared to inline manufacturing use-cases for vision — such as measurement, gaging, identification Continued algorithmic improvements, greater hand-eye flexibility between the robot and vision, and a full-system optimization per use-case will be required to see adoption rates accelerate.

ARTICLES SUBMITTED BY:
AMISHA PRABHU
CHINMAY SONAWANE
SOHAM WAGHMARE
SHARVIN DEDHIA

Do share your views, feedback and articles by mailing at bytemagvcet@gmail.com