

Coronavirus; Aftermath Technology Outburst

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Abstract

Coronavirus's pandemic health crisis is the 21st century worldwide human tragedy and the growing impact on the global economy, but with the struggle that has come with this crisis, there is another important side of it to be addressed and not to be ignored. Despite the available technologies that are growing every day, the dependency on the human being as the primary engine for the economy has not changed; therefore, the emerging technologies that for sure guarantee to change our lives for the better, and we used to believe that they are approximately five to ten years ahead and to be part of our normal life before pandemic situation, it is now officially accelerated and by adopting these technologies quicker than was planned, it will help the world to focus on the crisis without affecting the economy going forward.

Keywords — Coronavirus, Robotics, Bionics, Cloud Engineering, AI, 5G, IoT, Advanced National Security, Drones, Virtual Retail Shopping, Food Delivery Services, Universal Education.

I. INTRODUCTION

"Necessity is the mother of invention," coronavirus's pandemic crisis will lead to an alternate future for the whole of humanity. It will be considered the booster for many technologies to be deployed worldwide quickly; all obstacles and bureaucracy to make that happens in years are eliminated. Technology is advancing daily, and occasionally new approaches are invented, offering solutions to problems and improvements to our lives. Technologies such as robotics, bionics, cloud engineering, Artificial Intelligence (AI), 5G, and Internet of Things (IoT), security, drones, retail shopping, and food delivery services are going to outburst as a consequence of this health crisis; even the education system is changing as well.

There was always a concern that robots will steal human jobs, and some experts predict that by 2030, and ironically, during the industrial revolution, the economists had the same prediction, yet in general, it led to wealth and prosperity. AI has already changed our lives; it will be generative, synthesize geometry, come up with new designs all by itself; all it needs are goals and constraints. 5G networks will hold

together many of the technology innovations that will define the world in years to come, including the IoT, outdoor autonomous robots for agriculture and industry, the smart utility grid, and autonomous vehicles and drones. The proposed paper will cover a wide variety of these technologies and why it is expected an expediting process to be deployed in few years, not decades anymore, [1].

Education is very important for humanity's future; the university should be the place to offer the path to a better, more secure life that an employer would want that graduate which makes them professional and successful contributor to society. Unfortunately, this pandemic crisis has made it clear that the current education system did not help as expected, and if you are not innovative enough, if you are not creative enough, your job will not be available, you will be enforced to learn and change to a high-tech job, and that might be uneasy and unfeasible. A modern universal education system more suitable to the new norm situation on the rise and will be covered within this proposed research.

The most important thing is to remember that technology should be invented to help humans with their capabilities, disabilities, and needs.

II. ROBOTICS

The development of intelligent robots could help us achieve things that we currently find impossible, such as in dangerous, distant, and daring environments. AI is a disruptive technology and is the next breakthrough in numerous technical fields such as automated factories, economy, transportation, and non-technical fields, such as healthcare, disability, and finding a cure for complex brain diseases.

Coronavirus's pandemic crisis has ignited the desperate need for robotic technology that could help with human disability, and how connecting robots to the cloud-based on AI could accelerate the future developments that could protect us not to fall again in this economic situation [2].

A. Industry Robots

What we are going to see is the massive exploitation of robotic technologies. A real example of yesterday and is going to be the model of the future of tomorrow not in 10 years or even 5 years is



at mini's car plant on the outskirts of Oxford, UK, this is a land of robots, more than 900 of them filled the bodies of 1,000 new cars every single day with barely a human insight. Manufacturing methods have been heavily dependent upon manual labor and skills; today, it's more about the automation, it's all done on the computer, its programming work, its observation, it is setting up sensors for everything, it is the AI and with powerful, predictable robot arms and highly skilled people managing them. The manufacturers believe they can produce better quality cheaper cars; it is a pattern repeated in factories worldwide.

Robot dinosaurs can lift car-bodies weighing up to 400 kilograms, and with up to 6,000 spot wells on a car, they are kept busy, no fatigue, no lunch hours, not going home, not only working 8 hours per day like humans. Robot arms have replaced humans on the factory floor; they perform pre-programmed repetitive tasks much more reliably than humans. The workers used to do the labor job are replaced by robots. However, programmers, observers, quality controls, assurance, and supervisors of the robots' jobs are added as well, as shown in Fig. 1, [3].



Fig 1: Industrial Robots Productivity

B. Daily life Robots

Coronavirus's crisis has shut down almost all restaurants worldwide, but the lesson is learned: how to keep the economy going with less dependency on humans. Cobots are designed to share a workspace with humans, making automation easier than ever before for businesses of all sizes. All of these benefits have made Cobots a game-changer from assembly to painting, from palletizing to screw-driving, from packaging to polishing, from injection molding to welding, or whatever processing task we can think of to help achieve greater productivity to compete in a global market, [4].

Moley Robotics has created the first fully automated and intelligent robots that can learn recipes, cook all kinds of foods with remarkable precision, and then clean up after themselves. This futuristic-looking workstation is equipped with

advanced robotic arms and hands that can grip kitchen utensils, measure liquids, and crack eggs, as shown in Fig. 2, [5].



Fig 2: Add-On Kitchen Robot

Today, the new cutting-edge technologies of robotics revolution will impact the developing world, machines that automate parts of the clothes making process; it is quite clear that the workers are going to be replaced by these advanced new types of machines that are capable of ever more complex tasks, [6].

C. Exoskeleton

No matter how technology advances, there will always be somehow dependency on humans in some fields; however, the need is not for ordinary humans; the need is for more powerful, stronger, faster ones. The Biomechatronic group at MIT, USA, developed wearable robots that attach to the body mechanically and neurally, pushing the limits of what is possible to get as close as possible or even better than biological performance [7].

The exoskeleton is not science fiction; it is a scientific fact and is promising with superhuman strength. One of the pioneers, researchers, and inventors for the exoskeleton is Sarcos Robotics, and their latest product is Guardian XO. The exoskeleton is a wearable robot to help humans safely lift to 200 pounds without strain or injury; it can amplify the human strength by a factor of twenty, so a hundred pounds will feel like five pounds, as shown in Fig. 3, [8].



Fig 3: Exoskeleton

Humans have the intelligence, instinct, and reflexes, but machines are very good at doing something with a lot of precision better than humans. With exoskeletons, we will have the precision of a machine partnered with the intelligence of a human. The exoskeleton is a candidate to help out where humans have to physically demanding work such as construction, manufacturing of automobiles and planes, and warehousing. It is worth noting that the exoskeleton has its roots in the military because the military helped with some of the funding.

D. Robotics' Cloud

Self-driving cars have a lot to learn, but unlike humans, they learn quickly. It is the "Cloud Robotics" that interconnect every robot with the internet, so if you are a robot and learn something, all of the robots will know it immediately, which is learning and is very different from human learning. When those robots wake up because they have access to the internet, they can access everything all human knowledge transform into something else [13].

A new report by research firm Tractica forecasts global revenue for cloud robotics will increase from \$5.3 billion in 2018 to \$170.4 billion in 2025. The firm said that while the market is at a nascent stage of development, more companies understand its importance about what the market is, how it works, and implications for business.

The report classifies cloud robotics as a combination of cloud computing and robotic technologies in hardware, software, and services. The market is differentiated from general robotics through the use of teleoperation and cloud technologies, Tractica said. It also utilizes a cloud-based business model, which enables connected robots-as-a-service (RaaS) offerings for more rapid deployment of adaptive robotics solutions, as shown in Fig. 4, [9].



Fig 4: Robotics' Cloud

III. BIONICS

Humans need motivation, momentum, and a reason to get up in the morning and live for, a goal to work for, a dream to make it a reality. Unfortunately,

in accidents, amputation, and paralysis, all the reasons, goals, and dreams are demolished because of the disability. Disability at the beginning is very hard for any human to take and to adapt to. A decade ago, prosthetics were the only solution and helped a small percentage, but things have changed, technology has evolved. The rise of "Bionics" in recent years has prompted some interesting thoughts of the human future and with the birth of AI has facilitated the complex computations for reality simulation that has given them hope for a new and better future not only to reverse disability but to empower the humans with more capabilities, to be faster than they can ever be, stronger than they can ever dream of and more [10]. Since IoT is about connecting things, aka devices, to the internet, it is also expected to connect humans to the cloud, forming the Internet of Humans (IoH) as well [11].

Coronavirus's death roll has left no time for human deficiency to wait on another human to take over the job and get trained with uncertainties of the capabilities whether it will be the same as the previous one or less. We need a replacement with known calculated capabilities right away.

Just a few years ago, biotech companies for BioBots invented a new technology, "Biofabrication." They launched a desktop 3D printer; simply instead of plastic, a special ink is used combined with biomaterials like collagen and cultured cells to build living tissue and human organs; they demonstrated the printing of Van Gogh's replica's ear. Eventually, we will have printable noses, lungs, kidneys, and it will be affordable financially and on-demand. A new era has begun, the era of "Transhumans," which means embedding machines directly into the human body [12].

Perhaps our vision will be improved as well; we can see more colors, better resolution, visualize things like heat, identify different kinds of gases by sight alone, and even see through walls. A bionic lens is an implant designed to replace our eye's natural lens, giving us the promise of freely adjustable vision without laser eye surgery [13]. Over time, these bionic lenses could be upgraded to include additional functions like projecting your smartphone screen or even sharing your perspective with another person who also has a bionic lens installed; we could even send our visual data to others around the world, syncing it to the internet using a wireless 5G compatible system through these devices, as shown in Fig. 5, [14].

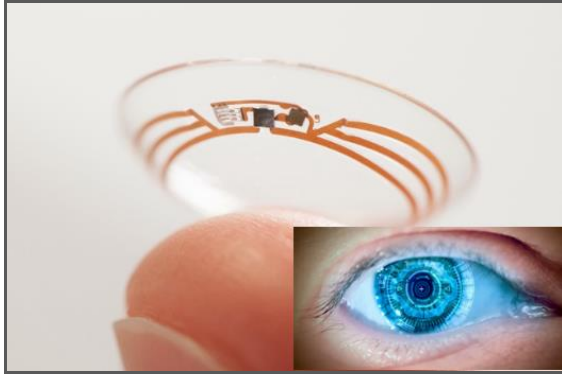


Fig 5: Bionic Lens

Over the last decade, Elon Musk has become one of the most famous men on the planet, revolutionizing the banking, automotive, rocket, and energy industries in a relatively short period. In July 2019, Elon Musk had a presentation detailing the Neuralink project. Neuralink is going to tap into these tiny electromagnetic fields generated as a junction in the brain. It will interpret this analog data as ones and zeros to be used in the digital world [15].

This technology could help accelerate the brain's exploration by understanding how the nervous system works. It will help people with severe brain malfunctions and injuries to live happier and longer lives. It can bypass the ear as a sensory organ and artificially stimulate the nervous system to allow the deaf to hear. This research field is looking at how we can use neural memory implants as a cure for Alzheimer's disease and how the AI can predict where body tremors caused by Parkinson's disease could occur.

IV. INTELLIGENT CLOUD

Demand continues to rise from both companies and consumers that rely on compute resources and storage accessible anywhere. Tech giants Amazon AWS, Google, Microsoft, IBM, and others are vying to be the Go-To providers behind a lot of the technology we use, from calling a Lyft to checking your video doorbell to streaming your favorite shows. When people are watching a Prime movie, or they're watching a Netflix movie, or a Hulu movie, or others like that, they're watching it and streaming off Amazon Web Services, the Super Bowl streams off AWS and Major League Baseball, and now NASCAR and Formula One racing as well, if you use Intuit to do your taxes in the USA, that runs on AWS, [16].

According to Cisco's 11th annual Virtual Networking Index, more members of the global population will be using mobile phones (5.5 billion) than bank accounts (5.4 billion), running water (5.3 billion), or landlines (2.9 billion) by 2021. Strong growth in mobile users, smartphones and IoT connections, network speed improvements, and mobile video consumption are projected to increase mobile data traffic seven-fold over the next five years [17]. Fig. 6 shows the Global Mobile Data Traffic

Growth; Global Mobile Data Traffic will increase 7-Fold 2016-2021.

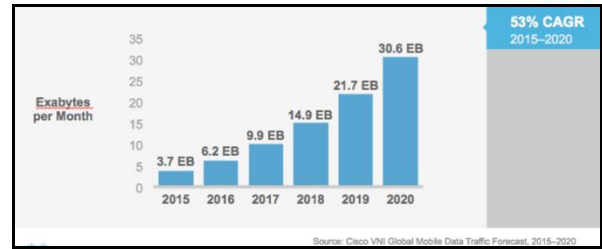


Fig 6: Global Mobile Data Traffic Growth

AI's business potential has been on the horizon for a long time, but many businesses have found AI hard to implement or even imagined. Machine learning is about teaching computers to learn than to program them with every single skill needed to complete a given task; however, deep learning is a subset of machine learning that uses neural networks, a set of algorithms modeled on the human brain that enables AI to tackle even bigger problems. Machine learning and deep learning have enormous potential for the entire economy, such as voice recognition, improved medical diagnosis, and even self-driving cars.

Machine learning has even been shown to analyze human behavior and predict warning signs but recognize the common language used by people like sexual predators or terrorists and alert law enforcement to prevent it. Facial recognition is a great promise offered by data-driven technology. China is the world's leader in using this emerging technology, and many of the AI start-ups are determined to keep it that way in the future.

With the machine and deep learning capabilities in the cloud, AI will correlate all information and data from different systems in real-time to serve a futuristic goal with precision and accuracy such as traffic lights, speed limit, GPS, to support driverless cars then everything is becoming predictable. They can drive much faster and can take any rational initiative that can speed them up if needed. Instead of rigid traffic rules, the flow will be regulated by a mesh of dynamic and constantly self-improving algorithms. Self-driving becomes hundred to two hundred percent safer than a person. As shown in Fig. 7, [18].



Fig 7: Driverless Cars with AI Core

V. 5G & IoT

5G technology is considered the foundation that comprises the world telecommunications infrastructure for the next years. 5G will bring a huge advance in speed and reliability to mobile devices and enable a new wave of technologies and applications such as smart cities, advanced manufacturing, healthcare systems, and connected cars. Many applications and web services have already moved to the public cloud. With tightening budgets, employment reduction, less traveling, and the higher demands for the services, as a service "aaS" allows organizations to consolidate and more effectively utilize their resources, control costs, and align those costs with consumers of the resources and also provide the organization with the ability to easily adapt to and deliver services that in a seamless and automated fashion. 5G infrastructure in the form of "5GaaS" could also easily be built and grown in the same manner utilizing the public cloud provider regions and edge services to reduce the latency accessing the applications, driving factors of 5G technology.

With public cloud and as a Service (PaaS), The enterprise just needs to plug in and subscribe, and the business is ready to go and can get started much faster than before, and it costs less. These technologies collectively will create a great number of new companies and tens of thousands of new jobs, generating new demands, investment, and skilled personnel, as shown in Fig. 8.



Fig 8: 5G as a Service (5GaaS)

Coronavirus's crisis daily news and being number one topic on all media outlets could cause us to ignore a very important fact which is China is already a leader in antenna and base station architecture with Huawei and ZTE, whose only global competitors are South Korea's Samsung, Finland's Nokia and Sweden's Ericsson. Although the Scandinavian equipment vendors have a small lead when it comes to memorandums of understanding on 5G and pilot tests with global carriers, Huawei surpassed Ericsson in 2016 to become the world's biggest producer in mobile equipment, gaining a global market share of roughly 30 percent. Fig. 9 shows the telecom carrier operators and their manufacturers' partners for the 5G trials worldwide.

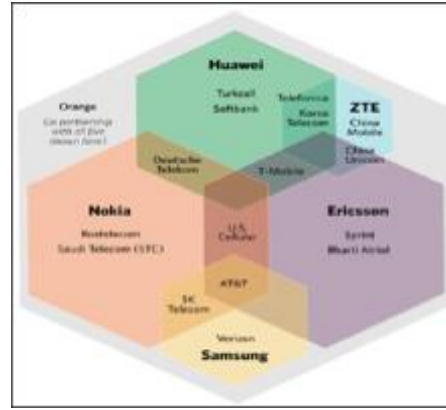


Fig 9: Telecommunications Carriers and 5G Manufactures' Partnership

IoT is influencing our lifestyle from how we react to the way we behave, from air conditioners that you can control with your smartphone to smart cars providing the shortest route or smartwatch that is tracking the daily activities. IoT is a giant network with connected devices; these devices gather and share data about how they are used and the environment in which they are operated. It's all done using sensors that are embedded in every physical device. These sensors continuously emitted data about the devices' working state and sent it to an IoT platform that integrates the collected data from various sources; further analytics is performed on the data, and valuable information is extracted as per requirement. Finally, the result is shared with other devices for better user experience automation and improving efficiencies.

We have smart appliances, smart cars, smart homes, and now smart cities where IoT is redefining our lifestyle and transforming how we interact with technologies. The IoT industry's future is huge; Business Insider Intelligence estimates that 24 billion IoT devices will be installed by 2020, and ITC predicts that IoT revenue will reach around 375\$B in 2019, resulting in a lot of job opportunities in the IT industry.

5G technology and IoT are the presents and the future for all mankind; they will connect almost everything to humans. 5G is representing a great leap forward over its relatively pedestrian predecessors [19].

VI. ADVANCED NATIONAL SECURITY

Coronavirus has changed the world dramatically; we're going to have a world with more variety and more connectedness. Technologies are amazing but could be the same frightening time; technologies must be protected, and most importantly, protect us if it falls in the wrong hand. National security regulations offer checks and balances that guarantee the useful, productive use and prevent corruption and destroying society. National security is responsible for global monitoring, collection, and processing of information and data for foreign and domestic

intelligence and counterintelligence purposes to protect citizens, reduce crimes rates and save lives

This information is mined to identify social media trends for targeted advertising, but it's also being used to predict riots, election outcomes, disease epidemics; data from tweets and social media is useful for predicting both disease outbreaks. With the technologies are mentioned above combined with human daily life activities such as Twitter, Facebook, Snapchat, or else, it could track things like restaurant apps, traffic maps, currency rates, and even food prices. Even more, these non-traditional data sources, like restaurant reservation information, hospital imagery, and so on to predict the flu, as shown in Fig. 10, [20].



Fig 10: Artificial Intelligence and Data Analysis

Also, individual tracking from a place to a place when he enters a store or an event. The Boston Marathon bomber was seen in many different locations, inconsistently because of different cameras and belongs to different stores or else. Re-identification in the crowd is much harder because there are many people, and those cameras do not belong or funnel to one system in real-time. Networks' camera data are mined for suspicious behavior that could stop future bombings, and it can also help law enforcement make them more efficient and help solve crimes, as shown in Fig. 11.



Fig 11: Intelligent Tracking System

Face recognition will change our lives; the human face will become your password unlocking smartphones and bank accounts, pay at the restaurant, get on the subway, go to the movie theatre, no more waiting to pay or check your ID. There are other advanced features such as tracking your movements

or following you around, even be able to guess your sexuality through facial features alone, which could be a breakthrough in protecting against crimes like rape. Face recognition is going to feel normal for daily life activities. Merchandizes that are deemed dangerous could be tightly controlled and tied to the individual ID, as shown in Fig. 12.



Fig 12: Biometric Technology

China also is a harbinger of the future for this kind of technology; companies have access to a government image database of 700 million people; almost half of China's population is already using this widely in security, looking for terrorists or people who have warrants out for their arrest but they're also using it to let people pay in fast-food restaurants to access their parks without having to buy a ticket and even bizarrely to try and catch people whose steal toilet paper from public toilets.

Tech companies are going forward full speed with their plans to make facial recognition part of everyday life. This technology is a new kind of power and needs to be protected from the bad guys, and this could only happen through government regulation and oversight that allows only the perceived good uses. No one should stop the progress because of the fear of privacy; the advantages of business information security and the whole nation are far greater than a single individual privacy issue.

The national defense could take this a step further, micro militarized drones self-flying, its processor can react a hundred times faster than a human, and the stochastic motion is an anti-sniper feature, just like any mobile device these days it has cameras and sensors and just like phones and social media apps it does facial recognition. Besides, there are few grams of shaped materials inside those drones that could have anesthesia effect or temporary paralyzing for living things such humans or animals, as shown in Fig. 13.



Fig 13: Modern National Defence

"If you have nothing to hide, you have nothing to fear," it is understandable that not everyone is convinced and will feel under surveillance, but can we imagine for a moment how many cops in the street do not have to die anymore, how many soldiers' lives will be spared, how many innocent people will be saved, it is worth it to use these new technologies for the good of mankind.

VII. DRONES

Due to the contagiousness of the coronavirus, it's safer if human-to-human contact is minimized. Since robots are immune to infection, tech companies such as JD.com and others have stepped up to the challenge to get more robots out in force to deliver, e.g., medical supplies within healthcare environments. Robots also prove valuable when delivering essential items to people who shop and purchase online and are quarantined at home. Meituan Dianping, a delivery app, ramped up its "contactless delivery" options through autonomous vehicles and robots. Shenzhen-based start-up Pudu Technology aimed to reduce cross-infection by implementing home delivery of drugs and meals via robot, as shown in Fig. 14, [21].



Fig 14: Medical Support Drones

Telemedicine, supported by robots, makes medical professionals possible to communicate with patients remotely, saving time and allowing contagious patients to stay confined. Not only can robots communicate with individuals quarantined due to coronavirus, but they can also acquire vital patient information and help doctors treat patients. At the Wuchang field hospital, a ward was staffed with 5G-powered robots to help alleviate human personnel's strain and contain the contagion.

During a pandemic, drones offer a lot of advantages. For one, they can minimize human interactions—preventing viral transmission. Besides, they can speed up transport by 50% compared with regular vehicle road transport. Drones can also be used to reach remote areas more easily and quickly than standard modes of transportation. Throughout the world, med-tech innovators and scientific researchers are coming together to find innovative ways to use drones to fight the coronavirus [22].

A drone delivery system, "Zipline," covering two countries in Africa with its existing primary role of delivering blood products and medication, could quickly distribute critical medical supplies in the United States to bring medical drone delivery to fight the coronavirus. Currently, Zipline is acting as a centralized distribution network for the coronavirus's supplies in the countries of Ghana and Rwanda [23].

Zipline's drones can reduce human involvement in the supply chain (a vector for infection) while reducing hospital overcrowding by making it more practical for non-urgent patients to receive care in local clinics closer to home, as shown in Fig. 15.



Fig 15: Zipline's Drones

In China, coronavirus, containment efforts, and technology are ahead of the rest of the world. The Micro Multi Copter company, located in Shenzhen, deployed over 100 drones to many Chinese cities to patrol areas and observe crowds. The drones were also capable of identifying people who were not wearing masks in public spaces and could be used as loudspeakers to broadcast announcements. Likewise, in Spain, Kuwait, and the United Arab Emirates, drones equipped with loudspeakers were used to broadcast messages, urging residents wandering outside to "go home." Drones have also been used in China to transport medical and quarantine supplies and spray disinfectants over public areas. Terra Drone is a Japanese company that has obtained the first urban drone delivery license from China to deliver medical and other supplies from Xinchang County's disease control center to the Xinchang County People's Hospital, China, without exposing humans to infection.

In Australia, a little further south in the Pacific, researchers from the University of South Australia have partnered with Draganfly Inc, a Canadian

company, to develop a "pandemic drone" that will remotely detect and monitor individuals' infectious respiratory conditions. A specialized sensor and computer vision system allow the drone to monitor temperatures, heart rates, and respiratory rates, as well as sneezing and coughing in crowds, offices, airports, cruise ships, nursing, long-term care homes, and other group scenarios.

In Ireland, researchers successfully delivered insulin from Galway, Ireland, to a patient on the Aran Islands, a remote region off the coast of Galway, and returned with a blood sample from a patient with diabetes for monitoring blood glucose control. The trip was roughly 12 miles each way, and using vertical take-off and landing, a Wingcopter 178 drone was flown southwest over the North Atlantic Ocean. The insulin was secured in an insulated package, complete with temperature-monitoring capabilities on the route and a security lock on the package if the device did not arrive at the right place.

In the United States, both Federal and State Governments are taking important steps to implement drone technology regulated by the Federal Aviation Administration (FAA). Drone users in the United States need FAA waivers to do many things—from flying drones at night to flying them over people, beyond their line of sight, and at higher altitudes. While US drone use many months ago was considered still in its infancy, everything has changed between the day and the night because of the coronavirus's pandemic crisis; steps are being taken to use them during the current pandemic. The Small Unmanned Aerial Vehicles (UAV) Coalition, for example, has filed a request for expedited FAA waivers to enable drones to carry supplies in both rural and metropolitan areas. Besides, the DRONERESPONDERS Public Safety Alliance, a 501(c3) non-profit public safety program, recently formed a task force to plan for and implement the use of drones to meet the challenges of the coronavirus pandemic. The potential of drone use for healthcare support during this pandemic has not yet been fully realized in the United States. But it holds the promise of many things—drone-delivery of medical supplies such as personal protective equipment, coronavirus's test kits, and test results; medication delivery to rural areas that are not easily accessible; and remote monitoring of patient symptoms, all with minimal personal contact and maximum safety for healthcare providers.

In Meriden, Connecticut, US, the police department deployed drones to remind park users to exercise social distancing and limit their gatherings in public settings. Using drones to monitor parks and trails is not intended to be punitive. It reminds users to be mindful of the current restrictions on large public gatherings and social distancing, intended to slow down the coronavirus's pandemic. Police do not intend to take enforcement action at this time, as shown in Fig. 16, [24].



Fig 16: Police Department's Drones

In Fort Worth, Texas, US, the police department deployed drones to remind the homeless about social distancing. Fort Worth police typically use unpiloted aircraft to find missing people, assist officers in SWAT situations, investigate fatal crashes and communicate health emergency messages [25].

In Elizabeth, New Jersey, US, the police department is already deploying drones with automated voice messages reminding people to keep their distance. But some new drones that are under development now will be equipped not only with cameras but high-tech sensors that can help determine if people are sick or not social distancing down below [26].

In Battle Creek, Michigan, US, the police department has a new perspective on combating the coronavirus. As part of a disaster relief program, a Chinese company named Dà-Jing Innovations, or DJI, a drone producer, recently gave the Battle Creek Police department three drones. The department is one of 45 police, fire, and public safety departments nationwide to receive the company's drones. "With 100 drones helping combat the virus at 45 organizations in 22 states, we hope to gather an extraordinary range of real-world experiences that will help public safety agencies do their best work to protect the public during an unprecedented crisis," the senior director of public safety integration at DJI, [27].

VIII. VIRTUAL RETAIL SHOPPING

In 2020, sale technology can be leveraged to improve the customer experience; retailers are interested in automated stores. The most familiar automated store concept is Amazon Go, which promises to eliminate checkout lines using computer vision, sensors, and machine learning to allow customers to grab their items and walk out of the store [28].

Late last year, Walmart opened its store of the future in Levittown, NY. The most interesting aspect of this pilot is the scope. While Amazon Go, Bingo Box, and 7-Eleven are small footprint stores, Walmart's automated store concept covers 50,000 square feet of floor space. Walmart's Intelligent Retail Lab (IRL) is also unique in that the retailer

isn't using automation for self-checkout. Rather, the company uses AI-powered cameras to monitor inventory levels to help associates keep shelves stocked, as shown in Fig. 17.



Fig 17: Automated Check out

The retail industry is expected to reach \$27.7 trillion in global sales by 2020 and growing opportunities. With deploying technologies to increase the customer traffic and experience, retailers have started investing in Robotic Process Automation (RPA) to speed-up certain repetitive tasks. These bots effortlessly carry out repetitive tasks within seconds since deploying a human workforce to carry out these tasks can be expensive, and the accuracy of the result is compromised. RPA has been increasingly replacing humans in various sectors like Healthcare, Finance, and Insurance, as shown in Fig. 18, [29].

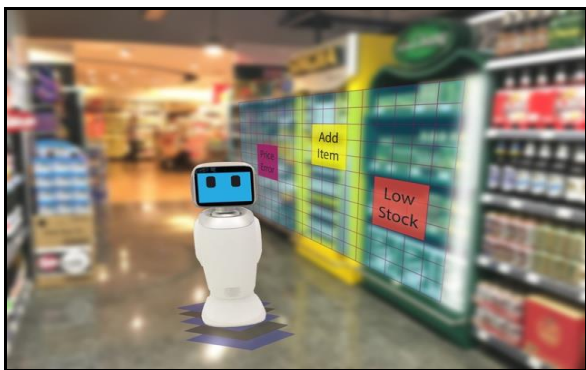


Fig 18: Robotic Process Automation (RPA)

Inventory management is the essential process in a retail business, and during sales season, it's common that the store employee forgets to follow up with the supplier for stocks and results in delayed delivery. Robotic process automation can help resolve this issue seamlessly. Working 24/7/365, bots can constantly monitor the inventory. They never sleep, never get tired, and their machine memory is always storing accurate information about the latest inventory and shipping details. When the stock available is below the threshold, the bots automatically reorder stock with the vendor. They can predict future requirements based on past trends and sales. This improves the procurement process, reduces costs, and also wastage, as shown in Fig. 19.



Fig 19: Inventory Management

Augmented Reality (AR) and Virtual Reality (VR) are poised to strengthen the retail sector in the coming weeks or months. These are some of the most sought-after technologies that can benefit the retail industry through improved customer experiences. Several retail companies are already using AR VR app development services to enhance their marketing strategies and build customer relations. Besides, these technologies are set to revamp the shopping experiences of millions of customers worldwide. Goldman Sachs predicts that the global market for AR/VR in retail is expected to reach \$1.6 billion by 2025. Coronavirus has changed this prediction; it is expected to be 2022 now, as shown in Fig. 20, [30].



Fig 20: Augmented Reality (AR) and Virtual Reality (VR) Retail

Yesterday we used AR/VR at the store to help the customer; tomorrow is different; AR/VR will help the customer anywhere without even going to the store. The virtual and physical worlds are combined to offer the ability to layer digital content on top of the real world; the technology now exists to easily digitally map the interior of a store and know where every product is located, the customer can be directed step by step to the exact product they want. Customers will soon be able to visualize in-store personalized promotions, coupons, and variable pricing alongside their favorite items on the shelf. The dual technologies – Augmented Reality (AR) and AI, when paired together, will reinvent retail, as shown in Fig. 21, [31].



Fig 21: Virtual Shopping Anywhere

IX. FOOD DELIVERY SERVICES

Once a thing of indulgence, food delivery may now be a necessity in the age of the coronavirus, as people are being instructed to shelter in place, cut physical ties to other people in workplaces and communities, and practice self-isolation and social distancing. Coronavirus is highly contagious, potentially deadly, and at a pandemic level, with more than a hundred thousand deaths already reported worldwide.

Despite this insanely sad state of affairs, the one thing people still have to do is eat, and for that, they may be forced to leave their homes and interact with others to shop for food and other necessities. These days, a home delivery meal service app can function as a safety precaution so that if you suspect you are infected or are feeling sick, you do not expose others.

As restaurants in the US put their dine-in services on hold, takeout is gaining ground as an alternative if you're seeking a prepared meal or even shopping for groceries. The larger risk of viral transmission is person-to-person contact — not the food itself, thankfully — so increasingly, drop-off services are trying to limit direct contact between delivery staff and customers [32].

Delivery companies like Grubhub, Doordash, Uber Eats, Postmates, Instacart, goPuff, and Chow Now available on iOS and Android, started offering customers a "Leave at my door" option customers can limit contact. Many services are also adhering to new health and safety guidelines, including providing sick pay for employees.

X. UNIVERSAL EDUCATION

In many cases, executives lack knowledge of what public cloud providers can offer them in time like coronaviruses, such as moving their workloads to the public cloud or allocating new compute resources for the extra capacity needed to accommodate the situation in no time, or when the employment and traveling are reduced effects on business continuity and the time line for completing projects drastically. This, in turn, is likely to influence the executives' decisions regarding the budget and futuristic plans where the enterprise should be in few years to accommodate economic demands [33].

Technical fields' engineering education comprises two directions; specialized vendor certifications and a college degree, and the choice are not easy between those two directions. Vendor certifications are very powerful and usually are the reasons to improve the engineer's performance at work in no time make the individual ready to take on tasks almost after one week once starts the job, the only caveat in this situation is no degree which could reduce the chances for getting to higher positions in the future. On the contrary, if the individual proceeds with a college degree instead, the curriculum does not align with the technology and what work needs compared to a specialized vendor certification besides it takes many years to complete, which reduce the opportunities of getting the job or even be ready in a short period and does not leverage the technical levels of the individual.

No one can deny that coronavirus has shown how important education is; many lower pay employees have lost their jobs simply because it could be shut down; however, high-tech jobs or individual with higher education barely affected them, and till now and in the middle of the crisis, lower education individual is not admitting yet it is also part of the problem.

Uncommonly and it is considered rare that with no certification nor a college degree but with a visionary mind, you will be making history. Distinguished examples are Bill Gates, Larry Ellison, and Steve Jobs, those industry leaders who didn't graduate from college, but if you have a chance to hire them, of course, that would be a good idea [34].

A new proposed vision of a universal education system that empowers individuals to take innovation, solve problems, take the incredible population growth, and make that a positive asset offers equal opportunity instead of equal outcome, which is the key to greater success. It offers the opportunity to gain up-to-date skills, obtain certifications and college degrees such as Bachelor, Master, Doctoral, and more, molding employers, companies, and enterprises by providing the educational environment such as factories data centers.

The universal education system extends its commitment to higher education through a Master and Doctoral (Ph.D.) level and more, which comes with development efforts toward the program sponsor's future. The program's last career foundation is achieving economic success for the individual; offering benefits and compensation could last for many years of employment, development, researching, and career advancement [35].

The universal education system is not tied or governed by any country globally; however, it adheres to governmental regulations and policies to make sure it is consistent everywhere.

XI. CONCLUSION

The 20th century was the computer age, while the 21st century is the age of robotics, bionics, cloud engineering, AI, 5G, IoT, advanced security, and drones. One pandemic crisis such as coronavirus has put the whole world in a questionable and unprecedented situation. This crisis was not only an eye-opener that we have never really as humanity were prepared, but also it was a wakeup call to accelerate the process of deploying these technologies as fast as we can and continue to push for worldwide to adopt and deploy them because it could have at least alleviated the economic situation that we have encountered.

There is certainly a fear that some jobs will be eliminated and robots will take jobs away from humans, which is true in certain sectors. The better way to think about it is that humans, robots, and AI work together not to compete against each other, machines are good, but human beings are good at wisdom. One thing is clear, the situation is still evolving and changing, and it is hard to predict what will happen next, but 5G will result in economic growth, job creation, and prosperity. New generations living in smart cities with state-of-the-art AI technology will simplify our lives and help us do things we would never dream of. Finally, national security to utilize these advanced technologies, monitor, regulate, and drive policies will keep us safe. The future has not been decided yet, and no limit to how far human dreams can reach, this technology's revolution should be embraced, not to fear it.

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REFERENCES

- [1] Khaled Elbehery, Hussam Elbehery, "Millennial National Security's Cornerstones 5G, Cloud Technology, and Artificial Intelligence" Seventh Sense Research Group®, International Journal of Electronics and Communication Engineering (IJECE), Volume 6, Issue 8, pp.44-54, Louisiana, USA, P-ISSN: 2349-9184, E-ISSN: 2348-8549, August 2019.(DOI: 10.14445/23488549/IJECE-V6I8P107)
- [2] Khaled Elbehery, Hussam Elbehery, "Millennium Robotics; Powered by Artificial Intelligence and Cloud Engineering" The International Organization of Scientific Research (IOSR), Volume 10, Issue 04, Series II, Pages PP 44-53, ISSN (e): 2250-3021 ISSN (p): 2278-8719, April 2020. ([http://iosrjen.org/pages/volume10-issue4\(series-2\).html](http://iosrjen.org/pages/volume10-issue4(series-2).html))
- [3] Society for Computation in Linguistics, Vol. 3 , Article 50., Abrams, Mitchell; Bonial, Claire; and Donatelli, Lucia, "Graph-to-Graph Meaning Representation Transformations for Human-Robot Dialogue," 2020. [Online] Available: <https://scholarworks.umass.edu/scil/vol3/iss1/50>
- [4] C.-P. Chen, S.-Y. Zhang, C.-T. Yeh, J.-C. Wang, T. Wang, and C.-L. Huang, "Speaker characterization using tdm-1stm based speaker embedding," in Proc. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). IEEE, 2019, pp. 6211–6215.
- [5] Universal Robots, "COBOTS OFFER GAME CHANGING BENEFITS," © Universal Robots 2020. [Online] Available: <https://www.universal-robots.com/products/collaborative-robots-cobots-benefits/>
- [6] Quora's mission, Swamy Krishna, "Cloud Robotics," February, 2019. [Online] Available: <https://www.quora.com/What-are-the-upcoming-trends-in-robots>
- [7] Sarcos Robotics, Guardian® XO, "Full-Body Powered Exoskeleton," © 2020 Copyright Sarcos Corp. [Online] Available: <https://www.sarcos.com/products/guardian-xo-powered-exoskeleton>
- [8] (2016.) [Online] Available: <https://www.digitaltrends.com/cool-tech/suitx-phoenix-modular-robotic-exoskeleton/>
- [9] Robotics Business Review, "Cloud Robotics Market to hit \$170B by 2025," August, 2019. [Online] Available: <https://www.roboticsbusinessreview.com/news/cloud-robotics-market-to-hit-170b-by-2025-report-says/>
- [10] Khaled Elbehery, Hussam Elbehery, "Artificial Intelligent Bionics; Disability to Exceptional Ability" The International Journal of Engineering and Science (IJES), Volume 9, Issue 04, Series I, Pages PP 23-33, ISSN (e): 2319-1813 ISSN (p): 20-24-1805, April 2020. (<http://www.theijes.com/Vol9-Issue4.html>) (DOI:10.9790/1813-0904012333)
- [11] Khaled Elbehery, Hussam Elbehery, "Public Cloud: The Business Technology Platform" The International Organization of Scientific Research (IOSR), Volume 10, Issue 02, Series I, Pages PP 33-46, ISSN (e): 2250-3021 ISSN (p): 2278-8719, February 2020.
- [12] ScienceDirect Journal & Books, Wound Healing Biomaterials, M. Tenenhaus, "Biofabrication," 2016. [Online] Available: <https://www.sciencedirect.com/topics/engineering/biofabrication>
- [13] Rasulic, L.; Savic, A.; Zivkovic, B.; Vitosevic, F.; Micovic, M.; Bascarevic, V.; Puzovic, V.; Novakovic, N.; Lepic, M.; Samardzic, M.; et al. outcome after brachial plexus injury surgery and impact on quality of life. Acta Neurochir. (Wien.) 2017, 159, 1257–1264.
- [14] Khaled Elbehery, Hussam Elbehery, "5G as a Service (5GaaS)" Seventh Sense Research Group®, International Journal of Electronics and Communication Engineering (IJECE), Volume 6, Issue 8, pp.22-30, Louisiana, USA, P-ISSN: 2349-9184, E-ISSN: 2348-8549, August 2019. (DOI: 10.14445/23488549/IJECE-V6I8P104)
- [15] University of California, San Diego (UC San Diego), "Tiny Injectable Sensor Could Provide Unobtrusive, Long-term Alcohol Monitoring," Apr. 10th, 2018. [Online] Available: https://ucsdnews.ucsd.edu/pressrelease/tiny_injectable_sensor_could_provide_unobtrusive_long_term_alcohol_monitoring
- [16] (2017) Disruptive Asia, "5G will start moving the needle on mobile data growth in 2020: Cisco VNI," [Online]. Available: <https://disruptive.asia/5g-mobile-data-growth-2020-cisco-vni/>
- [17] Adrian Jakobsson, "The 5G Future Will Be Powered By AI," informa Tec., Network Computing, UBM Americas, a UBM plc company, March 2019. [Online]. Available: <https://www.networkcomputing.com/wireless-infrastructure/5g-future-will-be-powered-ai>
- [18] The International Organization of Scientific Research, Journal of Engineering (IOSR), Vol. 9, Iss. 10, Ser. 2, PP 69-74, "Secure Data Group Sharing and Conditional Dissemination with Multi-Owner in Cloud Computing," October, 2019.
- [19] Colin Blackman, Simon Forge "5G Deployment; State of Play in Europe, USA and Asia," Policy Department for Economic, Scientific and Quality of Life Policies, Directorate-General for Internal Policies, PE 631.060 – April 2019.

- [20] (2019) Ban Lethal Autonomous Weapons, "*EFFORTS TO SUPPORT A BAN*," [Online]. Available: <https://autonomousweapons.org/>
- [21] Bernard Marr. (2020) Forbes, Robots And Drones Are Now Used To Fight COVID-19. [Online] Available: <https://www.forbes.com/sites/bernardmarr/2020/03/18/how-robots-and-drones-are-helping-to-fight-coronavirus/#2e1f80352a12>
- [22] Liz Meszaros. (2020) MDLinx M3 USA Corporation, Drone Technology. [Online] Available: <https://www.mdlinx.com/internal-medicine/article/6767>
- [23] Evan Ackerman. (2020) IEEE SPECTRUM, Zipline Brings Medical Drone Delivery to US to Fight COVID-19. [Online] Available: <https://spectrum.ieee.org/autoton/robotics/drones/zipline-medical-drone-delivery-covid19>
- [24] Michael Gagne, Record-Journal staff. (2020) RJ Media Group, Meriden police deploy drones. [Online] Available: <https://www.myrecordjournal.com/News/Meriden/Meriden-News/Meriden-Police-deploy-drones-to-monitor-social-distancing-in-city-parks.html>
- [25] Maria Guerrero. (2020) NBC Universal Inc., Fort Worth Police Deploy Drones. [Online] Available: <https://www.nbcdfw.com/news/coronavirus/fort-worth-police-deploy-drones-to-remind-homeless-about-social-distancing/2354753/>
- [26] Dan Krauth. (2020) ABC Inc., Pandemic drones to monitor fever and crowds. [Online] Available: <https://abc7ny.com/coronavirus-drones-covid-19-pandemic-nj/6102905/>
- [27] Tarvarious Haywood. (2020) WWMT West Michigan, Drones donated to Battle Creek police to aid in fight against COVID-19. [Online] Available: <https://wwmt.com/news/local/drones-donated-to-battle-creek-police-to-aid-in-fight-against-covid-19>
- [28] DATA CAPTURE/POS. (2020) Ingram Micro Inc., Automated stores. [Online] Available: <https://imagineNEXT.ingrammicro.com/data-capture/pos/automated-stores-get-closer-to-primetime>
- [29] Ayshwarya Venkataraman. (2018) Aspire Systems, Robotic Process Automation. [Online] Available: <https://blog.aspiresys.com/digital/big-data-analytics/3-success-areas-robotic-process-automation-retail/>
- [30] Sachin Kaushik. (2019) Augmented and Virtual Reality Magazine, Medium, Retail with Augmented and Virtual Reality. [Online] Available: <https://arvrjourney.com/creating-new-retail-experiences-with-augmented-and-virtual-reality-4b08f016dd78>
- [31] WordPress. (2017) Ariella's Blog Posts, The Future of Retail. [Online] Available: <http://ariellalehrer.com/the-future-of-retail-is-here/>
- [32] Jackie Dove and Alina Bradford. (2020) The best food-delivery apps. [Online] Available: <https://www.digitaltrends.com/home/best-food-delivery-apps/>
- [33] Khaled Elbehery, Hussam Elbehery "Universal Entrepreneur Education System" LAP LAMBERT Academic Publishing GmbH & Co. KG, ISBN (978-613-9-90152-4), September, 2019.
- [34] Amruta Deshmukh, M. A. Pund, Analyzing P2P Cloud Architectures: A Research Perspective, SSRG International Journal of Computer Science and Engineering (SSRG - IJCSE), US, Volume 6, Issue 1, January 2019.
- [35] Khaled Elbehery, Hussam Elbehery, "*Business Stimulation Strategies of Cloud Computing*" Seventh Sense Research Group®, International Journal of Computer Trends and Technology (IJCTT), Volume 67, Issue 5, pp.38-45, Louisiana, USA, P-ISSN: 2349-0829, E-ISSN: 2231-2803, May 2019. (DOI: 10.14445/22312803/IJCTT-V67I5P107)