HYPER GIANT INDUSTRIES

HYPERGIANT TRENDS 2020

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> **The fourth industrial revolution, and the future of AI, is not going to be defined solely by our technological advancements, but by our ability to meaningfully apply this technology to solve real problems.**

–Ben Lamm, Founder & CEO of Hypergiant

HYPERGIANT DECLASSIFIED

INTRO

2020 will set the pace for a decade with the potential to abruptly change course on the policies, technologies, and systems that are negatively impacting our human experience. We will have both the opportunity and necessity to create systems that do more than "do no evil"—and instead, create good.

We believe in a world where the infrastructure, economic policies, and societal pressures that have created the foundation for a more regenerative holistic system will be accelerated by AI and machine learning. This is the decade that AI will shift from something to be feared to something that will be seen as a benefit to both the individual and humanity. We do not have to embrace the concept of a dystopian future; we can craft a more utopian world.

The year 2020 will see new AI applications that will solve some of the world's most pressing problems, from protecting human life on Earth, to exploring how humans can live in space, to harnessing our learning from space to improve life on Earth. We will figure out new energy resources, new ways to decelerate climate change, and new economic and political models to better understand how to make the human experience one not of crisis but of possibility.

Additionally, more work will be done on both the public and private front to create a framework for understanding and regulating the ethical and security issues surrounding AI. This will involve more nuanced understandings of AI: AI doesn't steal a workers' jobs; downward pressure on businesses to reduce costs replaces workers' jobs. AI is not biased or unethical; humans are biased, and AI is trained on human data (sometimes hundreds of years worth, which comes with human bias). AI is not sentient—yet; we have time to ensure that AI is developing synergistically with human demands.

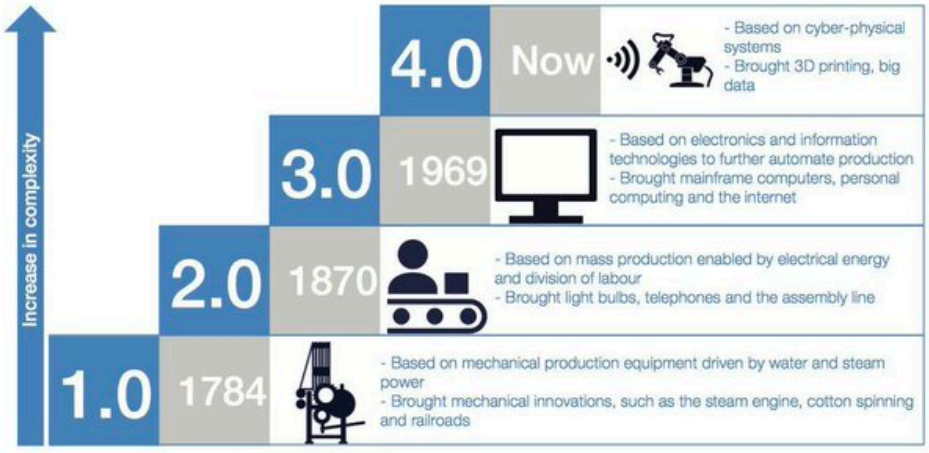
We can create AI that is regenerative and seeks to solve problems and create solutions that improve the human experience.

THE ROLE OF AI IN THE EMERGING ECONOMY

New experiments and advances in AI will power the emerging circular economy, create more regenerative systems, and help our world navigate the shift to the Fourth Industrial Revolution.

The Fourth Industrial Revolution refers to how technologies like artificial intelligence, autonomous vehicles, and the internet of things are merging with humans' physical lives and biological systems.

Figure 3: Evolution of the Four Industrial Revolutions



Source: Sean Gardner via WEF

The increasing pace of innovation, manufacturing processes, and technological development over the past 200 years has fueled an increased pace of growth and consumption based on greater efficiency. This growth has resulted in the utilization of massive quantities of finite materials and fossil fuels. It has become increasingly clear that industry needs to be more resourceful in how we reuse, renew, and restore these resources—doing so will create more sustainable materials and processes.

According to a McKinsey report[1] in collaboration with the Ellen MacArthur Foundation and Google, any system based on "continual extraction and consumption will eventually experience limits to growth." The report concludes that today's economy is hugely wasteful, resulting in large losses of value.

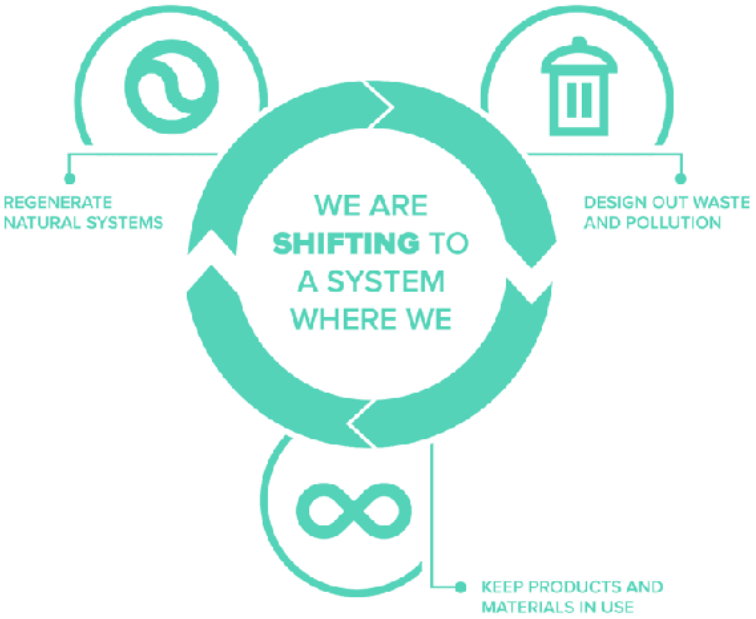
A growing body of global leaders and governing bodies agree.[2] A movement toward a circular economy has gained support from economists, academics, governments, and businesses.[3] In a circular economy, growth is gradually decoupled from the consumption of finite resources. It is guided by three principles:

- Designing out waste and pollution
- Keeping products and materials at their highest value
- Regenerating natural systems

Kate Raworth, Oxford economist and author of Doughnut Economics, makes a case for regenerative systems as an economic imperative—it's time we reject unsustainable growth at all costs. She turned economic theory on its head by putting humanity's long-term goals first and then finding the economic routes to achieve the costs.

> **We need to move from economies that need to grow, whether or not it makes us thrive, toward economies that make us thrive, whether or not they grow.**
>
> —Kate Raworth

What is the Circular Economy?



How we got here: In 1684 Thomas Savery invented the steam engine and it changed everything. This invention kick-started the industrial revolution, which transformed our ability to make things. Raw materials and energy were seemingly infinite, and labor was readily available. For the first time in history, goods were mass produced.

Where we are now: This created what is now known as the "linear economy." We take resources from the ground to make products, which we use, and when we no longer want them, we throw them away. Take-make-waste. This is known as a linear economy.

The problem: The linear economy is no longer working for businesses, people, or the environment. We are running out of resources and creating a stain on our economy and the environment with all of the waste.

"The way our economy is currently designed is unsustainable in the long run. We take a large portion of the finite and renewable resources from the Earth, often without considering the consequences extraction will have on our fragile ecosystem or communities."
—Wadzi Motsi-Khatai, CRCLR

The linear economy is also linked to quality-of-life issues such as health risks due to poor air quality, loss of crops, and threats to our livelihood as a result of disease, poverty, and famine.

The solution: a new way to design, make, and use things within planetary boundaries—the circular economy.

This circular economy addresses the need to change how we manage resources, how we make and use products, and what we do with the materials afterward, creating a regenerative system based on growth that doesn't deplete our resources and has the potential to benefit all humans.

Source:
https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy

The McKinsey report sites economic, environmental, and societal benefits of adopting this movement as:

- Addressing mounting resource-related challenges
- Generating growth and jobs
- Reducing negative environmental impacts
- Benefiting organizations small and large, local and global, private and public
- Holding the potential to create an economy that is distributed, diverse, and inclusive

The World Economic Forum estimates that the circular economy's potential for innovation, job creation, and economic development is a trillion-dollar opportunity.[4]

Stats: Impact of the Linear Economy

In 2016 the world produced 45 million tons of electronic waste (e-waste), with an estimated value of EUR 55 billion (61 billion US) in raw materials.[5]

5 billion tons of raw materials entered the economic system in 2010, and this figure is expected to grow to around 82 billion tons in 2020.[6]

Estimates suggest that the global population will reach close to 9 billion by 2030—including 3 billion new middle-class consumers, placing unprecedented pressure on natural resources to meet future consumer demand.[7]

The current production and consumption system has led to an overshoot in planetary boundaries: It now requires the equivalent of 1.7 Earths to replenish the resources consumed and absorb the pollution generated. At this rate, by 2050, three planet Earths will be needed. The linear models that have brought so much are no longer sustainable.[7]

Source: The Global E-waste Monitor – 2017, United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association, (ISWA);[5] Towards the Circular, World Economic Forum;[4] The Circular Economy Imperative, World Economic Forum Video;[7] WEF with Accenture and Pace, Harnessing the Fourth Industrial Revolution for the Circular Economy.[8]

EARTH OVERSHOOT
PRODUCTION AND CONSUMPTION

1.7 EARTHS
NEEDED TO SUPPORT HUMANITY'S CURRENT DEMAND

3 EARTHS
NEEDED TO SUPPORT HUMANITY'S DEMAND ON EARTH BY 2050

Enter AI

The glue between the circular economy and the Fourth Industrial Revolution.

> **Combining two emerging megatrends—artificial intelligence and the circular economy—can accelerate a shift toward a regenerative system fit for the future.**

— McKinsey, AI & The Circular Economy, 2019, with Ellen MacArthur Foundation and Google

Artificial intelligence (AI) can play an important role in enabling this systemic shift to a regenerative economy. AI is a subset of the technologies enabling the emergent "Fourth Industrial Revolution" era, and deals with models and systems which perform functions generally associated with human intelligence, such as reasoning and learning. AI can complement people's skills and expand their capabilities. It allows humans to learn faster from feedback, deal more effectively with complexity, and make better sense of abundant data. A growing number of initiatives are exploring how AI can create new opportunities to address some of the world's most important challenges.

Source: Ellen MacArthur Foundation, Artificial Intelligence and the Circular Economy - AI as a Tool to Accelerate the Transition (2019).
http://www.ellenmacarthurfoundation.org/publications

Most experts see technology, especially AI, as critical to scaling the circular economy and giving rise to growth behind the Fourth Industrial Revolution. According to McKinsey, AI can both accelerate the pace of human innovation to efficiently design new solutions, integrate emerging business models, and create the infrastructure needed to help design an effective economic system that is regenerative by design.

AI Defined

Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving. The ideal characteristic of artificial intelligence is its ability to rationalize and take actions that have the best chance of achieving a specific goal.

Source: Artificial Intelligence (AI), Reviewed by Jake Frankenfield, June 13, 2019
https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp

"Artificial intelligence is that activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment."

Source: Stanford University, "Artificial Intelligence and Life in 2030." One Hundred Year Study on Artificial Intelligence: Report of the 2015-2016 Study Panel, Stanford University, Stanford, CA, September 2016

We can see the impact of many of these benefits in the workplace. In fact, Accenture's global research indicates that by 2035, AI could double annual economic growth rates and increase labor productivity by up to 40 percent, enabling people to make more efficient use of their time.[9]

But it is the emerging applications of AI that will drive the most change over the next decade. AI combines agile learning, iterative design with increasing processing power, and data access to solve the more complex problems facing our universe.

At Hypergiant we are focused on solving the world's biggest problems and using emerging technology, specifically AI. We believe that the Fourth Industrial Revolution, and the future of AI, is not going to be defined solely by our technological advancements, but by our ability to meaningfully apply this technology to solve real problems. We see beyond business, beyond today, and beyond our planetary limits. AI is not just another technology that helps workers be more efficient; it updates and adapts to the needs of industry over time. Just as AI allows businesses to purpose-build solutions and thoughtfully adapt them as needs and goals change, it can apply these principles to developing solutions for intergalactic resource mining, climate change, health care, defense, and societal issues.

FOUR KEY TRENDS WHERE AI WILL DRIVE CHANGE IN 2020

Hypergiant has identified four key areas where AI is unlocking new solutions that will take hold in 2020 and shape life on Earth and beyond over the next decade.

Space: The technology that we'll harness over the next decade will be capable of making humans into an interplanetary species as we begin space exploration and ultimately colonization.

Extended Reality (XR): XR will be the "hot topic of 2020" as the world around us becomes more complicated and requires that we look at it in more than just a one-dimensional way.

Climate Change: We will continue to see government entities and private companies come together to develop actionable solutions and implement them at scale.

Culture: Our culture will understand that technology must be employed for the greater good, and doing so can improve all of the systems that impact us.

SPACE: FUTURE-PROOFING HUMANITY

The technology that we'll harness over the next decade will be capable of making humans into an interplanetary species. 2020 will be the decade for planning, building infrastructure, and putting the building blocks in place to truly begin space exploration and ultimately colonization. This isn't a mission to abandon Earth though. Everything that we do in the name of exploring space helps to create new technologies on Earth. After all, since space is much more unpredictable than Earth, technology that allows for humans to explore safely there also helps us here on the ground. Because of this, we will start to see the Earth become a smarter, safer, and more efficient planet than we could have ever imagined.

The Now: AI Turns Satellites Into an API for Space

The first artificial satellites were launched into space to fuel the space race. NASA's Explorer 1 launched in 1958, carrying a cosmic ray detector designed to take measurements of radiation near Earth and providing reconnaissance for landing man on the moon.[10] Satellites quickly turned their eye toward Earth with the first satellite picture of the planet taken in 1960.[11] Today, satellites are not just used for space exploration but also to inform our daily lives on earth, from GPS and weather reports to flight tracking and electronic transfer of funds (ETFs).

Now the ability of satellites in space to address problems on Earth is being accelerated by AI, both in terms of getting smarter satellites into space and what we can learn from them.

Hypergiant S.E.O.P.s (Satellite & Extraterrestrial Operations & Procedures) is making the data collection and analytics capability of satellites more accessible. We have integrated data mining, data analysis, and intelligent applications with the satellite (development, design, infrastructure), turning what is merely information about what can be seen from space into intelligence. This is, in essence, making space into another API.

And like any API, the real value is in connectivity and scale. S.E.O.P.s efficiency in transporting satellites enables a ride-share program that gives companies who want to do business in space a more cost-effective commercial route. In doing so, S.E.O.P.s is providing private and public sectors alike immediate access to a wealth of satellite-sourced data.

With more satellites and eyes looking down at earth, we can identify more disruptions and monitor shifts in real time. It's unprecedented what we can do today compared with even 10 years ago. Space intelligence can be applied to everything from hurricane tracking and monitoring natural disasters to optimizing city infrastructure and crop management and tracking the polar ice cap, ultimately preventing famine, staving off climate change, and protecting lives.

"The improvements in the industry are extremely attractive for businesses that want to get into space. It reduces costs from U.S. $200 million to $200,000, making it accessible to anyone and creating a new level of scale. If you feel like you want to do business in space, we can help activate that." - Greg Carley, VP, Product Innovation, Hypergiant

Growth of The Space Industry

The space industry is emerging as one of the most lucrative global industries. The space industry is valued at US $360 billion in 2018, is projected to grow to value US $558 billion by 2026. In terms of categories, nano satellites are expected to account for the highest proportion of spending, followed by markets for reusable launch vehicles, especially those vehicles that can place payloads in LEO orbit.

Source: Air and Space Transport Market Report 2019-2026, Segmented by Types, Share, Growth and Applications
https://ai100.stanford.edu/2016-report

The Next: New Technology is Coming

Satellite cameras are limited by clouds or smoke or tree cover. Hypergiant is working on a next-gen imaging technology that addresses this problem. Our new prototype technology creates a high-resolution image utilizing data and noise for other energy signals. If our experiments are successful, we will be able to see below the trees and through the clouds. Combining data, optical, and sound allows for the creation of a volumetric map of the Earth's surface that can identify certain assets or threats throughout the world at any given time.

Hypergiant Perspective: Securing Space

One of the biggest threats in space is the lack of situational data about LEO and GEO. Despite regulation and "zoning" that places satellites into three stratospheres, there remains only a murky picture for how satellites are moving and interacting. At the core of these concerns is the expansion of space commercialization. Commercial companies have been operating in the GEO for some time and have engaged cybersecurity measures for their satellites and ground systems. But with commercial satellites proliferating in LEO, the challenges become more complex with increased threat of satellite crashes, space debris and new cybersecurity issues.

According to Scott Kordella, director of outer space systems at Mitre, "We need to be careful to avoid the pitfalls of focusing on near-term business success rather than long-term sustainability and shared safety of operations."

Given these concerns, U.S. government officials are exploring adding space to the 16 critical infrastructure sectors, such as water, electricity, and health care.[12] In 2020, we will start to see people become concerned about the potential security implications of this and race to remedy the situation so that, in effect, we can map satellites with other satellites.

With about 2,000 satellites currently in operation, a number that's set to rise dramatically in the next decade, more stakeholders are calling for new rules and regulations to minimize the increasing threat of space junk.[13] The Space Safety Coalition (SSC) laid out new proposed voluntary guidelines last month in a document called "Best Practices for the Sustainability of Space Operations," which have been well received. One recommendation would require that any satellite that operates above 250 miles (400 kilometers) should feature a propulsion system equipped to maneuver its way out of potential collisions. This will place more pressure on companies that operate in the commercial space to find innovative solutions to engage in space sustainably.

The Difference Between LEO, GEO, and MEO Satellites

LEO — Low Earth Orbit
Satellites in low Earth orbit are 500 to 1,000 miles above the Earth's surface. They are primarily for satellite phone and GPS communication due to the minimal time it takes for the data to travel from satellite to Earth — usually about 0.05 seconds.

MEO — Medium Earth Orbit
Medium earth orbit (MEO) satellites circle the planet at an altitude of 8,000 miles and can be used to handle high-speed telephone signals and low-latency high-bandwidth internet. These MEO satellites can transmit data as quickly as 1.6 gigabits per second, 10x the speed of commercially available internet.

GEO and GSO — Geosynchronous Equatorial and Geostationary Orbits
GEO and GSO satellites orbit at 22,300 miles above Earth's surface. Both GEO and GSO satellites carry satellite television signals. GSOs can also forecast the weather and support other types of global communication. It only takes three GEO or GSO satellites to cover the entire planet because of their altitude.

Source: What's the Difference Between LEO, MEO and GEO Satellites?, CosmoBC.com, Megan Ray Nichols, Jun 1, 2019
http://astroblog.cosmobc.com/2019/06/01/difference-leo-meo-geo-satellites/

ALGAE AS A CLIMATE CHANGE DRIVER: FROM CONSENSUS TO CLIMATE COLLABORATION

Climate change solutions are needed that can both forestall the impacts and avert/solve the future potential disasters of a rapidly changing environment. Global estimates show that we need over $50 trillion to truly address climate change and that action is required at all levels. In 2020,[14] we will see solutions come to market from both public and private entities that can begin to make an impact. The biggest question will be how much and how quickly can we create change.

Algae is a potential solution that allows for rapid scale. And this year saw a number of inventive technological applications for algae, as it emerges as a viable alternative to planting trees in the fight against climate change. Both trees and algae use photosynthesis to convert carbon dioxide into oxygen. Yet because algae grows much more quickly than trees, it can sequester carbon more quickly. In addition to algae growing on land, it thrives in oceans, which cover 71% of the world.[15]

In 2020, we're going to continue to see new, innovative ways that tech companies and consumer brands alike are integrating algae into their existing infrastructure in an effort to minimize their footprint and spread overall awareness around the benefits of algae as a climate solution.

The Now: Bioreactor As Learning Platform

Hypergiant is leveraging AI to advance algae's use as a solution for climate change. The Eos Bioreactor is an AI-enhanced machine that uses algae to capture and sequester carbon from the atmosphere.

Employing AI to augment light, temperature, and air flow in the bioreactor can identify efficiencies in algae's growth rate and carbon intake that could help scale its use in climate change. The Hypergiant team estimates that the device is 400 times more effective than an acre of trees at carbon sequestration, pulling around two tons of carbon out of the air each year.

The company plans to use the platform to better understand how to design reactors for the variety of environmental conditions we're going to encounter in the future.

The current device is three-by-three-by-seven feet. It's a closed system that works indoors, connecting with an HVAC system to reduce CO2 levels inside and release cleaner air. Future versions could sit on the rooftops of high-population areas to capture carbon and reuse it to make products like food, fertilizer, cosmetics, or even fuel (though it's worth noting that many past attempts to make algae biofuel into lasting businesses have failed). The company envisions using the devices in various sizes depending on local needs.

A Building Powered by Algae

The BIQ, a five-story residential building in Hamburg, is the first building in the world to be powered by algae bioreactor panels. Algae cultivated by the panels is used to produce energy, and can also control light and provide shade. The building was a pilot for the concept that algae could power whole buildings with low running costs and act as a CO2-sink at the same time.

Source: https://www.nytimes.com/2013/04/25/business/energy-environment/german-building-uses-algae-for-heating-and-cooling.html

The Next: Collaboration Over Competition

2020 will see more collaborative efforts around the fight against climate change, as more public and private companies come together to develop actionable solutions and implement them at scale.

A first step is to break down many of the traditional barriers of private companies. Hypergiant is working toward this with the next iteration of the EOS Bioreactor by creating an open-source version that will invite the maker community to iterate on the product, thereby making it as effective as possible.

This is in line with a growing movement that is calling to combine open-source design with sustainability instead of focusing on only profit-driven, proprietary sustainability products.

POC21 is an international innovation network whose participants believe that open-source is the key to real sustainability impact. This has led to open source 30$ Wind Turbine, Aker (open-source urban gardening infrastructure), and Faircap (open-source portable water filter). According to Benjamin Tincq, Good Tech Founder and POC21 cofounder, POC21 has brought together hundreds of designers, makers, and organizers to "prototype the fossil-free, zero-waste society."

Others are leveraging healthy competition to fuel innovative new solutions. TED and YouTube recently announced a partnership to form Countdown, a coalition of global leaders and nonprofit environmental organizations aligned on fighting climate crisis. They will focus on generating ideas around five broad topics: renewable energy, infrastructure, transportation, food, and restoring ecosystems. The best proposals would be put into action with the help of businesses, policymakers, and celebrities. Countdown will work with a panel of experts and scientists to vet proposals, and the strongest will be turned into TED talks and shared with those who have the power to activate the ideas.

> **Collaboration is our key to survival.**
>
> — Katie Eder, founder of The Future Coalition, founding member, World War Zero

Open Sourcing AI In Action

Open source initiative Masakhane is creating machine translation for more than 2,000 African languages. Sixty contributors across the continent are contributing to develop AI that can translate these native languages and preserve their integrity. With the continent's population projected to account for half of global population growth between now and 2050, machine translation in Africa could be a key driver to developing conversational AI, communication, and commerce online and in the real world.

Source: The Masakhane Project Wants Machine Translation And Ai to Transform Africa, Venturebeat, Khari Johnson, November 27, 2019, https://venturebeat.com/2019/11/27/the-masakhane-project-wants-machine-translation-and-ai-to-transform-africa/

Hypergiant Perspective: Harnessing Nature to Fix Nature

Biomimicry and the drive for biophilic solutions to solve the Earth's problems will continue to grow. 2020 will be a year of asking how do we learn from nature to create systems that improve our planet?

Clean energy is hard to scale. However, scientists are close to operationalizing solar panels in space, which have up to 40 times the capacity of a solar panel on earth.[16] Due to the absence of clouds, atmospheric emissions, and proximity to the sun, they can continuously capture and transmit substantially more energy than solar panels on earth. That energy can then be transferred back down to the ground to reduce and replace fossil fuel dependency.

EXTENDED REALITY SUPERCHARGES RESPONSIVENESS

Virtual reality, augmented reality, and mixed reality are now being grouped into a new category called Extended Reality (XR or X-Reality). XR encompasses all real-and-virtual combined environments and human-machine interactions generated by computer technology and wearables. According to VisualCapitalist, XR is expected to be a $209 billion business over the next four years. This is an 800% increase from their 2018 forecast of $182 billion.[17] XR will gain momentum in 2020 as the world around us becomes more complicated, requiring we look at it in more than in a one-dimensional way. Over the next decade, XR will equip people in tactical situations with the ability to complete tasks and missions in ways that are smarter, more efficient, and safer than ever before. With the rollout of 5G networks, their speed, capacity, and data response combined with the processing capacity of cloud technologies will make XR increasingly accessible and will be increasingly adopted by civilians.

The Now: Adoption by Public Service and Military and First Responders

XR is advancing across military communities, transforming the way we train soldiers and how they operate in combat. The Defense Department has embraced the promise of XR for improved training, situational awareness, logistics support, and combat readiness. The Navy and Air Force have already been using XR technologies to train their fighter pilots. In addition to allowing the military to prepare for battle without having to go to battle, XR applications can reduce costs and training time. The Air Force has reduced pilot training from 12 months to four since it began using virtual reality, artificial intelligence (AI), and biometric tracking.[18]

As a result, XR technology is being adopted across a variety of military functions. By superimposing virtual data over real-world imaging, it makes it easier to navigate unfamiliar terrain anywhere in the world. For training, its strength lies in enabling military forces to rehearse for potential battle scenarios and overlay virtual enemies and obstacles. It can also help teams practice for medical, maintenance, or other specialized procedures.

Next-Gen Spacesuit Helmet Has an “Iron Man” Heads-Up Display

Hypergiant Industries has created a smart helmet prototype designed to keep the military, police, firefighters, and other first responders safe. The XR-powered helmet features night vision, infrared, thermal imaging, biometric readouts, and more. It has a 200-degree field of vision and collects information from mounted sensors and networked data sources. Hypergiant Industries’ system matches integrated situational information to a decision-maker’s specific cognitive framework needs.

“In times of stress and when lives are on the line, more data is not helpful. What is most helpful is decision-quality integrated information presented at the right place, at the right time. The results could mean more lives saved and mission accomplished.”

—Lance Lord, a retired four star general and Hypergiant advisory board member

Source: http://www.siliconhillsnews.com/2019/09/04/hypergiant-industries-creates-augmented-reality-helmet-for-military-police-and-firefighters/

The Next: Anytime Anywhere Responsiveness

XR application is gathering momentum in both surgery and mental health therapy. The first remote brain surgery was performed in March 2019 using 5G-supported surgery on the human brain 1,800 miles away.[19] It has also found value in the treatment of post-traumatic stress disorder for veterans and active-duty military personnel. The combined power of a smartphone and computer vision will open up new ways to use information, from helping doctors identify and diagnose disease more quickly to recommending emergency treatment.

Someday, anyone could use the camera on their mobile device to analyze a wound and make an initial treatment decision based on a library of images that catalog a wound's color and size and suggest possible medical next steps. This wouldn't replace a doctor, but it could provide immediate recommendations about the threat of infection or whether you need to go to the doctor.

XR also has the potential to enhance the safety and effectiveness of space-walks, opening up more doors to understand how humans can live and thrive in space. Spacesuits are layered with oxygen that is protected for the astronauts use. Any technology integration creates threat of a spark that would prove deadly. That means any data analysis occurs after a space walk or through audio transmission. Hypergiant is working on an AI application that would live safely outside the suit in the helmet. Using an implant and heads-up display (HUD), data could be projected right onto the astronaut's screen on demand, eliminating the need to call down to ground control. Then the control center monitor heart rate, stress, and physiology to send recommendations back and maximize the length of time spent in space.

Hypergiant Perspective: Unlocking the Power of 4D to Respond to and Recharge Our Environment

The integration of AI with other emerging technologies will continue to fast-forward innovation that goes beyond responsiveness to positively impact our environment. Hypergiant recently launched Worlds.ai, a spatial intelligence platform that combines deep learning and IoT inside of a 4D environment. Worlds.ai will focus on giving organizations the ability to persistently observe, analyze, and learn from their physical surroundings using an XR environment for "active physical analytics."

Beginning with computer vision, the product uses live AI-powered models to spatially capture the real world, enabling companies to achieve higher levels of automation, increase efficiency, raise productivity, and dramatically lower costs.

Hypergiant Worlds.ai will launch with a focus on solutions that improve clean energy, reduce carbon footprints, and improve security as part of the continued Hypergiant Industries focus on humanity-saving critical infrastructure. Whether it is a military base, an oil well, or a hospital, the product will provide organizations with the ability to perceive and understand their environments in ways that were never possible before, including heat, sounds, and movement.

EXTENDED REALITY SUPERCHARGES RESPONSIVENESS

We've spent the past 30 years steeped in dystopian Hollywood narratives about the coming horrors on our planet, from cyborgs gone wrong to battles over the will of man vs. machine. These are not without reason, but they are also our own undoing. In 2020 people will increasingly understand the difference between pop-culture portrayals of AI and the real-world applications in industry today. In the next decade we will shift to a more nuanced understanding of the role it can play in government, enterprise, and consumer applications as we grapple with complex issues around ethics, privacy, regulation.

That understanding will also come with a broader understanding of pitfalls and a rising consumer willingness to slow down development to ensure that AI is being developed in a way that is ethical, thoughtful, and good for people.

The Now: Brokering in the Era of Ethical AI

In 2020, an increasing priority is to ensure that technology ethics are globally agreed upon, with representation from people across all spectrums, or we risk creating a massive inequality in access and default advantage. Tech companies with proprietary data sets can use AI to further entrench their market position and monopolies, much like the railroad barons of the past. We are seeing an increasing awareness and a call for action to create a framework for managing trade-offs and ensuring technology is used for good.

A new report from the Stanford Institute for Human-Centered AI (HAI) warns that AI's power dynamics could create "tectonic shifts" in the global economic balance if not managed.[20]

Citing a PwC estimate that AI will deliver $15.7 trillion to the global economy by 2030,[21] the study author, former Google Cloud chief AI scientist Dr. Fei-Fei Li, articulates the imperative to ensure AI is on the right side of growth.

"If guided properly, the age of AI could usher in an era of productivity and prosperity for all," he wrote. "However, if we don't harness it responsibly and share the gains equitably, it will lead to greater concentrations of wealth and power for the elite few who usher in this new age — and poverty, powerlessness, and a lost sense of purpose for the global majority."

Concerns raised in the report include job replacement and the disproportionate impact on low-income households and people of color, the lack of race and gender diversity in decision-making roles, the use of human experience as a free resource for behavioral data that companies can profit from (aka surveillance capitalism), autonomous weapons, use of facial recognition by law enforcement, deep fakes, and political ad targeting.

Similarly, a PEW Research study of almost 1,000 AI experts and stakeholders found the majority (63%) were optimistic about AI's potential to do good, but as many also expressed concerns about the long-term impact on human agency.[22]

Regardless of their position on AI, research respondents believed "moonshot mentalities" and collaboration are necessary to find innovative solutions, human-focused policies and systems and to develop technology that meets social and ethical responsibilities.

New Systems Are Emerging to Better Understand and Act on Ethical AI Concerns:

As awareness of these concerns rise, new systems are emerging to better understand and act on these concerns from the grassroots to the government-initiated.

Tech leader action: Elon Musk joined more than 4,500 AI and robotics researchers to sign an open letter calling for the banning of autonomous weapons.

Individual action: Thousands of Google employees signed a letter protesting the company's participation in the AI project for drone object detection, leading Google to end its Maven contract in 2019 and a set of AI principles.

Legal action: Joy Buolamwini testified before Congress that multiple audits found facial recognition technology generally works best on white men and worst on women of color, leading Microsoft to change the technology.

Religious/humanitarian action: The Vatican held the Common Good in the Digital Age tech conference where Pope Francis urged Facebook executives, venture capitalists, and government regulators to be wary of the impact of AI and other technologies.

Governmental action: In the US, the National Security Council on Artificial Intelligence was created by Congress a year ago. Roughly 33 nations have created national AI strategies, according to FutureGrasp, an organization working with the United Nations.

Corporate action: Despite some bumps in the road, Apple has been making inroads in carving out a position on privacy and security, creating a push for other tech giants to follow suit.

Startup action: Startups, such as Arthur and Weights & Biases, are taking a stand and focusing technology on solving the problems of machine learning, offering tools that make it easier to observe, visualize, and audit machine learning software's behavior.

Private-public partnerships: Partnership on AI brings groups like Amnesty International and Human Rights Watch together with the biggest AI companies and seeks to determine how best to make safety-critical or transparent AI systems.

Source: VentureBeat: AI Ethics Is All About Power, Khari Johnson, October 23, 2019
https://venturebeat.com/2019/11/11/ai-ethics-is-all-about-power/

The Next: Slowing Down and Speeding Up

There is a trade-off to privacy, security, and convenience. We want to live in a world where everything just shows up at our house, preferably the same day. We don't want to wait in line to get on an airplane. Yet we all demand safety, at no cost. We don't know if we want facial recognition aiding in crime, but we don't want to see photos of missing people fading into oblivion. It's time to reconcile our desire for convenience and safety with the technology that provides it. Some are finding solutions by slowing down — putting the brakes on the need for speed until we figure out how to put frameworks in place to harness growth for good from the start. AI is biased because humans are biased...or we don't have enough unbiased data sets. But if it's a brave new world, how can we avoid the issues that caused human bias to avoid it being passed on to machines? New organizations have emerged with an aim to work on AI without the growth constraints of startups or shareholders.

Some academics and stakeholders believe we have to start earlier. The utter lack of effectiveness of diversity reporting and implicit bias training to progress diversity and inclusion in the tech industry has led a group of academics and fellows to propose a racial-literacy framework that takes deliberate steps to address race in technology. The coauthors want racial literacy to become part of the curriculum for computer science students, as well as training for employees at tech companies to break free of old patterns.[23]

At the same time, both governmental entities and corporations are seeking to speed up their efforts to re-skill their workforce to keep up with the applications involving AI. For example, offices such as the patent office and the FDA aren't equipped to address the iterative nature of AI and the processing.

Hypergiant Perspective

We are pushing the industry forward, with what's best for humans as our central mission. The past two decades of rapid technology growth have shown us that we cannot assume that technology will be used for good, and we must instead look at and design for technology impacted by human behavior. At Hypergiant we have created an Ethical Reasoning Process to review every AI use case and business model we explore. The process ensures that each use case has a positive intent, passes the test that it will allow humanity to survive another 100 years, and screens out deployments that use people as a means to an end.

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