

07

Microsoft Services



**Empowering People –
How Artificial Intelligence is
changing our world**



The digital revolution is democratizing societal change, evolving human progress by helping people & organizations innovate in ways not previously possible.

1784

STEAM, WATER,
MECHANICAL PRODUCTION EQUIPMENT

1870

DIVISION OF LABOR,
ELECTRICITY, MASS
PRODUCTION

1969

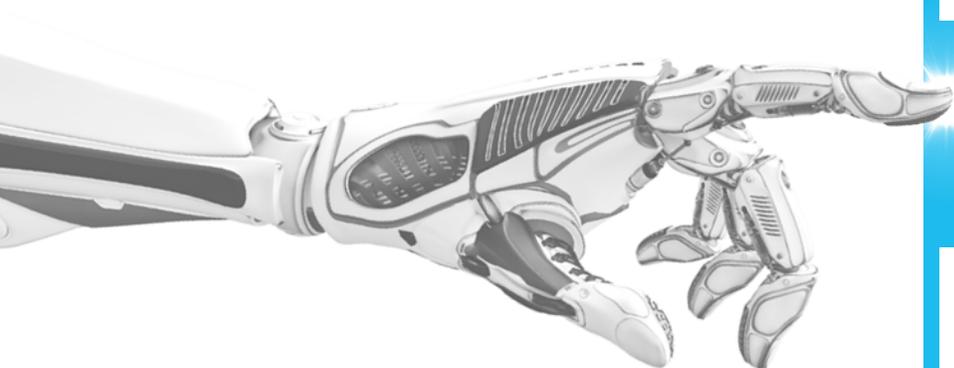
ELECTRONICS, IT,
AUTOMATED PRODUCTION

1970s – 2010

PERSONAL COMPUTING, CLIENT/SERVER
COMPUTING, GRAPHICAL USER
INTERFACE, INTERNET, MOBILE, SOCIAL,
BIG DATA, IOT

2017

BLURRING THE PHYSICAL AND THE
DIGITAL DIVIDE



Intelligent machines are increasingly complementing human reasoning to augment and enrich our experience and competencies.

Machine learning

Computers continuously learn from new data to evolve into advanced, intelligent systems.

Human language technologies

Computers and humans communicate using speech recognition, language modeling and understanding, and spoken language and dialog systems.

Perception and sensing

Computers and devices recognize what their visual sensors detect, facilitating tasks ranging from autonomous driving to medical image analysis.

Cyberphysical systems and robotics

Investments and partnerships with industry and governments, guide the integrity, assistive robotics, and other intelligent technologies that interact with the physical world.

Human AI collaboration

Humans interact with computers in novel, meaningful, and productive ways.

Decisions and plans

Predictive reasoning facilitates informed collaboration between humans and intelligent agents.

People and society

Society and individuals impact the design and prevalence of intelligent technologies.

Systems, tools, and platforms

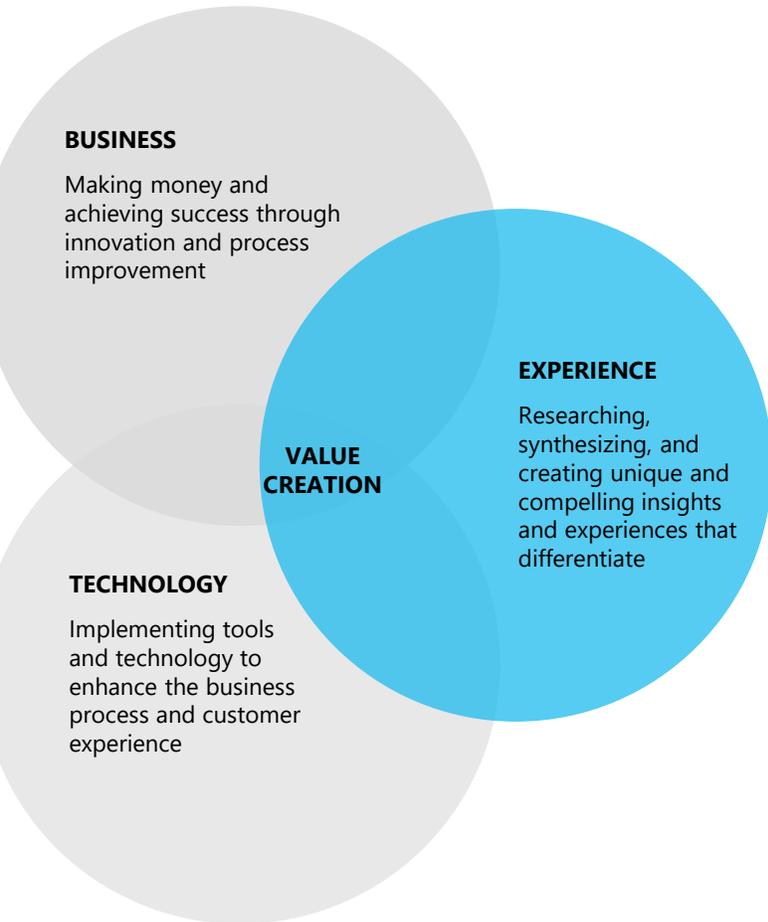
Intelligent technologies are integrated into interactive tools to enhance human cognition, for example contextual data incorporated into chatbots to support decision making.

Integrative intelligence

AI advances such as computer vision and human language technologies are woven together, creating end-to-end systems that learn and adapt.



Reimagining the digital society



Artificial Intelligence (AI) democratizes the digital revolution, accelerates innovation, and makes possible solutions to some of the world's most pressing challenges.

By using advanced algorithms and harnessing digital data and computational power, AI facilitates collaborative and natural interactions between people and machines—extending human senses and comprehension.

With AI, computer systems gain the ability to reason, communicate, and perform with humanlike skill and agility.

Advancing the state of the art in machine intelligence and perception, AI enables computers to understand what they see, communicate in natural language, answer complex questions, and interact with their environment.

AI enables smart apps to understand and act on data; to adapt and consider their users and environment; to comprehend images and video; to hear and speak to their users; to identify speakers and understand intent; to process text; to tap into rich knowledge amassed from the web, academia, or other data; and to access billions of web pages, images, videos, and news.

Artificial Intelligence is not about machines replacing humans, rather it's about humans and machines working together to transform the world.

Agents

Agents transform data into intelligent action by performing tasks or services based on user input, location awareness, and the ability to access information from a variety of connected sources. Agents can complete tasks, predict outcomes, make adjustments, monitor, and trigger alerts automatically.

Intelligent agents are becoming smarter—understanding humans and the world and surfacing information about daily tasks often before users know they need it.

Applications

Bots become the single app you use—an intermediary between you and countless applications and webpages. Bots grow smarter with each use, infusing your business processes and productivity and communication applications with intelligence. Bots see and hear and learn over time to anticipate, predict, and automate.

Services

Smart apps understand and act on data. With vision recognition, they can distinguish faces, detect emotions, and see and identify objects, people, and actions. By filtering noise, they can hear and recognize language, identify speakers, and perceive intent. They learn and develop greater understanding over time by tapping into rich knowledge amassed from the web, academia, images, videos, news, or your own data.

Infrastructure

AI services require a different type of technology in the cloud: GPUs (graphics processing unit) for training, and FPGAs (field-programmable gate array) to talk to the network directly.

FPGAs are programmable hardware, offering efficiency, speed, and flexibility.

Microsoft continues to improve its global, hyper scale, cloud infrastructure across performance, scale, richness, and sophistication to enable innovative scenarios that were not possible before.

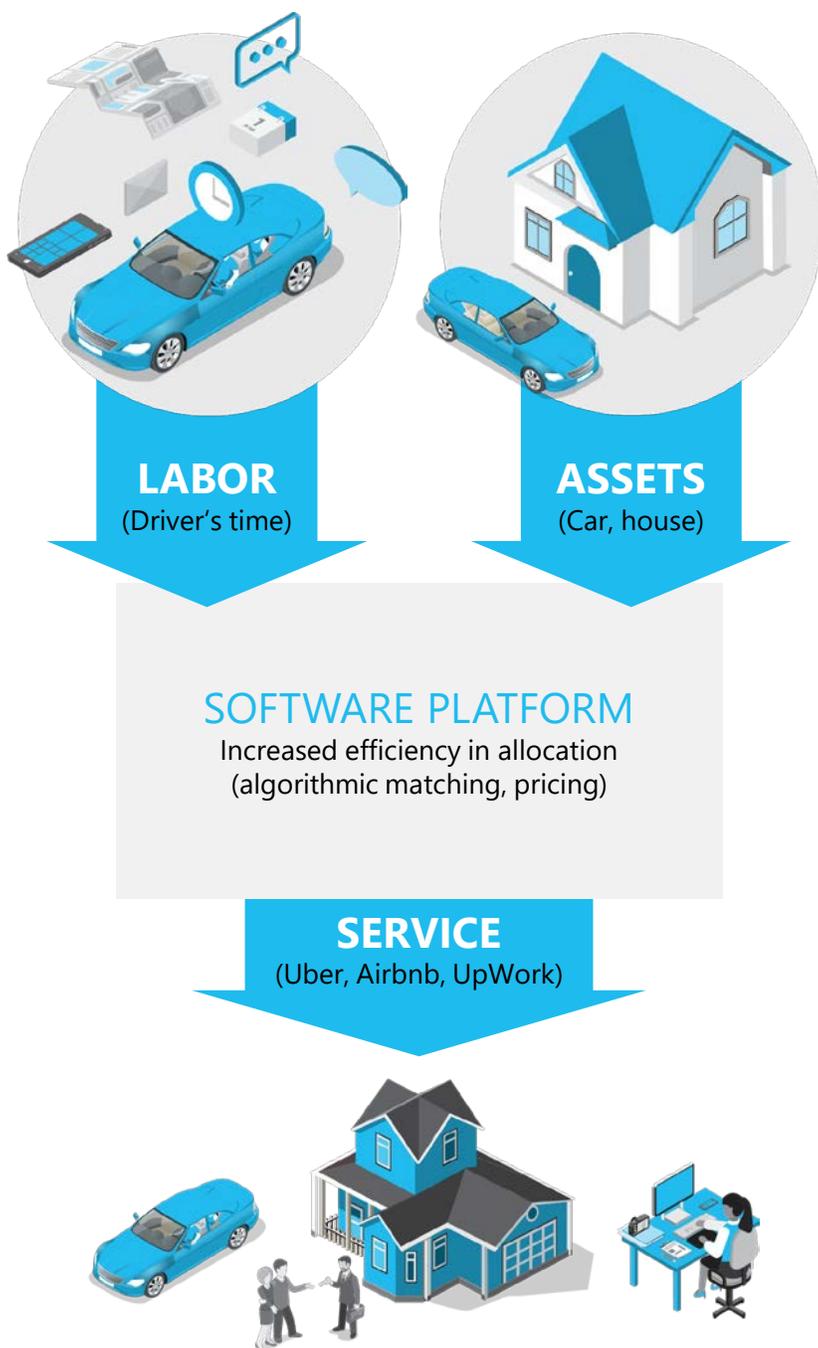
Autonomous and semi-autonomous vehicles

Powered by computer vision, object recognition, and high density mapping services, vehicles autonomously brake, observe speed limits, drive within lane markings, and park while adapting to ever-changing conditions, such as roadwork. These scenarios have both consumer and commercial applications including the platooning of trucks by mining operations to provide fuel savings and the autonomous piloting of boats in open waters.



Jobs reimaged

In a digital society, work and jobs will be redefined, new job markets will be created, and labor clearing houses will develop in a skills-for-hire economy. While clarifying, quantifying, simplifying, streamlining, and optimizing jobs, AI will be infused into bots to perform routine and repetitive work.



App-driven labor and asset sharing markets (Uber, Airbnb, Upwork, etc.) are central to redefining work and how people think about labor.

A broad array of traditional jobs will be sliced into microtasks and assigned just-in-time.

Wages and prices will be set by a dynamic measurement of supply and demand.

A worker's performance will be tracked, reviewed, and subject to customer satisfaction.

The valuable data by-products will include intent, process, transaction, and reputation tracking.

Driving into the future

Uber uses driver selfies to prevent fraud and protect drivers' accounts from being compromised while protecting passengers with the assurance that the appropriate driver is behind the wheel.

After passengers request a ride using Uber's mobile app, Uber sends information about the driver including name, photo, car make, model, and license plate number.



Using AI to help find art in the everyday



Multiple artificial intelligence technologies have been incorporated into artwork at Tate Britain in the UK to match news imagery we see every day. Sophisticated algorithms were at the heart of its operation, collating and organizing artwork to establish accurate matches at lightning-fast speed.

Using a computational algorithm, Recognition was able to study a piece of art in the collection and, much as a human would, recognize a range of features including composition, color, people, objects, and emotion almost instantly. The tool combined this with details about the image, such as the location of a painting or the genders featured in a picture.

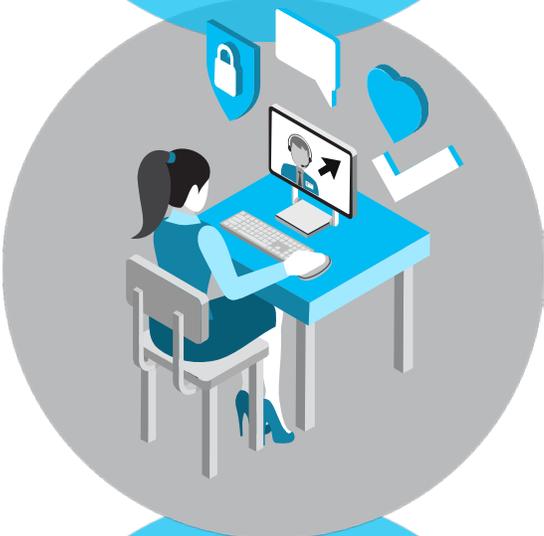


How to lead in the age of artificial intelligence



HELPFUL & COMPLEMENTARY

By augmenting human creativity, empathy, emotion, and judgment with the computational speed and ability to analyze large amounts of data of machine intelligence, positive social change becomes possible.



TRANSPARENT & TRUSTWORTHY

To engender human trust in machines, privacy protections, transparency, and security must be incorporated into technology.

People must have control over the information that they share and know for what it is used. Information must be protected with the highest level of security. People and organizations should be able to control information collection, storage, and archival.



INCLUSIVE & RESPECTFUL

AI systems augment, extend, and empower human abilities. As such, AI technology must be inclusive—useful to all abilities, needs, and cultures—to be impactful.

Intelligent systems have the potential to help or harm individual and business reputations. During their learning phase, AI systems must be able to adapt to different situations while they are guided by responsible humans.



Human language is the new user interface

People discover, access, and interact with information services and applications using natural language. They initiate conversations through Skype, Facebook, WeChat, Slack, SMS or email.

Enhancing human conversations

Communication channels that provide context, a consistent messaging framework, language understanding, and translation services enhance our ability to engage with other humans.

Text and speech translation services dismantle language barriers. Business and personal knowledge services deliver intelligent answers and build customer trust.

Inclusive and situational solutions can be adapted to a user's current environment or emotional state.



Personal digital assistants

Like their human counterparts, the best personal digital assistants get to know the people they serve over time so they can provide smart, personal, helpful, and proactive service. Personal digital assistants store data about their users and share only what is needed to complete a specific task: researching information, providing relevant details, guiding a user through a simple task, or completing tasks.



MEETING REMINDER	3PM
LOCATION: EAST WING	220

BOTS

Companies are increasingly implementing intelligent applications called bots to fulfill the role of agents. Bots get to know the domain or company they operate within to provide smart, intuitive, and knowledgeable services to the users they support. Bots request and store only enough information from a user or the user's digital assistant to accomplish a specific task.



Human computer interaction

As computers have changed, so have the devices we use to enter and receive information. Where once we were limited to keyboards and mice, AI enables us to interact with machines in the context most conducive to understanding and expression.

COMPUTER VISION

Machines use vision to comprehend the world, ranging from object detection to face recognition and even emotions.

SPEECH

Machines hear and speak to people by filtering noise, identifying voices, and understanding intent.

NATURAL LANGUAGE PROCESSING

Machines process text and recognize the intent including jargon and pop culture references.

KNOWLEDGE

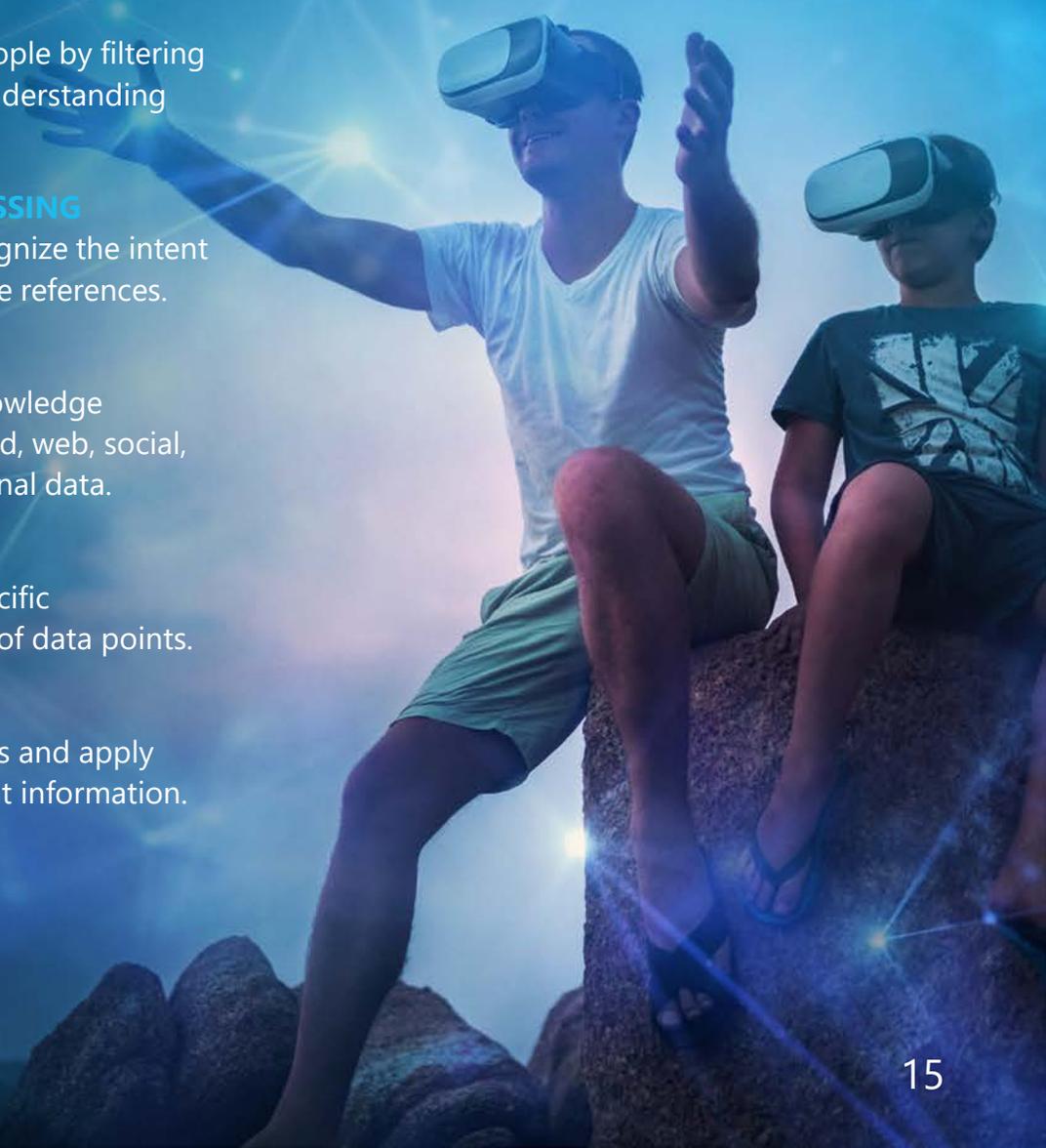
Machines implement global knowledge gathered from the physical world, web, social, academia, corporate, and personal data.

INTELLIGENT SEARCH

Machines help humans find specific information among the billions of data points.

CONTEXT

Machines are aware of situations and apply context to provide more relevant information.



Technology transfer in everyday business

BANKS are providing customer service for repetitive finance tasks such as transferring funds and providing support services.

TELECOMMUNICATION providers are enhancing web support services with chat bots. These intelligent bots answer questions and access shared knowledge to provide support.

GOVERNMENTS are enhancing government services with web based agents that understand the citizen services of the person contacting them.

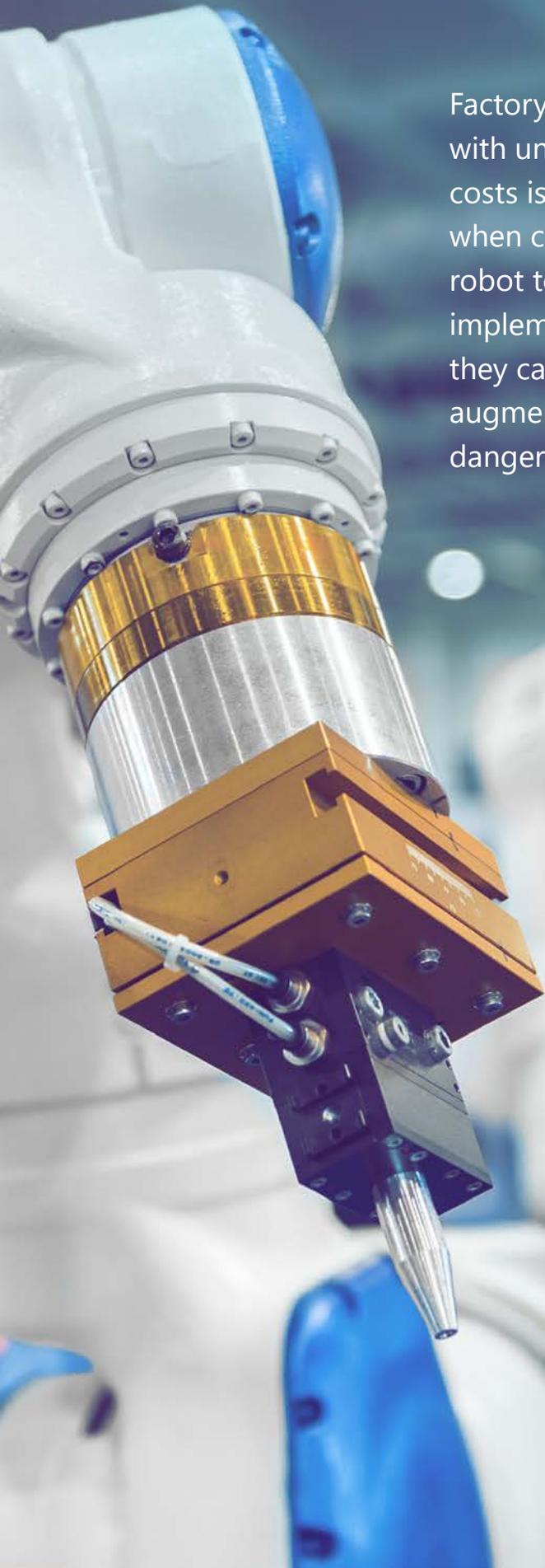
HEALTHCARE PROVIDERS are increasing the knowledge of their call center assistants and providing contextually relevant customer information to improve customer care.

MANUFACTURERS are embedding AI into products to provide personalized and intelligent assistance, predictive maintenance, and remote monitoring.

RETAILERS are helping consumers find and recommend products and services in a more personal, trusted, and appropriate manner.

Robots

Factory robots are well suited to highly repeatable tasks with uniform constraints. One of the highest maintenance costs is the retooling of factory robots, especially impactful when complex environments must be designed around the robot to enable safe human-robot cooperation. By implementing computer vision, robots will gain sight so they can detect objects and learn from human behavior, augmenting and even replacing humans for repetitive or dangerous tasks on the assembly line.

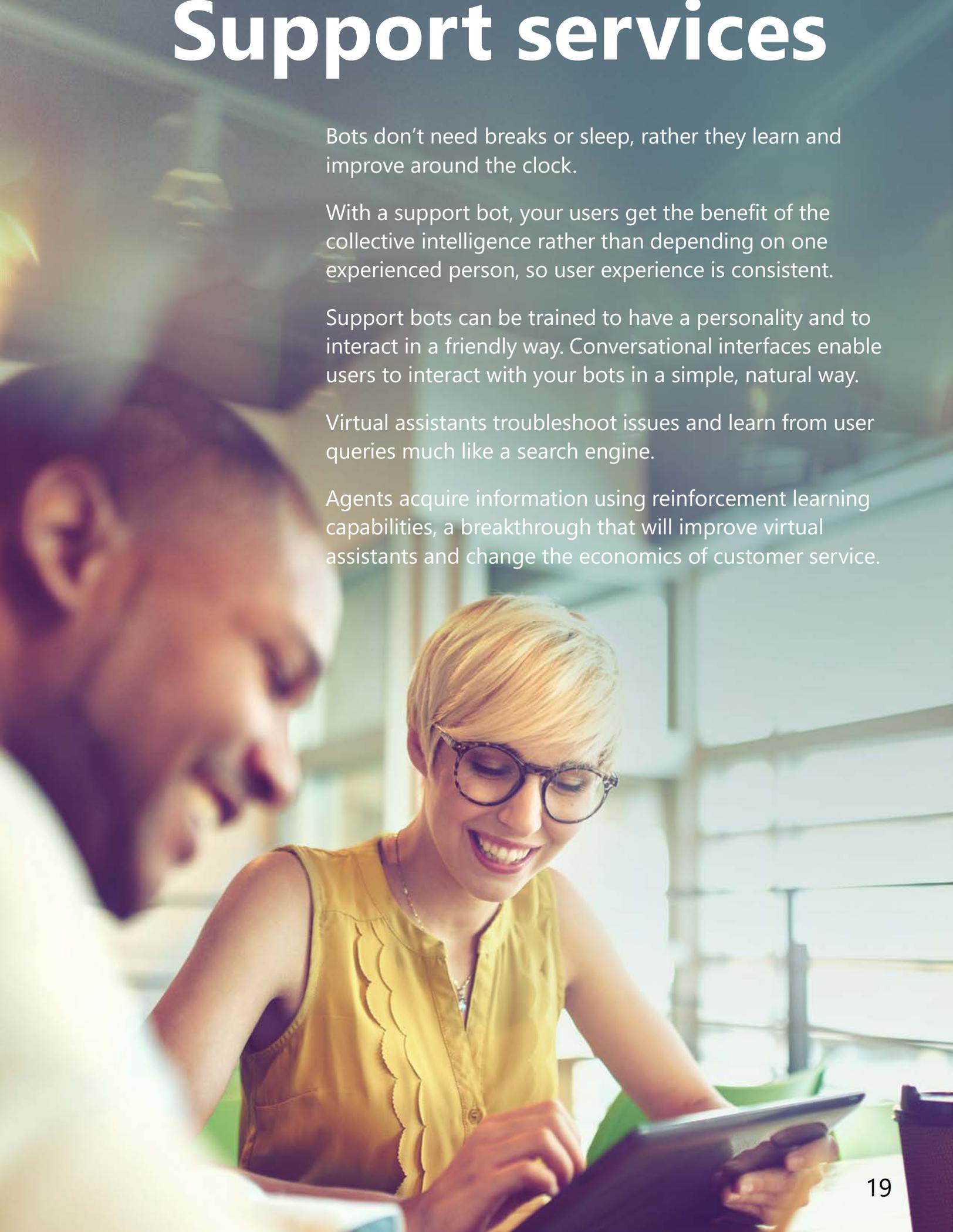


The harsh truth of the camera eye



Cameras are present in nearly all public locations today—on streets, in stores, and within transit centers. Providing these cameras with intelligence can enhance safety and improve traffic flow. Intelligent cameras can detect pedestrians about to cross the road and alert cars and drivers of the potential danger. Intelligent cameras can detect anomalous behavior and identify potential suspects for criminal justice investigations. Intelligent cameras can also help identify process inefficiencies such as vehicle and human congestion and alert where assistance is needed.

Support services

A man and a woman are smiling and looking at a tablet together. The woman is wearing glasses and a yellow top. The man is wearing a white shirt. They are in a bright, modern office setting.

Bots don't need breaks or sleep, rather they learn and improve around the clock.

With a support bot, your users get the benefit of the collective intelligence rather than depending on one experienced person, so user experience is consistent.

Support bots can be trained to have a personality and to interact in a friendly way. Conversational interfaces enable users to interact with your bots in a simple, natural way.

Virtual assistants troubleshoot issues and learn from user queries much like a search engine.

Agents acquire information using reinforcement learning capabilities, a breakthrough that will improve virtual assistants and change the economics of customer service.

Mass personalization

Imagine what happens when the cloud collects and consolidates user preferences, behaviors, likes and dislikes, and expectations.

The intelligence gets personal.

All data about a particular user feeds into the systems and ecosystems leading to more personalized experiences that delight your users.



Machine learning for EQ



When you apply machine learning to emotional intelligence, you create bots that learn to relate and respond to people in a more empathetic, nurturing way.

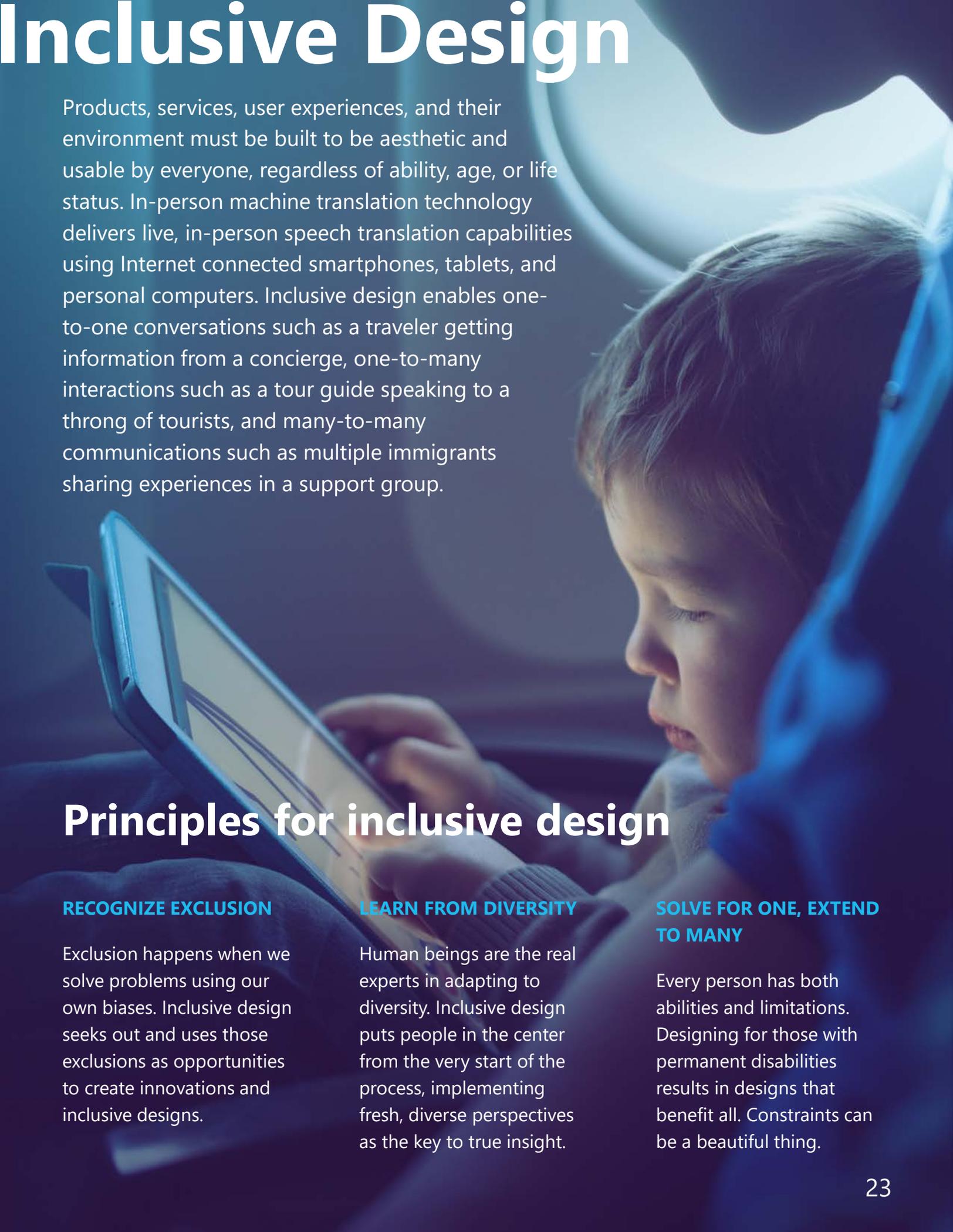
You won't have to send each bot to training on interpersonal skills. Each bot has instant access to the emotional intelligence patterns that emerge from daily interactions.

Social intelligence

When you have insight into community feedback about your product or service, you can generate product improvements, new features, new experiences, and better brands.



Inclusive Design



Products, services, user experiences, and their environment must be built to be aesthetic and usable by everyone, regardless of ability, age, or life status. In-person machine translation technology delivers live, in-person speech translation capabilities using Internet connected smartphones, tablets, and personal computers. Inclusive design enables one-to-one conversations such as a traveler getting information from a concierge, one-to-many interactions such as a tour guide speaking to a throng of tourists, and many-to-many communications such as multiple immigrants sharing experiences in a support group.

Principles for inclusive design

RECOGNIZE EXCLUSION

Exclusion happens when we solve problems using our own biases. Inclusive design seeks out and uses those exclusions as opportunities to create innovations and inclusive designs.

LEARN FROM DIVERSITY

Human beings are the real experts in adapting to diversity. Inclusive design puts people in the center from the very start of the process, implementing fresh, diverse perspectives as the key to true insight.

SOLVE FOR ONE, EXTEND TO MANY

Every person has both abilities and limitations. Designing for those with permanent disabilities results in designs that benefit all. Constraints can be a beautiful thing.

By making applications and devices intelligent and giving them the capability to comprehend and interact with the world naturally and respectfully, organizations can continue to improve human to machine interactions in powerful ways and deliver business outcomes through digital transformation.

Human ingenuity and passion together with technology can solve many of humanity's challenges—and change the world.



Microsoft Services empowers organizations to accelerate the value imagined and realized from their digital experiences.

Imagine. Realize. Experience.

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