Making sense of AI

by Kimberly Nevala

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THE POWER TO KNOW.

Making sense of AI

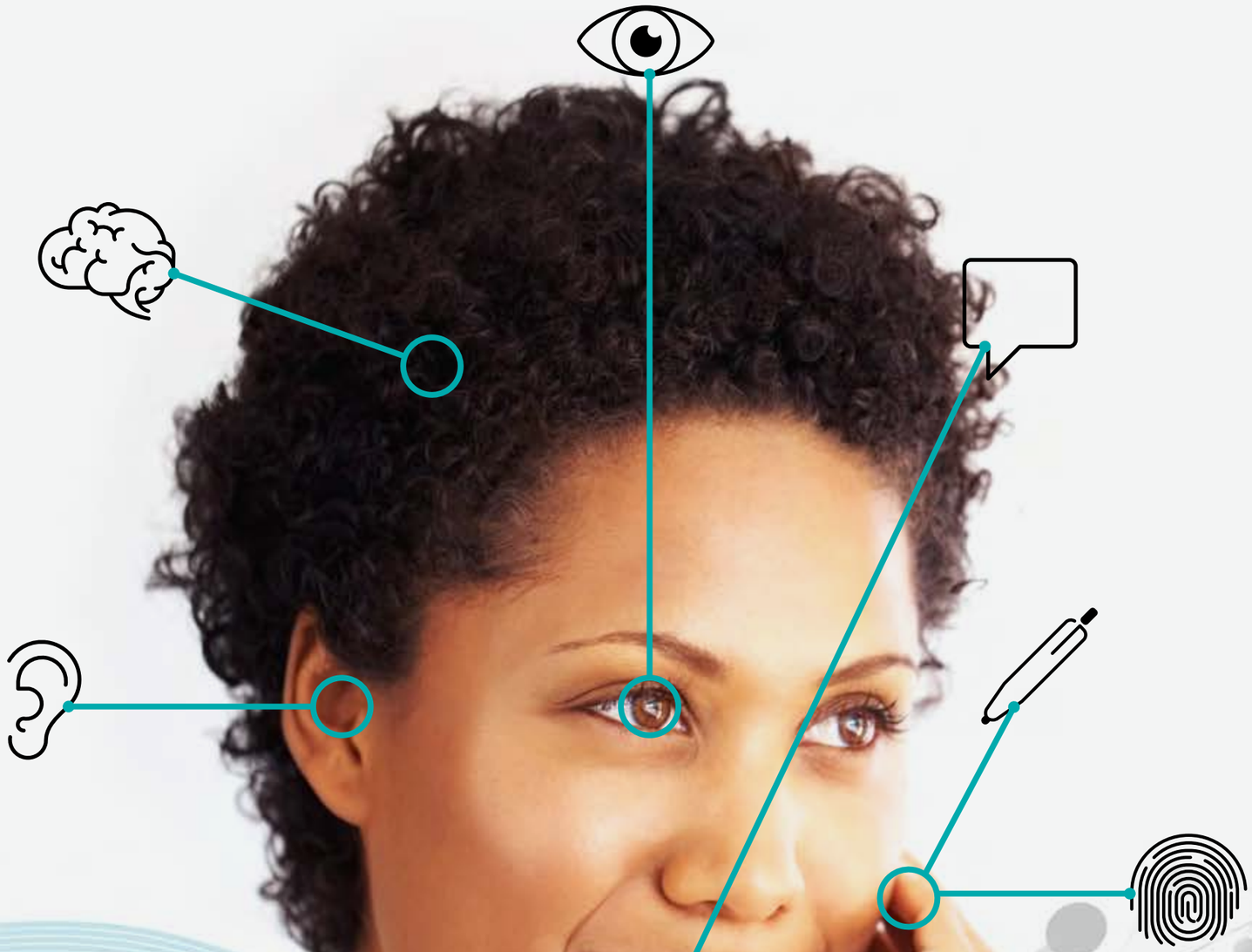
TODAY'S ARTIFICIAL INTELLIGENCE (AI) SOLUTIONS are not sentient in the manner popularized in science fiction depicting scores of self-aware (and typically nefarious) androids. Even so, the ability to arm such systems with the ability to directly sense and respond to their in situ environment is critical.

Why? In the future, our experiences will be smart, intuitive and informed by analytics that are not seen but felt via new business, personal and operational engagement models. Enabling this interaction requires AI applications that can sense, analyze and respond to their environment in an intelligent and interactive manner. Without requiring the end user to write, understand or interpret code. "Sensitive" artificial intelligence enables:

- More productive use of expanded (big, often unstructured) information sources.
- Intuitive man-machine interactions (no code-speak here!).
- Adaptive, immersive experiences and environments.

As frequently touted on the news, AI's popularity is clear. However, the term's ubiquity often results in the overestimation - or, increasingly often, underestimation - of what AI can do. To clear the air, let's explore the boundaries of AI's capabilities today.

Reading, Writing and Arithmetic



ALL AI OR MACHINE LEARNING (ML) driven systems learn from data without being explicitly programmed (that's the math).

But creating a cooperative environment in which man and machine work seamlessly together takes more than a smart machine. Deploying smart systems in ways we humans find natural and intuitive is the science and the art.

This means AI must also have the ability to ingest information and/or interact using natural sensory constructs. This may include spoken and written language, visual observations of pictures, video or objects, and so forth. In other words, today's AI solutions should be able to observe, analyze and respond intelligently to their environment in the native tongue.[1]

1. In the case of machine-to-machine interactions, such as the IoT ecosystem, the "native tongue" may be binary.

seeing

Detect, identify and understand the context of objects (people, places and things) in pictures, videos and real life. This includes the ability to translate or interpret text, written language and symbols.

hearing

Capture, catalog and interpret spoken commands as well as speech, sounds and auditory signals within the ambient environment or from video.

speaking/writing

Communicate insights, directions or responses verbally or in writing using natural language. Including ability to apply appropriate dialects, slang or mimic individual speech patterns. Such as this sentence fragment.

feeling

Ingest diverse inputs such as environmental conditions (e.g., temperature, wind, precipitation) or biometrics (e.g., heart rate, perspiration) utilizing sensors and other devices often associated with the internet of things (IoT).

thinking

Apply machine learning and other analytic techniques to integrate, analyze and generate insight from input information and signals.

The Holy Grail: From Seeing to Knowing

MODERN AI APPLICATIONS are smart, adaptive and interactive. But just how smart are we talking? The figure below provides a simple, gross model for gauging the spectrum of machine understanding.

Recognition

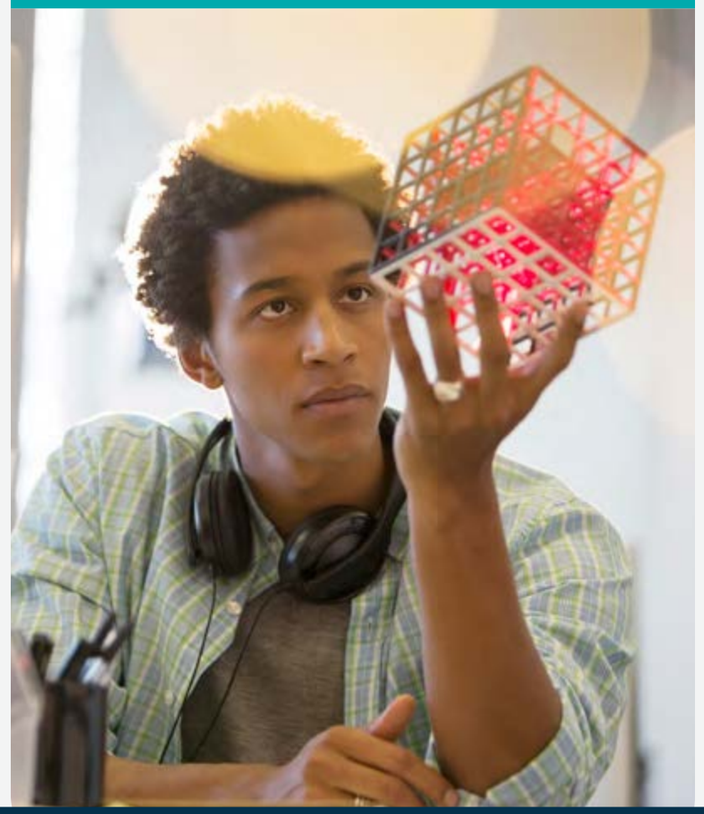
Simply identifying people or things (objects, sounds, etc.)

Comprehension

Understanding how things relate; gaining and applying insight based on the context of a given situation.

Abstraction

Imagining or conceiving new ideas or theories based not just on discrete, observed inputs or events but on intuition or “leaps of logic” (facts not in evidence).



we are here

Great progress has been made improving the machine's ability to understand very complex, yet discrete, situations or events. However, abstraction remains beyond the reach of AI today. But, as these simple examples show, achieving full cognition isn't as simple as it sounds (pun intended!).

Vision

Recognition

Identify things in a picture or video.

Comprehension

Relate items to each other.

Abstraction

Evaluate and **predict** future performance.

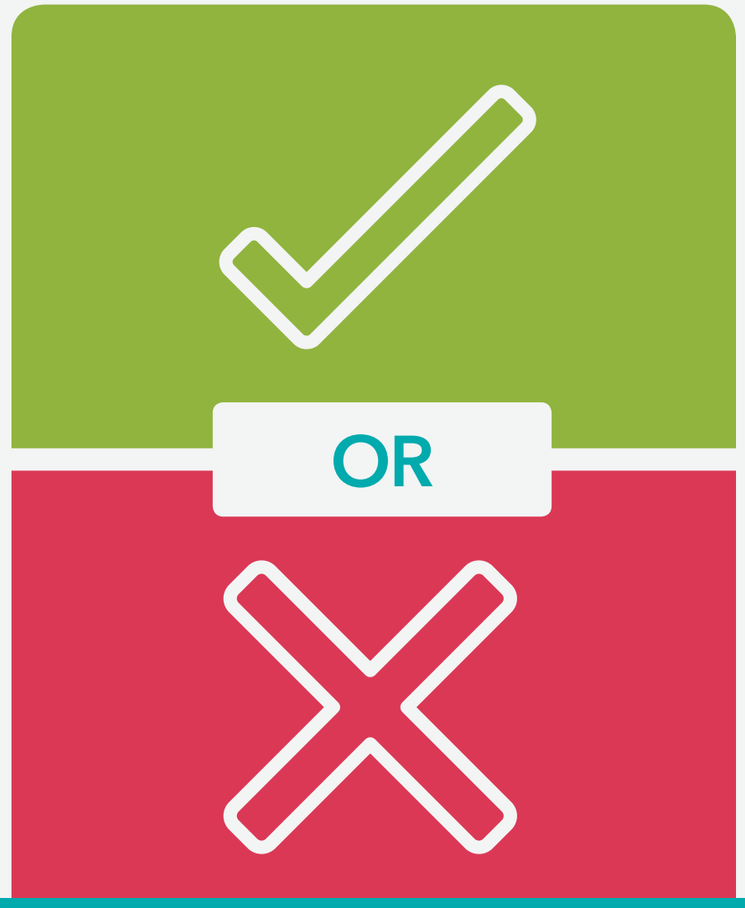
Interpret Speech

Recognition

Translate speech **verbatim**.

Comprehension

Recognize this as an exclamation, and not a farm animal having a religious experience.



Abstraction

Posit a **positive** or **negative** response.

AI in Practice

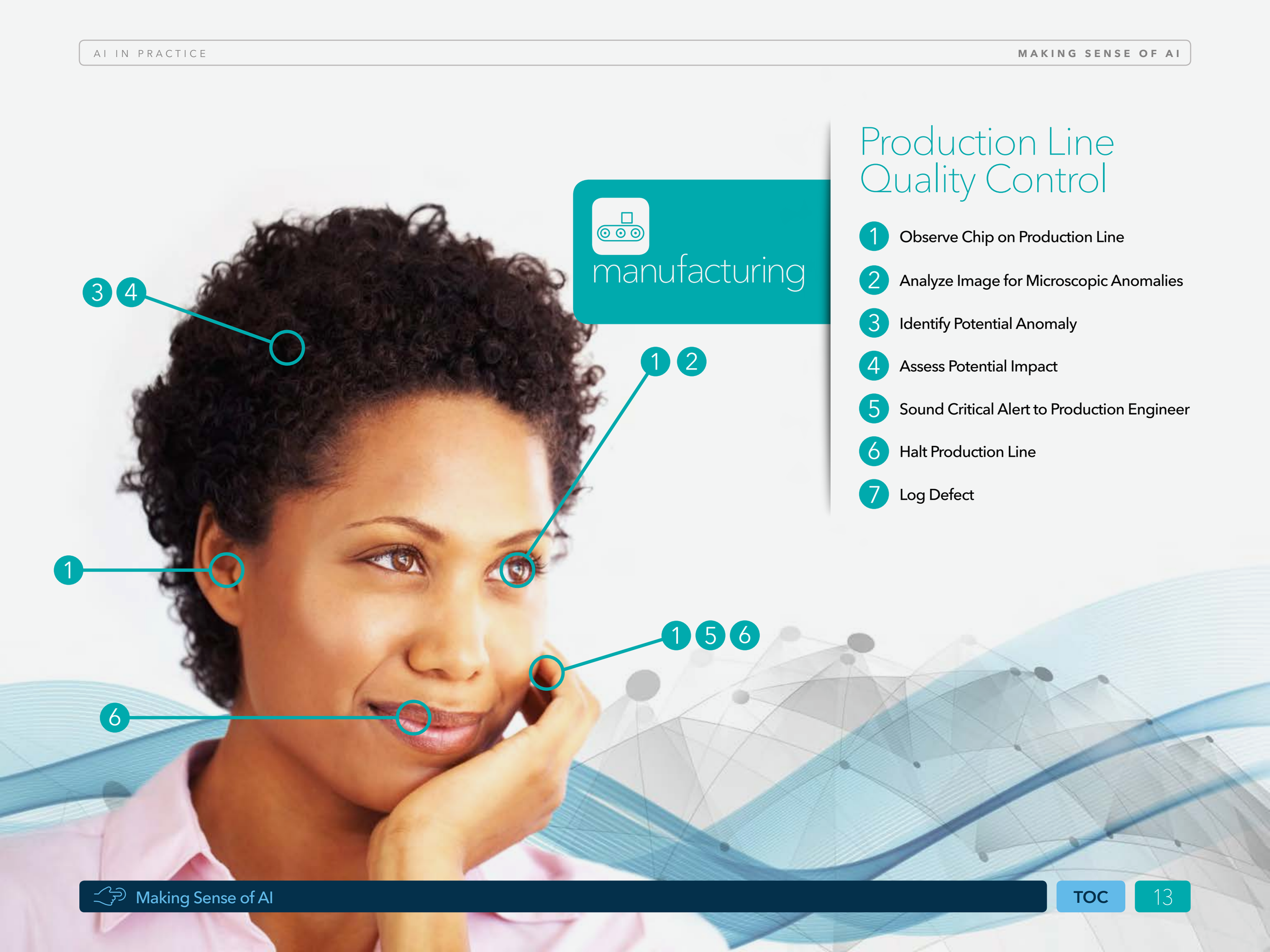
health care

Urgent care triage

1. Use Facial Recognition to Identify Patient
2. Ask Patient Triage Questions
3. Record Answers
4. Collect Patient Vitals
5. Analyze Patient Symptoms & History
6. Prioritize Patient for Triage
7. Add Patient to Triage List & Notify Nurse
8. Assign Patient to Appropriate Waiting Area

Smart Thermostat

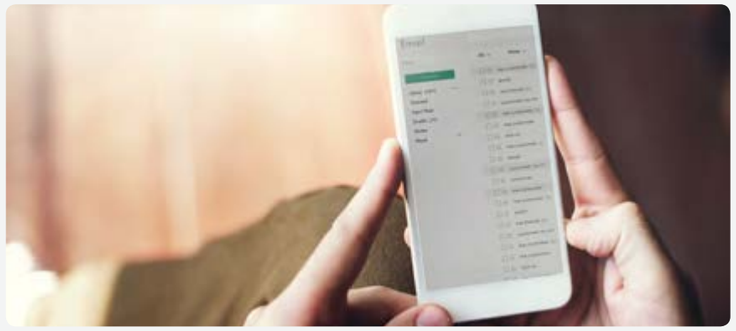
1. Monitor Internal & External Environment
2. Identify Movement
3. Assess Level, Frequency of Activity
4. Analyze Current Conditions & Prior Energy Settings
5. Adjust Thermostat to Cool Room
6. Send Alert to Homeowner's App



Production Line Quality Control

1. Observe Chip on Production Line
2. Analyze Image for Microscopic Anomalies
3. Identify Potential Anomaly
4. Assess Potential Impact
5. Sound Critical Alert to Production Engineer
6. Halt Production Line
7. Log Defect

other applications



Personal Assistant

Manage email or voicemail based on individual preferences and behavior: flag or schedule priority items, draft proposed responses or automatically answer common inquiries in your vernacular.

Customer Service (Bots)

Provide answers to frequently asked questions and fulfill routine service requests via speech or text-based communication channels.

Smart Grid Optimization

Monitor and optimize grid allocation based on real-time operating conditions and energy utilization.

Legal Analysis

Identify and collate relevant legal briefs, case precedents and legal statutes for review by paralegals and attorneys.

Financial Advisor

Propose optimal investment mix or trades based on your individual goals and risk tolerance, historical and current market performance, and behavior of "like individuals."

Business Monitoring

Monitor key business processes and notify key decision makers when out-of-norm or anomalous operating conditions are identified or forecast.

Points to Ponder

ARTIFICIAL INTELLIGENCE solutions are extremely powerful but not without limitation.

Keep in mind:

AI **Will Adapt** but **Won't Create**.

AI solutions are smart, not spontaneously creative.

AI solutions become more adept at identifying the right action or predicting outcomes as they test and learn from experience (aka data).

AI will not brainstorm, project new futures or create net new responses – regardless of the data consumed.

AI **Talks** but Doesn't **Walk** Like a Person.

Intuitive, insightful interaction is a keystone of AI. Have a question? Just ask. The machine will answer. Out loud. In English (or your preferred language, as determined by the algorithm).

From this perspective, AI systems are designed to emulate how humans communicate. This doesn't mean that how an intended task or outcome is accomplished can or should be modeled against human practice or process.

AI Is **Focused**.

Practical business solutions are typically specialized: automating or augmenting discrete, well-bounded systemic interactions or points of engagement.

A solution to recommend treatment for breast cancer will not apply to colon cancer. Or diabetes.

The personal assistant managing your calendar won't optimize your financial portfolio.

Points to Ponder

ARTIFICIAL INTELLIGENCE solutions are extremely powerful but not without limitation.

Keep in mind:

AI Doesn't Discriminate (Between Man and Machine)

While AI use cases tend to focus on human-machine interactions, AI is also core to machine-to-machine interactions (often via the IoT).

In either case, key intersection points, rules of engagement and expected outcomes must be deliberately designed.

AI Automates, Augments or Extends

AI may automate discrete tasks or interactions, augment existing decision pathways or extend them.

Creating appropriate, easily consumable interactions between man and machine requires clarity about the scope of the problem being solved and the intended experience.

AI Is an Experience

When it comes to AI, the experience is the product. That experience can't be prefabricated.

Chatbots, for example, must be trained to respond to specific types of inquiries with the responses and tone that reflect your offerings and brand.

Conversational design (which is not limited to just text or verbal interaction) is the new user experience.

KIMBERLY NEVALA is the Director of Business Strategies for SAS Best Practices. She is responsible for market analysis, industry education, emerging best practices and strategies in the areas of advanced analytics, information governance and data-driven culture. Nevala's current focus is helping clients understand the business potential and practical implications and limitations of artificial intelligence and machine learning. A popular speaker and author, she has authored or co-authored numerous e-books and white papers including: *The Machine Learning Primer, Portrait of a CAO, Data-Driven: Going From All Gut to Analytically Driven Glory, Anatomy of an Analytic Enterprise, Sustainable Data Governance* and *10 Mistakes to Avoid When Launching Your Data Governance Program*.

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