BUZZWORD DEMYSTIFIER

Artificial intelligence

The second installment of ABB Review's "Buzzword demystifier" series looks at artificial intelligence. This guest article is by Derik Pridmore, CEO of Osaro, a San Francisco-based company partnering with ABB in the domain of machine learning.

Derik Pridmore
CEO of Osaro
San Francisco, USA

derik@osaro.com

Osaro is a company specializing in machine intelligence. Osaro partners with ABB in bringing machine learning to ABB products.
www.osaro.com

I'm often asked "what is artificial intelligence?" and "why is artificial intelligence important for industrial robotics?" The term artificial intelligence seems to intrigue, confuse, and frustrate businesses that hope to use it to better serve their customers.

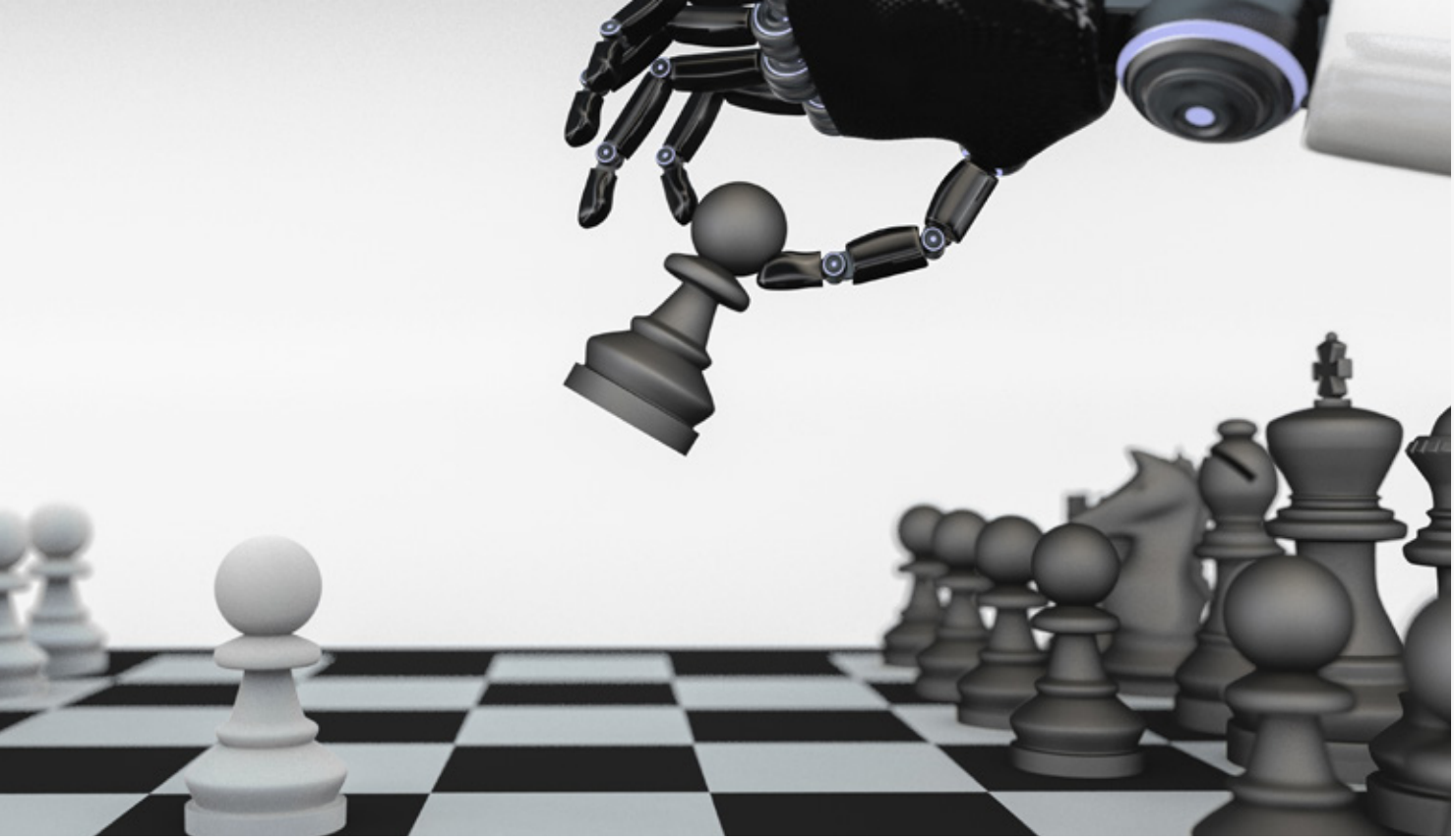
Before we define artificial intelligence, it is useful to define intelligence. Intelligence is the ability of an agent (human or otherwise) to achieve goals in a wide variety of environments [1].

For instance, when presented with a new goal or situation, humans are often able to achieve that goal. Their intelligence gives them robust capabilities. An artificial intelligence is an algorithm (computer code) that has this property – the ability to achieve goals in a variety of environments.

Adding to the confusion, we often hear the terms "machine learning" and "artificial intelligence" used interchangeably. They have become synonyms because learning is a very useful method for increasing intelligence. Machine learning simply means algorithms that are designed to learn from data. Two machine learning techniques which have shown particular promise in the past five years are deep learning and reinforcement learning.

Deep learning is a supervised learning technique that uses neural networks to form compressed and generalized representations of a data set. Reinforcement learning is a separate technique which takes a representation of an environment and a goal (called a reward function), and then uses trial and error to discover actions that maximize the reward. (It might also take in examples of how to achieve the goal – this imitation learning is how Osaro's software works.) In theory, by combining these two techniques we can simultaneously learn a representation and discover how to achieve a goal.

—
Footnote
1) For a technical overview of this definition, see https://arxiv.org/pdf/0712.3329.pdf.



The only questions that remain are how fast, how well, across what types of environments, and with what guarantees can we learn? This is the focus of most modern machine learning research.

With these definitions in hand we can understand why artificial intelligence is important to industrial robotics. If a business changes a part or workplace even slightly, today's robots fail and need to be given a new set of instructions.

The algorithms controlling conventional robots have very little intelligence. Artificial intelligence will increase the range of tasks and environments in which robots can used. It will also decrease the total cost of robotic deployments by saving time and alleviating costly reprogramming. ●

Imprint

Editorial Board

Bazmi Husain
Chief Technology Officer
Group R&D and Technology

Adrienne Williams
Senior Sustainability Advisor

Christoph Sieder
Head of Corporate Communications

Reiner Schoenrock
Technology and Innovation Communications

Roland Weiss
R&D Strategy Manager
Group R&D and Technology

Andreas Moglestue
Chief Editor, ABB Review
andreas.moglestue@ch.abb.com

Publisher
ABB Review is published by ABB Group R&D and Technology.

ABB Switzerland Ltd.
ABB Review
Segelhofstrasse 1K
CH-5405 Baden-Daettwil
Switzerland
abb.review@ch.abb.com

ABB Review is published four times a year in English, French, German and Spanish. ABB Review is free of charge to those with an interest in ABB's technology and objectives.

For a subscription, please contact your nearest ABB representative or subscribe online at www.abb.com/abbreview

Printer
3MA Group
68250 Rouffach/France

Layout
DAVILLA AG
Zurich/Switzerland

Artwork
Konica Minolta
Marketing Services
WC1V 7PB London,
United Kingdom

ISSN: 1013-3119

http://www.abb.com/abbreview

Tablet edition
ABB Review is also available for your tablet.

Please visit abb.com/abbreviewapp

Stay informed…
Have you ever missed a copy of ABB Review? Sign up for the email alert at abb.com/abbreview and never miss another edition.

Please note that when you register for this alert, you will receive an email with a confirmation link. Please ensure that you have confirmed your registration.