



AGE OF THE MACHINE

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING OFFER POTENTIAL FOR TIME AND COST SAVINGS

By Sarah B. Hood

» **IN THE DAILY ROUTINE OF THE WORKSITE**, artificial intelligence and machine learning can sound like futuristic concepts, but that future is today. These technologies are part of every industry, like the automotive sector, where they are integrated into everything from robotic manufacturing equipment to built-in parking assistance and obstacle detection.

COVID is revealing that every mobile device and laptop offers a wealth of opportunities to increase safety, efficiency and productivity that have barely begun to be exploited. Combine these with other tech tools like drones, thermal sensors and BIM modelling, and there's hardly any area of construction that cannot be made more efficient, except possibly waiting for concrete to cure. (But wait – Ottawa-based Giatec Scientific Inc., a partner of Procore Technologies, is currently leveraging AI and machine learning to predict whether a concrete mix will reach strength when it's required!)

"Machine learning is a computational method: a way of doing math to train a machine to do a task over and over again, using algorithms," explains Kris Lengieza, Procore's senior director of global partnerships and alliances. With AI, "you're layering in the industry knowledge to basically predict what's next; when we start to predict what's next, that's when we move into AI."

This can take many forms, including Intuitive AI's Oscar Hygiene, which monitors the health of people entering a worksite or building. Another example is the work of INDUS.AI, another Procore partner, which uses AI to simplify the automation of data entry or PPE-use monitoring, or make material deliveries

and removal more efficient through continually-learning algorithms that monitor and analyze video feeds from site cameras.

LEVERAGING DATA

In November 2020, Procore announced its annual How We Build Now Canada survey. It found that 88 per cent of respondents believe technology will play a key role in the future of how we work in construction, or actually form the backbone of the construction industry. With more than 300 partners in its platform, Procore is integrating an enormous amount of data collected from its users in the field that can be used to fine-tune its analytics platform through artificial intelligence and machine learning.

"We are leveraging all the data that is available to build out the algorithm to better serve industry," says Lengieza. With each request for information (RFI), the system becomes better able to direct users to the information they need. In that sense, with every RFI, "you're actually training that algorithm to get a little smarter, depending which result you go to, so the next time you search, it's going to bubble that response higher to the top of the list."

Just as auto manufacturers are building smarter cars, heavy equipment is getting smarter too. For example, California-based Built Robotics produces a combination of hardware and software that can be installed on any piece of heavy equipment, explains director of communications Erol Ahmed. It's currently the only commercially available system of its kind specifically geared towards the earth-moving needs of the construction industry. "We see the need for construction companies to upgrade to the

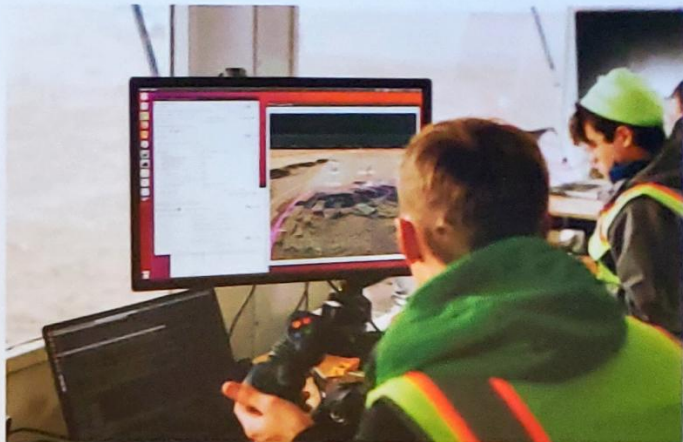
21st century. It's getting more and more expensive to build things, and construction can benefit by having the best tools," explains Ahmed. Although "the complexities that humans can handle are still out of reach for robotics," smart machines are ideal in remote or dangerous environments and situations that require consistent repetitive tasks.

Using Built Robotics' systems, a human robotics equipment operator (REO) can program an excavator to dig a pipeline trench almost as simply as setting up a coffeemaker for the next morning. "The robot will plan its path and start digging," says Ahmed. "The REO can close their laptop and go on to the next jobsite." Onboard cameras and sensors ensure that the equipment will pause if it encounters an unexpected obstacle.

"One of the big benefits of software solutions is that the knowledge of one machine can be shared among all the machines," Ahmed adds. "Each machine will learn its own dataset, but then they will share it with all the others, whether you're in the U.S. or Australia."

BUSINESS STRATEGY

Rosemarie Lipman is CIO and SVP of digital & data engineering with EllisDon Corporation. She holds that companies should "implement technology with a clear connection to business strategy or purpose; we have to think about the problems we want to solve and what data contributes to the solutions, including the quality and quantity of data needed to leverage AI. For general contractors, I think unsupervised machine learning definitely has application in the office, in areas such as scheduling and estimating [but] we will still need human oversight and interpretation in the field."



As an example of an application with potential to develop AI, Lipman names COMPASS, software that collects, organizes and analyzes subcontractor data to help manage risk. COMPASS provides predictive analysis to enhance decision-making. In 2017, EllisDon provided COMPASS with seed capital and became its first client. It has since been implemented by 11 Canadian general contractors and eight in the U.S.

"People say construction is pretty behind in digitization and automation. AI and machine learning is a bit far out there. Many are still focusing on getting out of paperwork, but we've seen a huge adoption of technology, especially since COVID," says Lengieza. "What I ask them to do is not to ask whether I need to use artificial intelligence and machine learning, but whether I can use digital tools to make me more efficient." ◀

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