

An Eye on Success

The ever-expanding potential of jobsite cameras

By Vicki Speed

Digital cameras have long supported jobsite security and more recently, work progress monitoring and even project management. Many may not realize that within the walls of these typically small systems sits a powerful resource that could directly influence project success—thanks largely to ever-evolving smart analytics.

Artificial intelligence—and all of its subcategories—offer increasingly powerful capabilities in the jobsite camera space, turning what used to be passive, remote observation systems into intelligent, proactive alert systems that can drive productivity, efficiency and safety. “Now it’s all about the data in the image,” says Brian Cury, founder and CEO of EarthCam, “Workers, objects and materials can now be detected instantly, and based on specific events or combinations, advisories can be sent to stakeholders to help them establish a safer, more productive jobsite.”

Elevating Awareness

Jobsite cameras equipped with smart analytics can help track anomalies on a jobsite, whether that’s potential theft, a safety hazard, material and equipment deliveries or even work progress anomalies. Today’s leading intelligent solutions camera solutions take advantage of artificial intelligence (AI) software and its many subcategories including machine learning, natural language processing (NLP) and computer vision, along with Internet of Things (IoT) sensors, to turn visual data—videos and images—into valuable insights.

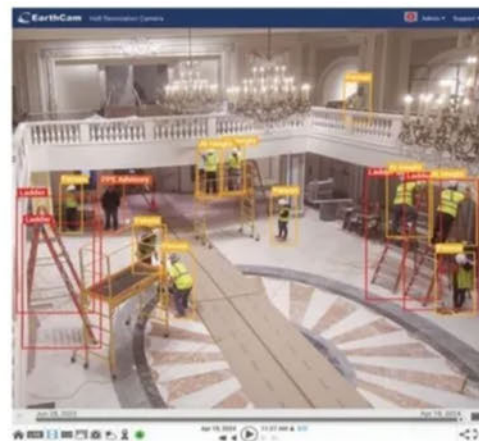
Computer vision, or the ability to interpret and understand visual data,

is increasingly common. For instance, CamDo Solutions’ platform employs IoT cameras that use AI and computer vision to automate, detect, collect and analyze visual jobsite data in its CloudX platform or within construction management platforms. As well, EarthCam employs AI and computer vision to identify objects, advise on safety behaviors, track progress and identify equipment.

Here’s how it might work according to EarthCam. If a canopy installation is scoped to require three scissor lifts, AI can determine whether they are elevated, and being utilized safely. If lifts are not reported as present, workers can be redirected to other tasks. The AI alerts and observations then automatically populate project management platforms such as Procore and Autodesk Build.

Similarly, OxBlue’s construction cameras are equipped with AI to quickly analyze project images, spot activity, equipment, personal-protective gear and more of the common things found on site. Richard George, chief operating officer of OxBlue, says, “Cameras are a way to elevate awareness of surroundings, minimize the unexpected and monitor potential roadblocks.” He continues, “Through AI, cameras can help “raise the flag” when something is spotted on camera; like if there’s no hard hats on site, or if equipment doesn’t arrive by a certain time. Trained to spot activity, equipment, personal-protective gear and more of the common things found on site, cameras are a way to elevate awareness of surroundings, minimize the unexpected and monitor potential roadblocks.”

Looking ahead, Todd McCann,



With AI-enabled EarthCam camera technology, it’s easy to see if workers are safe.

founder and CEO of CamDo Solutions, points to emerging advancements in large language models, generative AI and classification AI with GPT4-V as well as edge processing advancements. He explains, “Put simply, edge processing means moving the computer vision to the field capture device rather than the cloud, for processing. For builders, this means reducing the reliance on internet connectivity and faster insights from the data.” OxBlue’s George agrees, adding, “The goal is to make as much information about the jobsite available and to distill that information into bite-sized, actionable insight. This way everyone invested in a project can take action at the right time with the right information.”

While smart analytics and intelligence often take center stage in conversations about camera technology, the hardware for these smart solutions is also advancing.

A Sensor of Choice

Camera hardware and sensor advancements are largely focused on quality, durability, flexibility and power

efficiency. George notes that these solutions are continually evolving; they're lighter, more reliable and increasingly energy efficient. "As production developments continue, you'll see cameras that are made for mounting anywhere, that include all-weather resistance and stability in high winds," he adds. The sensor technology also continues to improve with the addition of infrared, forward-looking infrared, night vision and thermal imaging systems.

Some might wonder if one camera can "do it all," which, according to CamDo's McCann, is likely not in the best interests of the contractor. "With all of the restrictions that a dynamic construction environment brings, camera hardware is actually getting more diverse as opposed to more universal. In the coming years, we will see a divergence of hardware and software while these new construction technologies find their feet. Aspects like price, size and mobility will become

more important as the volume of cameras increases."

Realizing the Visual Value

Today's jobsite cameras are more than virtual recorders of on-site activities. They're rapidly becoming an integral part of jobsite workflows, helping reduce the frequency of on-site inspections, enhance communication and increase accountability for owners and contractors.

EarthCam's Cury says, "Professionals should look beyond the sensor to the capability of the processing chips inside cameras that can now accomplish many complex tasks—such as AI object recognition on the 'edge' at 30 frames per second."

Through analytics, project managers and owners can better understand manpower, safety behaviors, equipment utilization and materials against a target schedule to help manage jobsites effectively.

These increasingly intelligent systems can also support the emerging era of digital twins. For example, EarthCam 3D is able to automatically align and merge live-camera streams with digital twins allowing users to pan, tilt and zoom to reveal architectural details while immediately seeing the corresponding model alignment.

McCann concludes, "The obvious benefit of today's smarter jobsite cameras is the speed in which the insights are delivered to project teams. One of the best superintendents I ever worked with asked me, 'How do you think projects get delayed?' His answer was simple: 'Day by day.' While there's a lot of value in walking the jobsite, there are also huge efficiency gains when insights are sent to the right people at the right time." That's where the ever-expanding potential of analytics-enabled jobsite cameras can and do make a difference. ♦

Live Streaming · Time-Lapse · Risk Analytics

The advertisement features a central computer monitor displaying a construction site with various equipment and workers. Red bounding boxes and labels identify objects such as "Telescopic Boom Lift", "Articulated Boom Lift", "Pick Up Truck", "Backhoe", and "At Height". A "PPE Advisory" banner is also visible. To the left, a smartphone shows a live stream of the same site. To the right, a sign reads "EarthCam.net SECURITY" with contact information: "For technical support contact support@earthcam.net or call 1.800.488.1111". Below the monitor, two more cameras are shown. The background is a blue gradient with a faint map of the United States.

Safety & Security

AI Object Analytics

New Jobsite AI Delivers Safety Insights and Risk Analytics

AI camera technology empowers contractors and insurers to analyze construction risk and improve jobsite safety due to its ability to identify objects, analyze activity in real time and send notifications to stakeholders. Better awareness created by objective AI analytics has real potential to prevent injuries and deaths. Popular jobsite camera provider EarthCam is leading the effort to create AI that detects when workers are operating at height and identifies the presence of ladders with significant accuracy.

Falls are the leading cause of construction fatalities, and many contractors, including Turner Construction and Skanska, have policies mandating safer methods like man-lifts and scaffolding instead of ladders wherever feasible. EarthCam AI verifies “ladders last” policy implementation, documents workers at height and shows

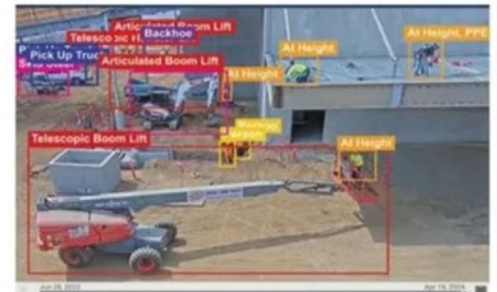
whether man-lifts are raised, lowered or empty. Each instance is graphed automatically in a dashboard and associated imagery is uploaded to management platforms like Procore or Autodesk.

“Detecting workers at height is one of the most in-demand, yet challenging AI models to develop,” says Brian Cury, EarthCam’s CEO and founder. “EarthCam’s unique expertise in deploying and managing automated robotic cameras, together with advanced deep learning can instill best practices with unbiased data.”

Once alerted by AI detections, safety personnel can retrieve detailed video to verify safe practices are observed, fall protection is applied and PPE is worn. Site visits by safety inspectors are supplemented with remote, visual validation of safe behavior. This AI data provides insights to encourage safe practices, prevent injuries and

earn better insurance terms. AI object detection recognizes vehicle types, and proximity advisories are sent when workers are close to energized equipment. Additional AI services include activity heat-maps, disposal monitoring and time-lapse.

EarthCam serves thousands of jobsites worldwide with technology that analyzes situations and behaviors with safety in mind and continues to pioneer software and services for construction. ♦



Detect workers at height, ladders and PPE using EarthCam AI.

PHOTO: EARTHCAM

Providing More for Less

The complete visual information ecosystem for your jobsite

