

Artificial Intelligence: What's Next For AI And The Cloud In Physical Security?

Published on 1 Mar 2019



Application of artificial intelligence (AI) and deep learning in the physical security market runs a gamut from cloud computing to edge computing. A variety of hardware solutions enable AI to be deployed at any level of a system from the cloud to edge devices such as security cameras.

Smarter AI-Powered Applications

A distributed structure can incorporate cloud computing and edge computing. It extends the Artificial Intelligence (AI) algorithm from the cloud, to an edge network of on-premises video recorders and servers, and further to edge devices like the security cameras. The three-layer architecture all

supports the goal to build a new class of AI-powered applications, being even smarter and faster.



A combination of in-camera video analytics and deep learning capabilities in the cloud can improve video analytics

A combination of in-camera video analytics and deep learning capabilities in the cloud can improve video analytics. Cameras can be equipped with basic video analytics, and they are tied into a cloud infrastructure that provides additional deep learning algorithms. The cameras provide computer vision pre-processing, with the bulk of detailed analysis happening in a neural network in the cloud.

Data capture form to appear here!

The software-as-a-service (SaaS, or cloud) model gives companies the resources to improve deep learning. Systems are more accurate and can scale better and faster, using a larger data set from multiple customers accessing the cloud-based system. One customer benefits from another customer, and all the knowledge is aggregated together.

Distribution Of Data From Edge To Cloud

Cloud computing allows users with various computing capabilities to store and process data either in a privately-owned cloud or on a third-party server located in a data center. However, with the computing business becoming more and more versatile and complicated, the demand for data processing performance is even higher. In the process of data transition to the cloud, cloud computing consumes tremendous network resources and time, which all result in network congestion and low reliability.

Distribution of data throughout a system, from the edge to the cloud, relieves pressure at any one point. With AI algorithms woven into edge devices, only selected information such as an individual or a vehicle in a video image will be extracted and sent which significantly enhances the transition efficiency and reduces the network bandwidth, while still sustaining high quality and accuracy.

The Cloud Adds AI Capabilities

The cloud provides additional data computing capabilities required for AI and deep learning applications. A single Amazon Web Services data center has between 50,000 and 80,000 servers. All told, observers estimate Amazon Web Services may have between 3 million and 5 million servers. The other major cloud services — Google, Microsoft, VMware, Citrix and others — add additional millions of servers.



Amazon Web Services offers a broad and deep set of machine learning and AI services for a business

AWS (Amazon Web Services) offers a broad and deep set of machine learning and AI services for a business. In effect, the service puts machine learning in the hands of any developer, enabling them to build, train and deploy machine learning models.

On behalf of customers, AWS is focused on solving some of the toughest challenges that hold back machine learning from being in the hands of every developer. Capabilities are built on a comprehensive cloud platform optimized for machine learning with high-performance and no compromises on security and analytics.

Advantages Of Edge Systems

Deep learning and neural network computing are everywhere. They are now widely available in on-premises computers, in systems embedded in edge devices, and even in the cloud.

The edge is particularly important in the video surveillance market, enabling systems to function despite any bandwidth or latency issues that would limit the effectiveness of a central server-based system. Edge-based functionality also limits concerns about the privacy of information and eliminates dependence on the availability of 3G connectivity.



Edge computing makes it possible to ensure data is more private, rather than having it reside in a private or public cloud

Artificial intelligence (AI) is a very computational-intensive process, and doing that processing at the edge avoids the need to do it centrally, whether in the cloud or in an on-premises computer. In the case of video cameras, in particular, there isn't enough bandwidth to transfer video data across a network infrastructure to be processed. Half the populated world has Internet speeds of less than 8 mbps, which can't possibly handle the level of data required for new intelligence applications.

Latency is another advantage of intelligence residing at the edge. Applications increasingly require little to no latency (less than 200 milliseconds), and transferring data to be processed elsewhere takes time.

Edge computing also makes it possible to ensure data is more private, rather than having it reside in a private or public cloud or on premises. [Higher computing ability and efficiency of embedded systems at the edge](#) are paving the way for physical security devices with intelligence far beyond what the industry now has to work with.

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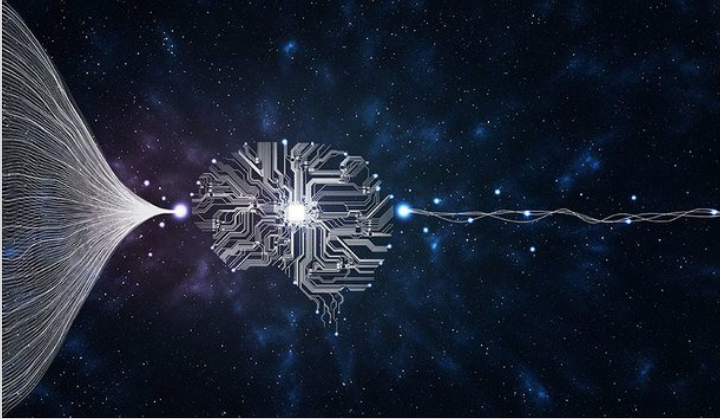
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An experienced journalist and long-time presence in the US security industry, Larry is SecurityInformed.com's eyes and ears in the fast-changing security marketplace, attending industry and corporate events, interviewing security leaders and contributing original editorial content to the site. He leads SecurityInformed's team of dedicated editorial and content professionals, guiding the

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