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AIoT surveillance system development is made easier with the incorporation of smart cloud platform

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Internet of Things (IoT) applications are beginning to take shape in recent years. Especially starting from 2016, with advancing artificial intelligence (AI) developments, AIoT platforms combining AI and IoT technologies are rapidly gaining attention in the information technology (IT) sector. AIoT applications are also emerging in some sectors. ThroughTek chairman Patrick Kuo points out, "smartization" is a fundamental element to IoT design and with the incorporation of AI, the market will see growing AIoT applications across vertical applications.

Today 80% of the applications on the market have something to do with image processing, which will also be the major area of AIoT applications onwards.

Contrary to the popular belief that IoT emerged only in recent years, the industry has been making use of sensors and communication networks to allow systems to collect data and turn the data into applications through transmission, storage and analytical processes long time ago, indicates Kuo. However, the practice did not become popular because there were seldom of product types and communication protocols, making interconnections across machines and systems difficult.

The term IoT popped up about a decade ago with growing market acceptance and industry-wide engagement. However, only with AI it became popular again in 2016; the synergy of the two started to bring IoT applications into reality. From an application perspective, AI is the last piece of the puzzle that enables IoT devices with intelligent computation capabilities, allowing them to make prompt and precise responses to be put in practical use.

The three fundamental technologies supporting AIoT video analysis development

Commenting on current AIoT technology trends, Kuo believes edge computing, cloud platforms and video analysis are the three major forces in driving AIoT advancement. They enable the development of complete AIoT systems with specific functions and target applications.

Kuo explains that AI-based connected video analysis implement different types of computation at both the edge and back-end. Edge computing at the edge deals with data that require simple processing and instant responses while tasks that require more powerful computation capabilities such as machine learning or deep learning are carried out by upper-level cloud platforms at the back-end. Whether through edge computing or cloud computing, video analysis process video generally for recognition purposes so they can be used in a wide range of smart applications.

Video analysis systems are already being used in a myriad of applications, including surveillance systems for smart cities, healthcare, elderly care, retail and logistics. Due to the nature of the use scenarios, video analysis systems come with very different functions and specifications and system integrators across different sectors base their product design on their own specialty and expertise. For example, face recognition or production volume, to meet specific industry requirements and accommodate different operating environments.

Video transmission is instrumental to how well imaging systems can leverage the full potential of upper-level cloud computing. It ensures complete and seamless transmission of video captured on front-end cameras to back-end platforms to provide more precise cloud computing results. Transmitting video data over cloud may not be a big deal with today's technologies. However, the actual process entails highly-specialized know-how. Take ThroughTek for example, the company has more than 40 million cameras connected worldwide. As reliability and scalability are critical to video analysis, having built up such a massive network of cameras with proven data transmission quality, ThroughTek has established itself as a professional provider of cloud-based image processing solutions that are enthusiastically embraced by the market.

Rapidly advancing technologies spur widespread applications

Kuo believes rapid developments and already widespread deployment of video technologies are the two key factors behind the applications of AIoT developments in imaging systems leading other areas. Since MPEG-1 first released in 1990, video standards have progressed to H.264 (MPEG-4 Part 10) published in 2014. The availability of H.264 makes video streaming an important feature of IT systems, spurring a new wave of developments for the industry and leaping advances of image recognition technologies. With these technological breakthroughs come burgeoning applications. For example, retailers can find consumer faces and determine their age and gender from image data. Traffic systems can monitor traffic flow and detect the make, model and color of vehicles violating traffic rules. With the integration of edge computing and cloud computing, the market can definitely expect more full-featured applications to become available in the future.

Video surveillance has become part of people's daily life with cameras everywhere. For AIoT applications, these surveillance cameras provide ample data for analytical processing, enabling them to deliver immediate and substantial results, such as the applications in retail and traffic mentioned above. Being able to see the results, governments and businesses are therefore more willing to invest in and deploy AIoT applications.

Judging from current developments, AIoT architectures used in surveillance systems have grown mature as solutions providers actively engage in edge computing and/or cloud computing research. Video data captured by front-end cameras is sent to back-end cloud platforms for storage and analysis. However, neither Infrastructure as a Service (IaaS) suppliers nor camera manufacturers can provide the intermediary functions between the frond-end and back-end to meet the needs by specific applications. This is where Software as a Service (SaaS) comes into play.

Managing cloud-based imaging systems using VSaaS

Take ThroughTek's Video Surveillance as a Service (VSaaS) for example. Designed with two-way communication, real-time data transmission and video surveillance, event and full-time recordings on cloud as well as support for multiple browsers, ThroughTek's Kalay platform allows system integrators to make flexible selections based on customer needs. For example, if video is recorded around the clock and the data is stored on cloud, the customer may run up a huge tab for cloud storage. In this case, system integrators can choose ThroughTek's event and full-time recording on cloud solution, which first keeps the recordings locally at the front-end cameras and transmits the data to cloud for storage when an event is detected. Furthermore, ThroughTek's VSaaS also supports multiple browsers and devices and allows users to check video data in real-time using mobile devices including phones and computers.

As opposed to FTP-based video data transmission to cloud, ThroughTek's VSaaS sends video data using Real-Time Messaging Protocol (RTMP), enabling more flexibility to support functions including event video upload mentioned above and live streaming while accommodating wide-ranging brands and types of devices. For instance, conventional DVR and IP cameras mostly use Real-Time Streaming Protocol (RTSP) and can be integrated with ThroughTek's VSaaS to deliver all the benefits. In addition to supporting deployment over large-scale cloud infrastructure platforms such as AWS, ThroughTek's VSaaS also allows businesses with information security concerns, such as telecom operators, smart factory owners and large enterprises, to efficiently deploy image management systems on top of their own IT infrastructure. Moreover, businesses already using RTSP-based devices are able to integrate them with ThroughTek's VSaaS without having to purchase new equipment and thus save on costs.

ThroughTek will showcase a 4G LTE-M IP camera launched by its partner at the 2019 Consumer Electronics Show (CES Las Vegas) taking place in January 2019. The product is the world's first LTE-M-based surveillance camera with an optimal cost-performance ratio. It enables reliable and seamless video data transmission at low costs and with low power consumption. Eliminating the need for Wi-Fi connection, the product will widen the applications of smart surveillance to dashboard cameras, outdoor and farm surveillance and police cameras.

Going forward into 2019, ThroughTek will make continuing efforts to secure its current market position while endeavoring toward the enterprise segment. According to Kuo, ThroughTek supports integration with cloud services including telecom Independent Data Center, Google Cloud, Amazon Web Services and Aliyun and works with all types of system integrators to provide reliable, easy-to-use, high-performance cloud-based streaming video management platform.

As an interlocking piece between the front-end and back-end of AIoT, SaaS is instrumental to cloud-based video management, says ThroughTek chairman Patrick Kuo (center).

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