Application Story

License Plate Recognition: Driving Smart Parking with AI@Edge Solutions

Industry: Parking Management

Product: BOXER-8120AI

Introduction

Thanks to the continued development of AI Edge computing, many new AI systems are being developed to provide solutions for a wide range of applications. One application that has seen a lot of interest in the use of AI Edge is in the use of Smart Parking systems in garages or enclosed lots.

Smart Parking works by utilizing License Plate Recognition technology to check-in cars as they enter, and to check-out cars as they leave. Usually, the system also determines how long the vehicle was parked and automatically calculates the parking fee.

Smart Parking systems were originally developed using machine vision technology. However, machine vision based systems have several limitations. In order to recognize the license plate, the car needs to be oriented in the correct spot and angle, which can cause frustration for drivers. Machine vision systems perform poorly in dim lighting conditions or in weather conditions such as fog or rain. Machine vision systems can also have issues with specialty or non-standard issue license plates.

To overcome the limitations of machine vision systems, one company has developed an AI Edge based solution for a major retail chain. They turned to AAEON to provide a hardware platform that could power their system to its fullest potential.

Challenges

The developer faced several challenges in developing an AI Edge Smart Parking solution. The system would need to operate at the Edge with little reliance on the cloud, it would need to be able to operate in an outdoor embedded environment, and also provide support for multiple cameras and sensors.

Edge System

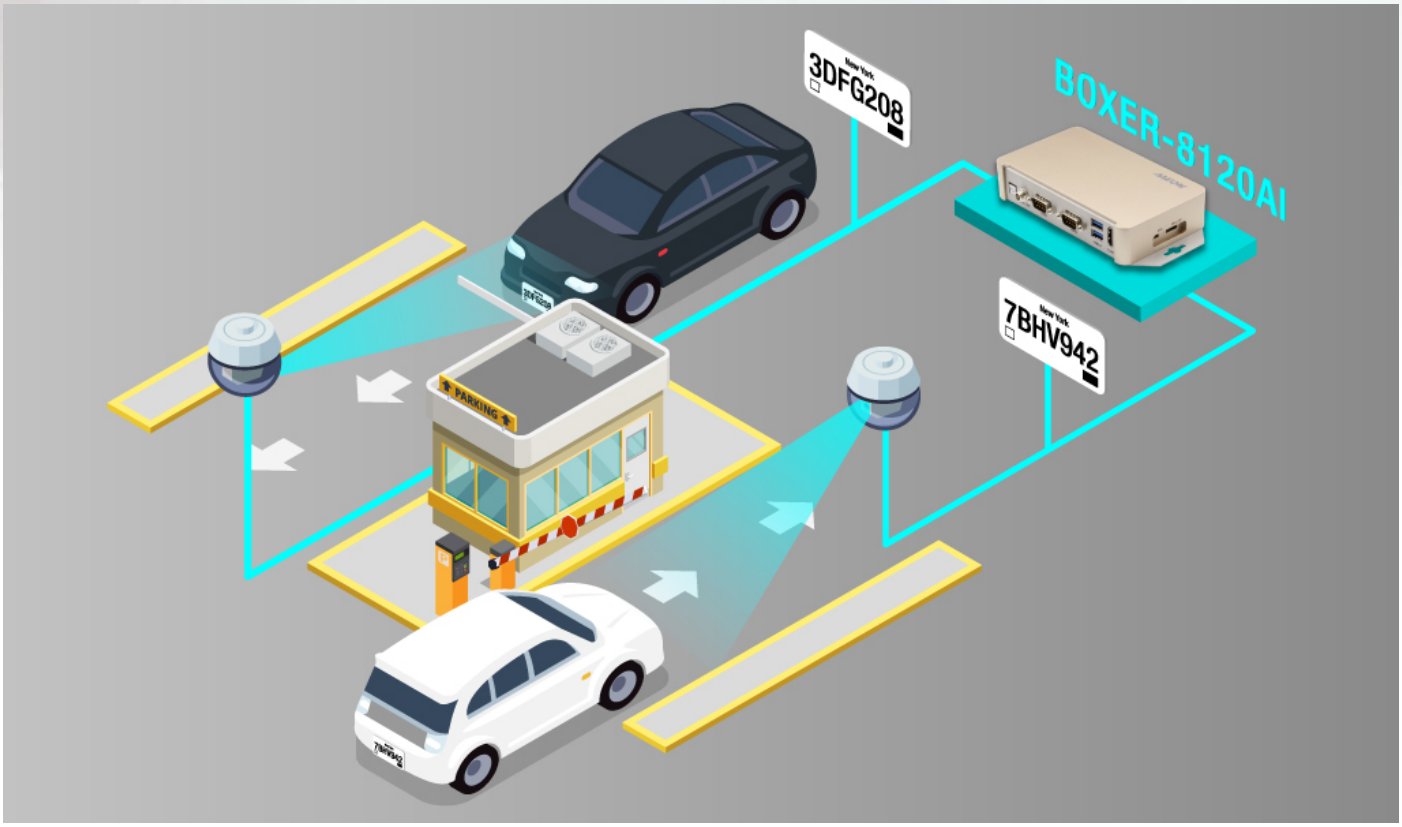
To provide prompt service to customers, the AI system needs to be capable of operating at the edge. Relying on a cloud based system could slow down service as the system communicates with the central server. Parking lots and garages often have inconsistent network connections, which would interfere with cloud based systems.

Outdoor Conditions

The system needs to be able to be deployed in the parking lots or garages where customers are. A compact system can provide flexibility, but most importantly, the system must be able to operate in a wide range of conditions, and not be affected by dust or the exhaust from cars.

I/O Support

The AI application requires multiple camera inputs to read license plates as cars enter and leave. Additional connections with controllers such as the parking gates and payment kiosk help to increase the utility and effectiveness of the system.



Solution

Working closely with the developer, AAEON determined the award winning BOXER-8120AI AI@Edge fanless embedded system to be the best solution.

NVIDIA Edge Solution

The BOXER-8100AI family of AI@Edge systems all feature the powerful NVIDIA Jetson TX2. The BOXER-8120AI delivers the performance needed to power AI at the Edge, with a hexacore SoC, NVIDIA Pascal 256 CUDA core GPU, 8GB of memory and 32 GB of eMMC storage.

Embedded Design

Only 30mm thick, the BOXER-8120AI is built to fit anywhere it's needed. With fanless design, operation isn't affected by dust or exhaust. The BOXER-8120AI is designed to operate in a wide range of temperatures, from as cold as -20°C to 50°C (-4°F to 122°F).

Built to Connect

The BOXER-8120AI features four Gigabit Ethernet ports, perfect for connecting to LAN cameras. It also features additional I/O ports including HDMI, providing security staff with another tool to help keep shoppers safe.

Impact

With the BOXER-8120AI, the developer was able to provide an AI@Edge license plate recognition solution to power their client's smart parking garages. Thanks to the power of the BOXER-8120AI, the developer's AI system could provide functionality beyond that of machine vision based solutions. The system is able to recognize and read license plates at different angles, in different lighting conditions, and in the case of fog, rain or other inclement weather conditions.

With a more intelligent smart parking solution in place, the developer's client was happy to have a system that made parking for their customers easier, quicker, and without the frustrations often caused by machine vision based parking systems. Smart Parking powered by AI Edge license plate recognition and the award winning BOXER-8120AI is helping to improve the experience of shoppers and store owners.

Product

The award winning BOXER-8120AI AI@Edge embedded fanless system is part of the BOXER-8100AI family of embedded AI solutions from AAEON. The BOXER-8120AI features the hexacore NVIDIA Jetson TX2, supporting 256 CUDA cores and a range of AI frameworks including Tensorflow, Caffe2, and Mxnet, as well as AI inference software developed by the user.

The BOXER-8120AI has four Intel LAN (i211) ports to support IP cameras, and it also boasts a series of rugged design features such as anti-dust specifications, a wide operating temperature range, a wide range power input, and an aluminum chassis. The BOXER-8120AI's compact, cost-effective design and powerful processing abilities mean you'll be able to deploy your AI platform anywhere.

AAEON Manufacturer Services provide configuration, customization and OEM/ODM support to ensure your AI application can be delivered quickly and effectively. Whether it's changing an I/O port, or reconfiguring the BIOS, AAEON is a committed hardware solutions partner, and ensures the specific needs of your project are met.

About AAEON

Established in 1992, AAEON has become one of the leading designers and manufacturers of advanced industrial and embedded computing platforms. Committed to innovative engineering, AAEON provides Industry 4.0 integrated solutions, hardware and intelligent automated services for premier OEM/ODMs and system integrators worldwide, as well as IoT solution platforms that seamlessly consolidate virtual and physical networks. Reliable and high quality computing platforms include industrial motherboards and systems, industrial displays, rugged tablets, PC/104, PICMG and COM modules, embedded SBCs, embedded controllers, network appliances and related accessories. AAEON also offers customized end-to-end services from initial product conceptualization and product development through to volume manufacturing and after-sales service programs. It is also committed to continuously redefining and harmonizing the management and development processes of the industry.

With its constant pursuit of innovation and excellence, AAEON became a member of the ASUS group in 2011, enabling the company to further strengthen its leadership, access advanced technology from ASUS, and leverage resources from within the group. AAEON is poised to offer more diversified embedded products and solutions at higher quality standards to meet world-class design and manufacturing demands in the years to come.

AAEON is an Associate member of the Intel® Internet of Things Solutions Alliance.

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