ADLINK
LEADING EDGE COMPUTING

AI Smart Camera Improves Factories High-voltage Electrical Testing Protection



AI Machine Vision Solution with Easy Development and No-code, Visual Development



Use Case

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Rising awareness of occupational safety standards means businesses are creating policies and investing in technologies that can help prevent accidents without affecting production. Electrical workers injured in high voltage accidents may be hospitalized if their injuries are mild, or worse. Therefore, businesses must be proactive to ensure the safety of workers.

Semiconductor, display panel, and computer assembly plants all conduct high voltage electrostatic testing. These tests are very dangerous, and workers who do not wear insulated gloves are at greater risk of electrocution.

For this reason, operational guidelines have been well established in factories requiring these types of electrical tests, but the possibility for accidents still exists because workers have the ability to choose not to wear protective equipment at all times for the sake of convenience. In order to curb worker non-compliance, many factories have adopted the following measures:

- **Establishing restricted areas by using rope or stanchions with retractable belts.**
- **Deploying personnel to conduct 24-hour surveillance of test areas to ensure worker safety compliance.**

There are, however, some issues with both of these compliance enforcement methods. Setting up restrictive barriers is a low-cost method that sacrifices operational flexibility and can impact production efficiency and capacity, while human surveillance incurs significant labor costs. Rapid advancements in technology in recent years has caused business owners to consider implementing vision AI solutions to enforce worker safety protection measures.

Key Challenges: Minimal Cabling and Tight Project Schedules

The application of a vision AI solution not only involves software technologies such as digital fencing and programming logic, including object classification and posture recognition, but also requires the deployment of hardware such as industrial cameras and computers. Industrial factories face the following challenges when configuring these hardware and software elements:



- **Cable management issues may arise when installing additional equipment in testing areas with existing machinery; therefore, ideal camera and computer setups must minimize supplementary cabling.**
- **Software development, deployment, and testing of customized image capture programs, AI inference programs (including classification, object detection, posture recognition), real-time streaming protocol (RTSP) programs, and I/O control programs, can seriously impact production schedules.**

ADLINK created the NEON AI Smart Camera to solve these pain points for industrial applications, partnering with various businesses and SI partners since 2020 to test the smart factory AI imaging proof of concept (PoC). In terms of protecting workers from dangerous high voltage current, a number of partners with similar application scenarios have given high praise to the NEON AI Smart Camera after actual field testing.

Key is the fact that the NEON is an all-in-one solution that combines both camera and computing functions in a single device that is similar in size to an iPhone while requiring only one network cable and one power cable to provide simpler cable management than conventional camera and computer setups often using a minimum of five cables, including two network cables, two power cables, and an I/O cable.

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Maximizing Modular Plug-ins to Accelerate AI Development Schedules

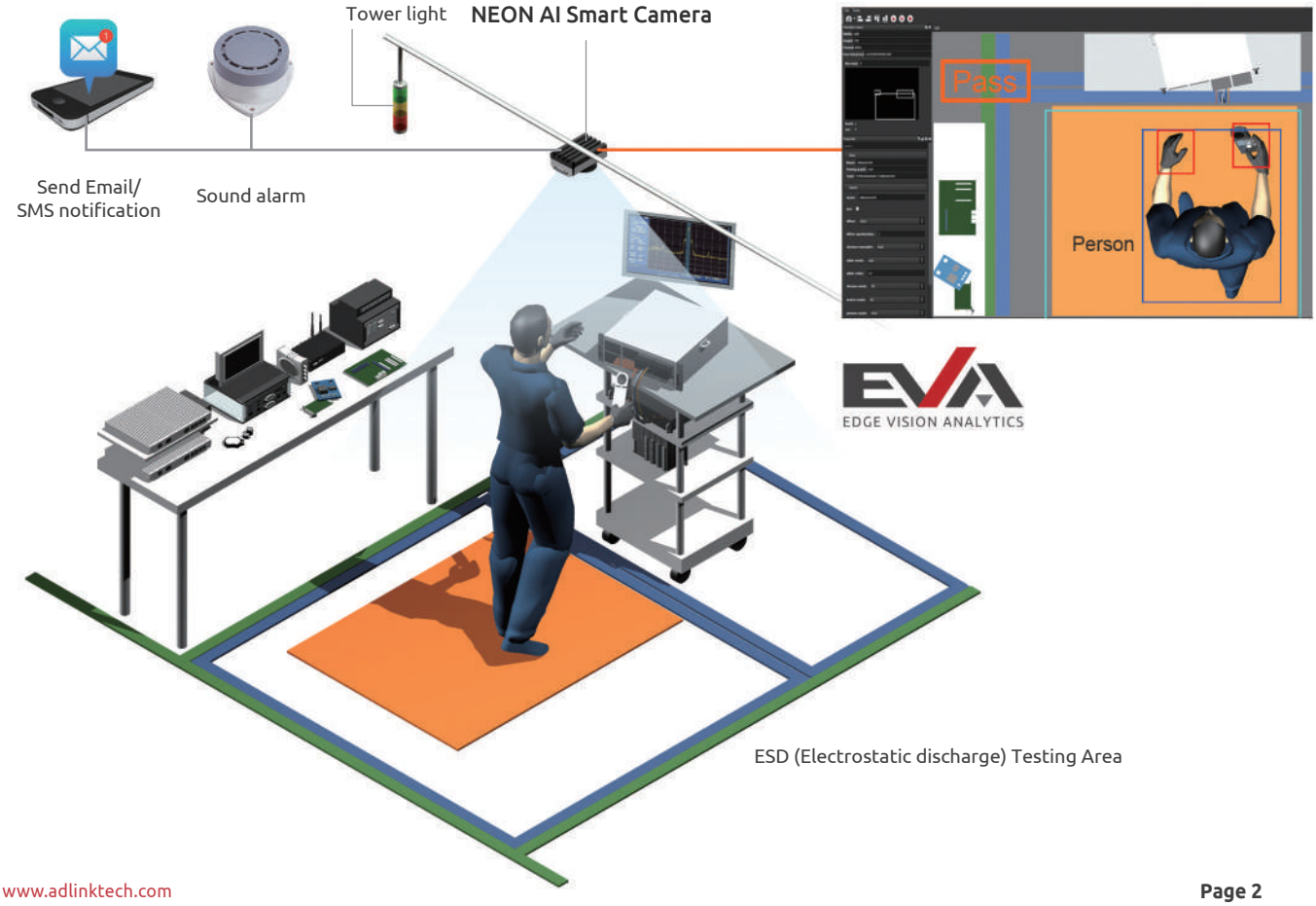
ADLINK encourages in-house AI teams or other project partners to leverage the EVA SDK modular plug-ins for image capture, AI, RTSP, and I/O control to save time by eliminating the effort required to develop custom programming code.

In the electrical safety application scenario, custom image capture programs must be created in order to capture images from different manufacturers' industrial cameras, while tailored inference programs need to be developed for various AI models to facilitate the execution of functions such as classification, object detection, and posture recognition to determine if there are "hands that aren't wearing insulated gloves" within the testing area; these requirements can easily be achieved with EVA SDK plug-ins.

AI engineers can also utilize the EVA SDK RTSP plug-in and RTSP protocol to save images of non-compliance violations to a remote network video recorder (NVR) without having to develop an RTSP program. Most factories implement three-color warning indicators for employees to be aware of the current working environment. For example, a green indicator could represent that there is no operation in progress, with orange indicating than an operation is in progress, and red signaling that a non-compliance issue has occurred. Normally, these scenarios require development of an I/O control program, but the EVA SDK I/O plug-in is more suitable and efficient in handling this task.

AI engineers can customize the EVA SDK plug-ins based on their requirements to accelerate project completion through low code development.
There are four leading benefits commonly reported after implementing the NEON AI Smart Camera:

- **Improved testing processes: the NEON solution solved the insufficiencies and lack of flexibility of fixed stanchions placed in traditionally restricted areas, allowing for more clearly defined guidelines such as having to wear insulated protective gloves at all times.**
- **Reduced instances of non-compliance: Non-compliance with safety protocols can be recorded, quantified, and uploaded to the management system for further analysis by supervisors who can then issue warnings and corrective behavior for violations. In such cases, the number of daily non-compliance violations decreased by 90% after implementing the solution.**
- **Decreased hazards: Real-time three-color warning indicators and voice warnings can immediately warn and correct staff who do not adhere to SOPs, reducing occupational accidents and personal injuries.**
- **Fast and trouble-free deployment: Development teams can complete all preparations from image capture and verification to adding algorithms within two weeks to rapidly setup and launch systems.**



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