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BUSNET Develops Access Management Technology for Public Health and Safety Compliance

Solution optimized with the Intel® Distribution of OpenVINO™ toolkit uses AI for compliance monitoring

busnet.it UP bridge the gap

"COVID-19 has created a range of risks that organizations must now account for. Only a solution that integrates multiple tools to recognize all known risk indicators can be considered truly effective. The Defence Line kit from BUSNET integrates several AI solutions, from temperature control to capacity alerts and social distance monitoring. Defence Line is integrated with Unifarco's system to help ensure pandemic-conscious corporate access and help protect the health of our 500 employees, who are our most important resource."

— Gherardo Zaltron, industrial engineering service manager, Unifarco

As the world adjusts to emerging challenges presented by the outbreak and spread of COVID-19, organizations of all sizes face new concerns about security and safety. Companies need a way to reopen while maintaining compliance with evolving guidelines and regulations. In response, BUSNET has created the Defence Line kit, a new technology for access management to help organizations maintain a safer environment and avoid downtime caused by noncompliance.

With the Defence Line kit, body temperature detection, social distancing, and capacity limits as well as mask regulations can be observed, with fast notifications for any compliance violations. Tested at an installation at Scrovegni Chapel, currently a UNESCO World Heritage site candidate, the Defence Line kit offers flexible access management capabilities that can be adapted as regulations are tightened or relaxed.

Demand for access management applications has been high during the coronavirus pandemic. In addition to the installation at Scrovegni Chapel, BUSNET is undertaking another opportunity with Unifarco to deploy the Defence Line kit in Italy. With over 5,000 Unifarco pharmacy branches operating in Europe, access management that satisfies COVID-19 compliance regulations is imperative. Using a fast-track implementation of the Defence Line kit, organizations can enhance detection and compliance efficiency while helping to reduce the risk of spreading the virus.

Challenges: Complying with evolving public health and safety mandates to help limit coronavirus spread

Organizations need to feel confident in their ability to reopen with full access control that helps limit the risk of exposure to disease. Some of the measures that have been implemented in order to control coronavirus spread include mask mandates, mandatory temperature checks to identify fevers, and social distancing regulations that maintain a specific distance between people who are not in the same household.

Because the duration of the coronavirus crisis is uncertain, and additional regulations may be forthcoming, organizations need solutions with the flexibility to accommodate new guidance. Organizations may have a limited amount of time in which to retool solutions for changing rules, so making these changes easy is a key requirement for access management in the postcoronavirus era.

OpenVINO™

Solution: Fixed totem and wearable device solution tracks compliance and identifies violations automatically

The Defence Line system incorporates multiple detection techniques, using a variety of artificial intelligence devices for environmental control. Central to the Defence Line system is a fixed totem device, which can include an optional double-door turnstile with automatic opening and can check identification with NFC cards or a QR code scanner, verify that visitors are wearing a face covering or mask, and monitor the temperature of visitors. The totem also monitors the overall number of people in an area, with alerts if capacity limits are exceeded. Alerts can be managed in the cloud for maximum flexibility in determining the appropriate response.

The Defence Line kit is designed to comply with privacy legislation. No sensitive information is retained on the device—instead, IoT sensors and AI technology at the edge are used to screen visitors and detect abnormal temperatures. If the body temperature of a visitor is above 37.5°C (99.5°F), the system will trigger an alarm and a red-light indicator.

To help ensure social distancing regulations are followed, Defence Line also incorporates wearable devices for visitors. These wearable devices hang from a lanyard on the neck and allow for continuous monitoring of distance between visitors. Both the totem and the wearable devices can be configured to adjust capacity, minimum required distances between visitors, maximum allowed temperature, and more.

With an adaptable, modular configuration, Defence Line allows organizations to rethink their access control needs beyond the coronavirus crisis. Flexibility will be key to companies configuring environmental control measures to meet tomorrow's unforeseen challenges.

Benefits of the BUSNET Defence Line kit include:

- **Configurable access control:** With thermal detection, mask compliance monitoring, and NFC verification or QR code authentication, ensure that visitors only gain admission when they present a low risk of infectiousness.

- **Continuous monitoring:** Detect compliance issues and maintain awareness of the number of people in an area to prevent violations of capacity regulations.

- **Real-time alerts:** Configurable alerts ensure that the right person is told about violations when they happen, to help ensure that compliance is restored as quickly as possible.
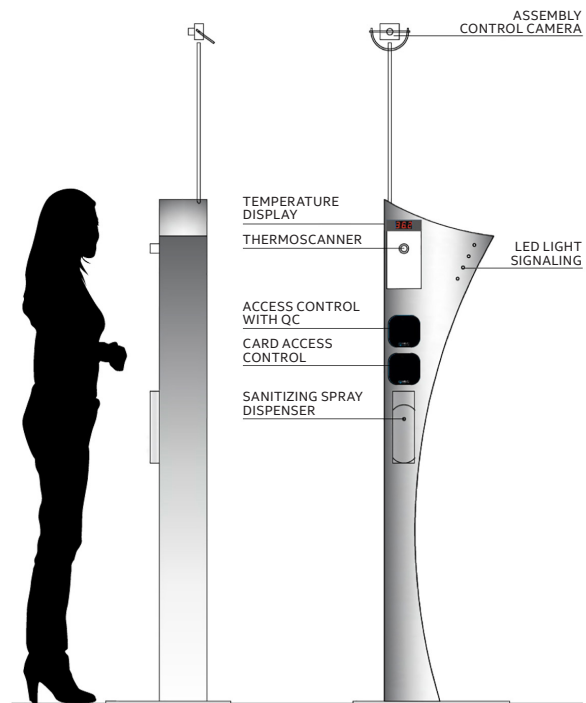

Figure 1. Defence Line—the complete model with thermoscanner for mask control, assembly, and hand sanitizer. (Source: BUSNET)

Figure 2. Defence Line Kit on-site demonstration. (Source: BUSNET)

How it works in brief

To develop the AI computer vision capabilities of the Defence Line solution, BUSNET used the UP Squared AI Vision X Developer Kit, which includes an Intel Atom® x7-E3950 processor, an Intel® Movidius™ Myriad™ X VPU, and the Intel® Distribution of OpenVINO™ toolkit. An Intel Movidius Myriad X VPU, capable of processing speeds of up to 105 fps (80 typical) and 1 TOPS as a dedicated neural network accelerator, powers AI edge computing processes.

Using the developer kit, BUSNET optimized Defence Line to use the Movidius Myriad X VPU for information processing during inference cycles, while leaving the CPU free for other operations integrated into the board. During AI deployment, stability is key: the solution must remain on, even for whole months at a time, without stopping. Using VPU compute is essential, enabling balanced resource consumption from each processing unit to avoid overload and shutdown conditions.

Benefits of the Defence Line kit include:

- **Ultralow power design:** Performs highly demanding tasks at 2.5W per chip.

- **High performance and efficiency:** Excellent performance per dollar and watt, with linear performance increases for multiple chip solutions.

- **Neural compute engine:** A dedicated hardware accelerator runs on-device deep neural network applications.

- **Small area footprint:** Very small footprint that can be easily integrated into existing products.

By using VPU capabilities, BUSNET was able to connect two video streams from two cameras while still receiving and processing data effectively. In addition to live streaming video, recorded video files may be processed by Defence Line. Using the UP Squared AI Vision X Developer Kit, BUSNET was able to build a flexible container structure to accommodate a range of different services to map multiple tools, including thermal imaging cameras, access control systems, and light and acoustic signals for alerts.

A trained neural network model detects all people in the frame of the camera and counts the number of people in an area, including a motion heat map. Using the Intel Distribution of OpenVINO toolkit allowed BUSNET to develop and optimize this neural network model quickly for more rapid deployment.

Defence Line also integrates with LabKey.io access control, a new system managed entirely in the cloud. Using an API, the LabKey.io system allows third-party software to integrate with other systems and exchange alerts, allowing full centralized access control for organizations that can easily be configured to comply with new regulations or initiatives.

Figure 3. UP Squared AI Vision X Developer Kit is equipped with an Intel Atom® processor and supported by an Intel® Movidius™ VPU. (Source: UP)

AI MODULE	UP AI CORE X	UP AI CORE XM 2280	UP AI VISION PLUS X	UP AI CORE XP4	UP AI CORE XP8
VPU	Myriad™ X 2485	Myriad™ X 2485	Myriad™ X 2485	Myriad™ X 2485	Myriad™ X 2485
Number of VPU(s)	1	2	3	4	8
Form factor	mPCIe	M.2 2280 B+M Key	Credit Card	PCIe x4	PCIe x4
Memory	4Gb LPDDR4 x1	4Gb LPDDR4 x2	4Gb LPDDR4 x3	4Gb LPDDR4 x4	4Gb LPDDR4 x8
Dimensions	30 x 51 mm	22 x 80 mm	56.5 x 90 mm	111 x 170 mm	111 x 170 mm
Supported frameworks	Caffe, TensorFlow, MXNet, Kaldi, ONNX	Caffe, TensorFlow, MXNet, Kaldi, ONNX	Caffe, TensorFlow, MXNet, Kaldi, ONNX	Caffe, TensorFlow, MXNet, Kaldi, ONNX	Caffe, TensorFlow, MXNet, Kaldi, ONNX
Thermal	Fanless heat sink	Heat sink with active fan	Fanless heat sink	Heat sink with active fan	Heat sink with active fan
System requirements	X86_64 computer running Ubuntu 16.04, 1 GB memory, 4 GB free storage, vacant expansion slot				
Software tool	Intel® Distribution of OpenVINO™ toolkit R4 or above				

Figure 4. Technical specifications for UP AI Modules. (Source: UP)

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Conclusion: Access control for health and safety, powered by Intel® technology

The COVID-19 pandemic has changed the way businesses operate, creating a greater need for access control that can be configured to meet public health and safety requirements. With the flexible Defence Line solution created by BUSNET, businesses can adapt to emerging challenges and control access with alerts when compliance issues are detected.

Optimized with the UP Squared AI X Vision Developer Kit containing an Intel Atom X7-E3950 processor, an Intel Movidius Myriad X VPU, and the Intel Distribution of OpenVINO toolkit, Defence Line used Intel® components to ensure well-rounded support from a single vendor while optimizing resource allocation for more flexibility while developing the AI solution.

Learn more

To discover how the Defence Line kit can help businesses to reopen while remaining in compliance with health and safety regulations, visit the product website today.

For a deeper exploration of the foundation of the Defence Line kit, discover more **here**.

About BUSNET

BUSNET is a dynamic company that excels in creating software and other services for companies in the IT market. The company's customers include small and medium enterprises, graphic studios, merchants, freelancers, craftsmen, public and private bodies, associations, and producers throughout Italy.

busnet.it

About Unifarco

Established in 1982 and located in the Belluno Dolomites National Park, Unifarco is a public limited company founded by and made up of pharmacists who play an active role in defining the company's strategy and who all share the same philosophy of pharmacy.

unifarco.com

About UP

UP is a brand founded by AAEON Technology Europe in 2015. The UP team aims to deliver innovation in technology, business models, and integrated solutions.

UP understands that success in the AI and IoT world cannot be done alone, so UP! Bridge the Gap has built an ecosystem and collaborates with partners to develop end-to-end solutions to penetrate different vertical markets.

Join the UP ecosystem and enjoy the related benefits. Together, we can make a difference. Sign up today!

up-board.org/partnership

Intel Distribution of OpenVINO toolkit

The Intel Distribution of OpenVINO toolkit is free software for developers that accelerates performance, deep learning, and computer vision inference from edge to cloud. It supports heterogeneous processing and asynchronous execution across multiple types of Intel® processors.

Introducing Long-Term Support

Developers can now choose between standard support releases or Long-Term Support (LTS) for the Intel Distribution of OpenVINO toolkit. Standard releases provide new versions of the toolkit every quarter, ideal for early-stage projects and developers looking to take advantage of the latest innovations in deep learning. LTS offers long-term maintenance and support, a great choice for later-stage developers focused on leveraging the toolkit's existing features and functionality.

Long-Term Support benefits:

- Focuses on deployment and is designed to be taken into production
- Includes critical bug fixes for one year, security patches for two years postrelease
- Enables shipping applications with reliability in existing capabilities and compatibility

Learn more ›

Intel® DevCloud for the Edge

Intel DevCloud for the Edge is a cloud-based sandbox that empowers enterprise developers to test, prototype, and benchmark AI edge models across multiple platforms in real time, from nearly anywhere in the world. This makes it easy to identify the best hardware configurations for AI edge applications, accelerating time to market and reducing costs.

Learn more ›