Image 1 | Penso is designed to work on unpredictable variations and defects, as well as on objects difficult to model or without a golden reference.

Self-Learning

AI-based Computational Unit for Imaging Applications

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Penso is an artificial intelligence-based computational unit for imaging applications. Once trained, it will start operating autonomously, warning you if something unwanted happens.

Many industries require new machine vision systems to be adaptive, so that they can be quickly repurposed to inspect new products. They also have to be easy to use, so that an experienced engineer is not necessarily needed for programming and maintenance. That's the reasons for the AI-based product Penso. It is an artificial intelligence-based computational unit for imaging applications. The system self-learns the expected features of an object by simply looking at a small series of samples, regardless of the possible presence of defective product in the midst. Once trained, it will start operating autonomously, warning you if something unwanted happens. Object modeling, often very difficult or even impossible, is no longer needed. Moreover, users are not asked to define possible object variations or defects from the beginning. Instead, as a human operator would do after observing some samples, the unit understands what will be considered normal and acceptable from now on. Since neither modeling or programming is needed, with just some elementary configuration tools the user can immediately understand if an application is feasible or not and saves a lot of time. Then, with minimum additional effort, they can fine tune the application and make it fully working. Penso is designed to work on unpredictable variations and defects, as well as on objects difficult to model or without a golden reference. Its full configuration requires hours, not weeks and produce feasibility studies in minutes without any programming required.

Easy Installation

Penso is easy to install. The user simply need to connect inputs (camera, keyboard/mouse etc.) and outputs (synchronization signal, OK/NOK signal, etc.) and provide 24V DC. The basic settings are simple and fast: image brightness, color correction, focusing and segmentation (i.e. is the process of separating the product to be inspected from the background) are assisted by convenient software tools. The interaction with the

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system itself is possible at all time through standard physical interfaces (keyboard, mouse or screen) or remotely, integrating the unit within the local network. The learning process is easily performed by presenting some products on the production line and activating the system in learn mode during normal operation. Unlike traditional vision units, Penso autonomously learns the characteristics of your production in a few minutes. It is normally sufficient to present a few tens or a few hundreds of products during production to allow the system to learn their characteristics without complicated settings. The unit can tolerate up to 20% defective products during the learning phase, without affecting its ability to sort products correctly. Penso will be ready to check productions once the status bar is full. Moreover, whenever the goods on the production line change or anytime the user wants to adjust the quality control process to new production parameters, he can just press the learn-button and the unit will adjust it-

self accordingly. Once the learning process is complete, Penso is ready for the sorting phase or check phase. The products deemed inconsistent with the desired level of quality are reported and can be rejected from the line by interfacing the unit with most common ejection systems thanks to the preinstalled opto-isolated outputs. Furthermore the system can store images of defective products, also keeping track of the reasons for rejection. This data can then be analyzed to improve the production process. The system also allows a higher level of control. The user can decide which features describing the object color and shape are taken into consideration by the system, and how much it will consider them critical for the final decision (weight), all done in real time. ■