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We create digital brains for a more intelligent world

x-pin.com identifies with JRex-IBOX

➤ Kontron provides the backbone for biometric application

Paying by fingerprint, withdrawing money by facial recognition, access control by iris scanning, identification cards with stored physical data: biometric identification procedures are simplifying and safe-guarding more and more authentifi-cation processes in our everyday lives – even outside of the fight against terrorism. According to a study by the market research company Soreon, the market volume for biometric applications will increase from twelve million Euro in 2004 to 370 million Euro by 2009. Of that, only 169 million Euro will be spent by governments for the biometric control of borders, foreign embassies, and at-risk public areas. No less than 208 million will flow into private-sector applications. The largest amounts are being invested by the transportation industry (approximately 60 million Euro), the financial sector, as well as commerce and services, each with more than 40 million Euro.

Biometric applications – recognition algorithm plus computing power
From a technical standpoint, biometric applications, like every IT solution, focus on two major areas: the software with the recognition algorithm – this is the greatest value a company in the biometrics industry has to offer – and the hardware, which has special requirements depending on the application scenarios.

The developers of recognition algorithms are often small, highly specialized companies. In order to turn their algorithms into market-ready solutions, they need strong hardware partners. The partners' task is to provide the biometric specialists with customized platforms, guarantee the availability of the hardware over years, produce it in large numbers, and deliver it internationally. That is why the young Austrian company x-pin.com GmbH has based their facial recognition solutions on technology from Kontron AG, which can offer the company the resources of a market leader in the embedded computing sector.

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x-pin.com enables error-free facial recognition
Together with the identification of fingerprints, facial recognition comprises more than 90 percent of all biometric applications, both currently and in the foreseeable future. The advantage of facial recognition lies, above all, in non-contact identification. The finger has to be placed on a viewfield for scanning, and because moisture makes recognition easier, people often moisten their finger with their tongue before placing it on the glass screen. This is a problem both for the acceptance of the solution and for maintaining hygienic standards.

x-pin.com's business concept is based on two revolutionary patents: the first concerns the algorithm, which very quickly and very reliably identifies the face. The second protects the camera, which eliminates the light problems that until now have limited the use of facial recognition.

The highlight: the x-pin.com system works in the infrared range of the spectrum and uses a frequency bandwidth of only 40 nm. This spectral range is largely free of interfering light influences which otherwise make identification in the visible range more difficult. For sufficient infrared lighting of the face, the camera provides an

infrared flash, also patented, which is invisible to the target person. The infrared method means that the x-pin.com application has an extremely wide range of use: it works in pitch-black darkness just as well as in broad daylight. Overall, the x-pin.com system boasts 40 percent better recognition values than the next best solution.

The actual facial recognition takes place via the comparison of a template, which describes the facial characteristics of the person in front of the camera, with the current image. If the characteristics recorded in the template agree with the facial characteristics on the image, identification is successful. The template data are either already in a database, or they are stored on a smart card, which is read by a smart card reader.
Every door node in the system consists of at least one computer unit, a camera-flash unit, and a card reader. If the personal data are stored in a central database, the nodes are networked together and with a server.

From algorithm to solution: hardware and partner selection
The decisive criteria for selecting the hardware for the door nodes and the hardware partner were based on the system design, the architecture, and the target market.
The acceptance of a facial recognition solution essentially depends on how much time is required to identify a person. Therefore, x-pin.com already had speed, along with error-free operation, in mind while developing the recognition algorithm. In order to actually implement the algorithm with the appropriate speed, a very fast processor was needed. However, because the identification applications do not operate in protected offices, but at (isolated) doors and entrances to lobbies and outside areas, or at outdoor teller

machines, the computers at the door nodes have to withstand inclement climatic conditions and be extremely fail-safe. Depending on the size of the system, it may take hours or days before a maintenance technician reaches a potentially defective system. Other important points on the x-pin.com checklist were PCI slots as interfaces for camera and smart card reader, and an adapted power supply for the peripheral devices.

The selection criteria for the hardware partner were just as clear for x-pin.com: support in system adaptation, guaranteed availability over years, adequate size to produce at a large scale, and international presence to support the world-wide activities of x-pin.com.

"We very quickly identified Kontron AG as a partner who met our company criteria and, at the same time, had the right products in their portfolio," says Michael Weisser, Release Manager with x-pin.com, looking back at the evaluation process. "The JRex-IBOX was the suitable computer platform for our door nodes and Kontron, as a market leader for embedded systems, with their size and their development know-how, could support us effectively in developing our business and the market."
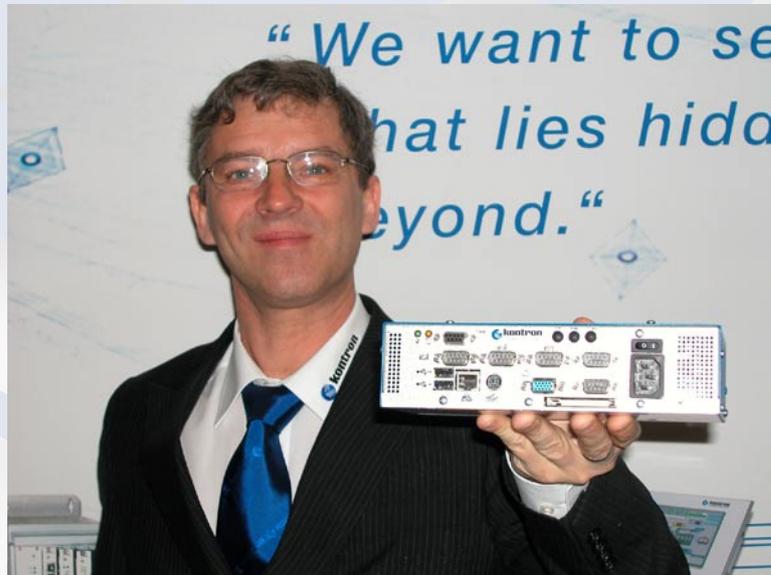
JRex-IBOX – fast computer in a minimum of space

The JRex-IBOX from Kontron is a complete industry PC that fits into a housing the size of a car radio. Only 12.2 cm deep, it nestles close to the wall, to which it can be mounted directly or on a top-hat rail. In the x-pin.com application, it fits comfortably in a standard outdoor rack for door controls. The interfaces, including the already integrated AT power supply for 24 V DC or 110/240 V AC, are implemented on the 226 mm wide and 55 mm high front plate. Because image evaluation requires a lot of computing power, x-pin.com uses the JRex-IBOX PM with a 1.6 GHz Intel Pentium M processor and ENHANCED Intel SpeedStep technology. The energy-saving, high-performance processor needs no CPU cooling of its own. Because it produces very little waste heat, it also functions trouble- and maintenance-free in 60° C environments. The chipset in the JRex-IBOX is the Intel 855 GM with 400 MHz front side bus, up to 1 GB DDR 200/266 RAM, and integrated graphics. The mini IPC communicates via interfaces for Gigabit-Ethernet, two USB 2.0 ports and one COM port. A VGA and a PS/2 interface are provided for monitor, keyboard and mouse. In the JRex architecture, the standard inter-faces for all IPCs in this series are implemented in the same place. Depending on the appli-cation, this basic equipment is enhanced by

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JFlex I/O expansion assemblies that are inserted, without cables and vibration-free, into PCI slots. For example, x-pin.com uses Kontron's own "Communication" assembly, which integrates two additional LAN interfaces, two additional USB 2.0 ports, and a Firewire interface. x-pin.com connects the infrared camera to the JRex-IBOX via Firewire. Other Kontron I/O expansion assemblies cover the areas multimedia (DVI or TV-Out, AC97 SPDIF Sound, Firewire) and metrics/communication with the MultiCOM assembly (4-x COM, 32GPIO, and second LPT). Numerous certified Kontron partners expand the range of I/O assemblies, so that the IPCs can be adapted to any purpose.

Kontron has equipped the JRex-IBOX PM to meet x-pin.com's needs with a specific power supply for the peripherals. Also customer-specific is the redundant design of the integrated housing fan. Besides the standard fan, a second fan cools the system in order to keep the functionality of the IPC steady even if one fan should fail.

The JRex-IBOX PM is the top-of-the-line model in a complete IPC series. For less computing-intensive applications, there are also computers with smaller processors in the program. The series ranges from an Intel ULV Celeron with 400 MHz, to VIA 600 MHz and up to the Pentium models with 1 GHz or 1.6 GHz – as with the Pentium M, all processors are passively cooled.

Conclusion

"With their support going far beyond delivering hardware, Kontron has contributed a great deal to our facial recognition solution now being ready for the market. Our superior algorithm in connection with Kontron's reliable systems increases our chances of fulfilling our mission statement: we want to become the market leader for biometric systems," says Michael Weisser, summarizing the cooperation with the German company.
The first big projects featuring this cooperation between Kontron and x-pin.com are about to be launched.

➤ Corporate Offices

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If it´s Embedded, it´s Kontron.