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Unified Education and Training at the European Imaging Academy

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Abstract – Machine vision has seen a dramatic evolution in recent years. Coming from scientific applications this technology has migrated into industry on the factory floor opening the technology to new users with lower qualifications and less experience. This trend is driven by the fact that most leading manufacturers of machine vision technology have focused on the development of machine vision systems that are easy to integrate, are reliable and easy to use. This is a great chance to establish this technology in new fields of application. However, even if the systems are easy to use it is important to provide new users a general knowledge of the technology and a solid foundation. With the progress of globalization it is crucial, to offer an international guideline for machine vision training.

Keywords: machine vision, imaging, academy

1. DEVELOPMENT OF MV MARKET

Evolving mainly from scientific applications machine vision technology has found many applications on the factory floor during recent years. However, most applications have been implemented by experienced integrators. Integrators are companies specialised in solving inspection tasks with machine vision. These companies provide different levels of services – either only software development to control the vision components or complete systems with all mechanical requirements including robotics. Most of these integrators have specialised on dedicated industrial markets (e.g. automotive, printing, packaging etc.) or inspection of dedicated materials (e.g. metal surfaces, wood, plastics etc.).

The sustainable support of machine vision by these integrators has built a good reputation for this technology. Machine vision has thus become an accepted technology for quality control on the factory floor that helps achieving the continuously raising requirements in production quality and production speed with quicker product changes and lower machine down time.

The next logical step is that more and more end customers (from the point of machine vision companies these are producers of consumer products or components without any direct link to machine vision) decide to build machine vision knowledge of their own instead of using external integrators for machine vision tasks. They want to be able to quickly install and maintain their optical inspection systems, just like they are able to care about their PLC and sensors. This will reduce cost and increase flexibility, production quality and finally profitability.

Of course for these end-user companies it is important to take two characteristics into account. First they do not have explicit experience in machine vision technology and second, they cannot concentrate on specific applications. They will be confronted with many different tasks, requirements and materials whenever their production needs change.

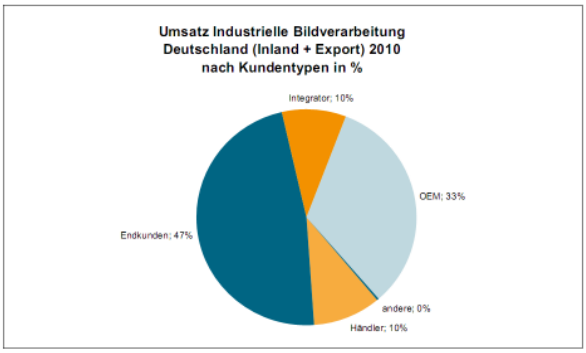

Fig. 1. Customer type distribution in percentage of 2010 turnover of machine vision in Germany (import and export); 47% are end-users. [1]

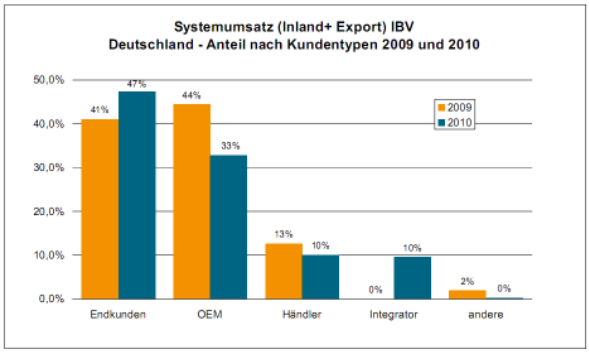

Fig. 2. Comparison between 2009 and 2010 [1]; the percentage of end-users is significantly growing.

Fig. 2 (taken from the VDMA market study [1]) shows this growth in end-user deployment of machine

vision. Since the machine vision market is still growing, this change in distribution of customer types does not inevitably imply a reduction of systems realised by integrators. However, it is expected that experienced integrators will concentrate on more complex applications while easy applications are realised by end-customers themselves in their own machine vision or automation department. Note: the integrator customer group was first analysed in this study in 2010 hence the numbers for 2009 are missing.

2. RESPONSE OF MANUFACTURERS

As a reaction to this shift in customer types the majority of manufacturers of machine vision components and systems are aligning their product lines accordingly. There has always been an obvious relation between the flexibility of the system and the ease of use. Depending on the manufacturer's history and strategy they either offer vertical sensors (e.g. for 3D measurement [3] or code reading [4], Fig.3) or smart cameras with intuitive user interfaces for parameterising (e.g. [5] or [6], Fig. 4) or flexible graphical user interfaces for use on industrial PC systems with separate cameras (e.g. [7], Fig. 5).

Vertical sensors are tailored to one specific task. In most cases they include the lens, the light, the camera and the processing unit in a compact housing. A separate computer is only required to set up the (usually fairly simple) operating parameters. With these systems the correct product selection can theoretically be done from just a datasheet.

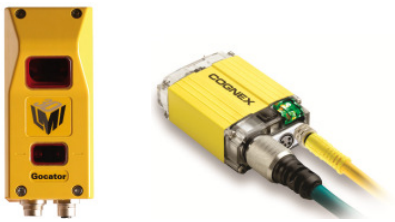

Fig. 3. LMI GoCator [3], Cognex Dataman[4]

Smart cameras typically contain the camera sensor and the processing unit but require application specific selection of lens and light. The selection of light and lens as well as the combination of the correct software algorithms requires at least basic knowledge about machine vision.

Fig. 4. Cognex In-Sight[5], Teledyne Dalsa Boa[6]

Using the graphical user interfaces on a PC splits the camera from the processing unit and provides more flexibility. With this technology the user has the freedom to select from a very wide range of cameras and therefore needs the knowledge to select the right camera technology and model.

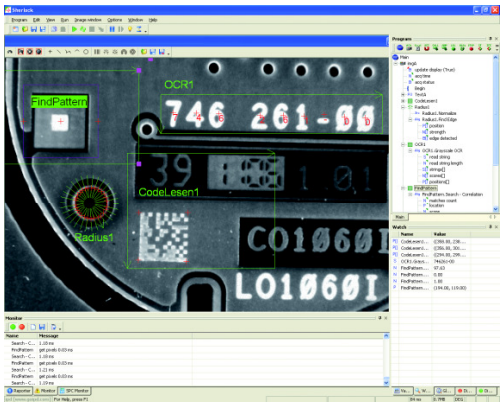

Fig. 5. Teledyne Dalsa Sherlock [7]

However such a system has the ability to scale and adapt to high-end and more complex machine vision technologies. In summary, the graphical user interfaces are intended to be used by the integrators and experienced machine vision specialists concentrating on more delicate applications but not eager to use sophisticated programming libraries.

There are many decisions to take on the journey to a successful realisation of a potential machine vision task. It is obvious that there are a lot of possible pitfalls for inexperienced end-users but also for experienced integrators getting in touch with new technologies or unfamiliar requirements and demands in terms of accuracy or speed. Only with proper consulting and training is there a good chance for them to select the right system and components and to overcome all obstacles.

3. THE EUROPEAN IMAGING ACADEMY

The requirement for training in the use of their own products has been recognized by most manufacturers who now generally offer product related training classes and seminars. Also there is a growing number of independent consultants and institutions of education that offer specific trainings for particular areas of machine vision. Both approaches are appreciated and will help increasing the success of machine vision. However, all of these approaches can only partly cover the real need for training.

The end-user getting in touch with machine vision applications for the first time needs much more than an simple product training or a theoretical lecture about physical fundamentals. He needs help on selecting the right system and components and he needs

help taking his first steps with the system he selected. To be most efficient this has to be a hands-on training. The best solution is when the consulting, the training and the supply of components are delivered by the same source. Having one partner for all questions and services provides the best conditions and helps ensure the project concludes with a reliable solution.

For the integrator it is important to have one supplier with a good overview of the entire market. The integrator needs training on the latest technologies and independent consultancy about the optimum combination of components. For integrators it is almost impossible to keep up to date with all the different innovations coming and going as well as to focus on their main business which is providing reliable machines.

Fig. 6. Modern hands-on training facilities

For both reasons STEMMER IMAGING [8] has founded the European Imaging Academy [9]. As a market leading independent provider of machine vision STEMMER IMAGING is perfectly placed for this important assignment and has built up a lot of expert knowledge about components, technologies and consultancy in machine vision over nearly 25 years. With subsidiaries in Germany, United Kingdom, France and Switzerland STEMMER IMAGING can offer unified education and training at the European Imaging Academy, which is of special interest for international companies.

The European Imaging Academy offers hands-on training for beginners and experts and specific technology days for key areas of machine vision. With modern training facilities, well prepared and practically relevant exercises and elaborate documentation the European Imaging Academy is the partner of choice for both training for end-users and integrators. To compliment the training courses delivered at the main European training centre in Puchheim, Germany and also locally at other STEMMER IMAGING offices "The Imaging & Vision Handbook" [2] has become a standard reference for applied machine vision. It contains a lot of general theoretical information covering all aspects of machine vision underpinned by comprehensive guides for the correct selection of products.

Fig. 7. 3D Technology Day 2011

3. CONCLUSION

Machine vision technology is poised to become a commodity standard on the factory floor. Other technologies such as PLC's and robotics have mastered this important step before. However, due to the wide variation in the application environment and material to be inspected there is a need for education which cannot be eliminated. Due to globalisation and specialisation of factory demands this training needs to be as practically relevant, tangible and manufacturer independent as possible. The European Imaging Academy is providing such trainings for end-users as well as for experienced integrators.

REFERENCES

[1] Gudrun Litzenberger, *Marktbefragung 2011 – Industrielle Bildverarbeitung in Deutschland*, VDMA, Fachabteilung Industrielle Bildverarbeitung im Fachverband Robotik + Automation, Frankfurt, 2011.

[2] Astrid Sommerkamp, *The Imaging & Vision Handbook 2010/2011, ISBN 978-3-00-030060-8; Handbuch der Bildverarbeitung 2010/2011, ISBN 978-3-00-030061-5,* STEMMER IMAGING GmbH, Germany, 2010

[3] LMI Technologies Inc., Delta, Canada: *GoCator* www.lmi3d.com

[4] Cognex Corporation, Natick, USA: *Dataman-ID-Readers*, www.cognex.com

[5] Cognex Corporation, Natick, USA: *In-Sight Smart Cameras*, www.cognex.com

[6] Teledyne DALSA IPD, Billerica, USA: *BOA Smart Camera*, www.teledynedalsa.com

[7] Teledyne DALSA IPD, Billerica, USA, *SHERLOCK GUI*, www.teledynedalsa.com

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