Practical example: Smart cameras can be used to extend existing PC-based vision systems.

Embedded or PC?

Addressing the issue of which system to use in industrial vision solutions

Solution providers need to recognize the signs of the times if they want to compete successfully on the market. What does this mean for decision-makers and product managers? Considering the rapid growth in the field of industrial image processing and fully-integrated embedded solutions for an increasing number of vision applications, the inevitable question is: What can be done to avoid being left behind? Three key aspects should be considered here: technological transition, market dynamics and strategy.

Corporate leaders should, of course, be familiar with all of the options so that they can offer the ideal image processing or optical solution. But what does "ideal" really mean in this context and what questions does this raise? This issue poses major challenges for companies. Since 1996, NET has been offering advice and camera technology to a number of international customers from the industry and medical sectors to help them find the ideal vision solution. One key observation is that the planning of future products/applications is more than just a matter of coming up with a technical solution. If ideal decisions are to be made, we need to question which system to use in vision-based industrial applications. When designing or choosing their vision solution, companies should try to keep up with the latest trends. Solution providers will only be able to take a global view of the questions raised in the era of embedded vision technology if they start thinking systemically.

The digital transformation continues As a result of the technological transition and the changing market demand, regardless of economic and political aspects, we need to look at the vision system as a whole. In the 1980s and 1990s, the sector experienced the digital transformation of industrial image processing. The technological transition continues to advance due to the pooling of interests within organizations and associations in image processing, now firmly integrated in standards and conventional practices, and a blurring of the technological boundaries between B2C and B2B that can currently be observed. The conventional decision-making scenario, dominated by the question of whether to "buy or develop", is no longer two-dimensional. When identifying the crucial success factors for their application solution and implementing these accordingly, providers can choose from a complex issue comprising a number of technological options. This is normally an ongoing corporate process rather than a cyclic event. The technological transition gives rise to the following questions:

- Has the potential of the PC-based image processing and Embedded Vision solution architectures been fully recognized?

- Is it possible to evaluate new technologies in terms of the benefits these bring for in-house solutions?

External know-how can make it much easier to reach a decision, especially when it comes to assessing the potential. Camera manufacturers who not only have the necessary expertise, but are also able to advise their customers before making a sale, are particularly in demand.

Making use of market dynamics: from follower to leader

The risk of being left behind by the competition or of completely missing out on trends in demand needs to be actively addressed. Companies would be better advised to use the available opportunities to strategically define the vision solution best suited to their needs. How can this be done? What impact do the market and the market environment have on the marketing strategy? Several market aspects must be considered here:

- Marketing strategy: positioning, differentiation, growth;
- Core competencies, resources;
- Customized v. standard solution;
- Automation of the solution;
- Alteration of the product life-cycle: flexibility, time-to-market.

A prominent example for the successful changeover from conventional PC-based image processing to Embedded Vision can be observed in the automation sector.

Today, due to new opportunities offered by system design, distribution and logistics applications are able to seamlessly trace and assess the quality of individual objects in real-time across a number of process stages and over large distances until they reach the buyer. Per se, the nature of image processing has not changed. The ability to use new technologies to adapt workflows to make them more efficient, safer and less expensive is, however, a direct result of the debate on the question of which system to use. The use of smart, decentrally-operating compact cameras, which are part of the application architecture, in connection with the provider's so-called IP cores is the key to success here. Regardless of the nature of their application solution, all companies basically have the potential to use new technological options to develop the ideal solution for themselves and their customers. A key indicator here is the ability to reconcile their own marketing strategy with the possibilities offered by image processing.
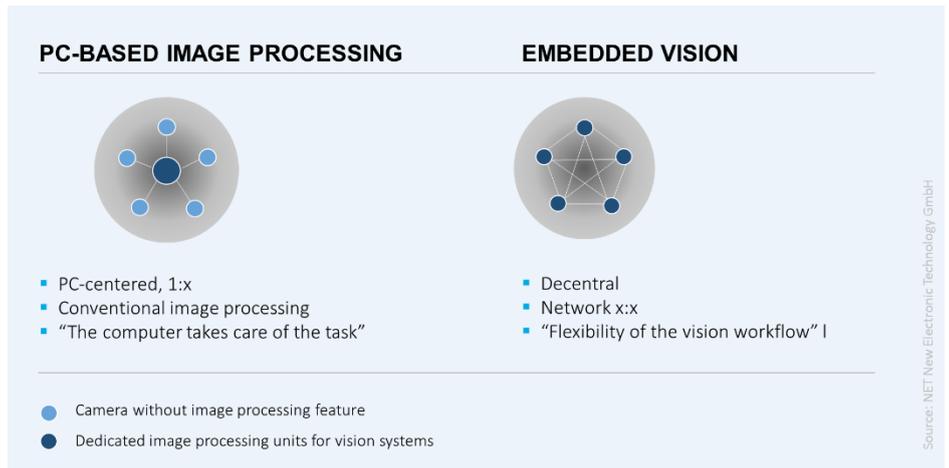
The basic difference between the conventional PC-based image processing architecture and Embedded Vision architectures
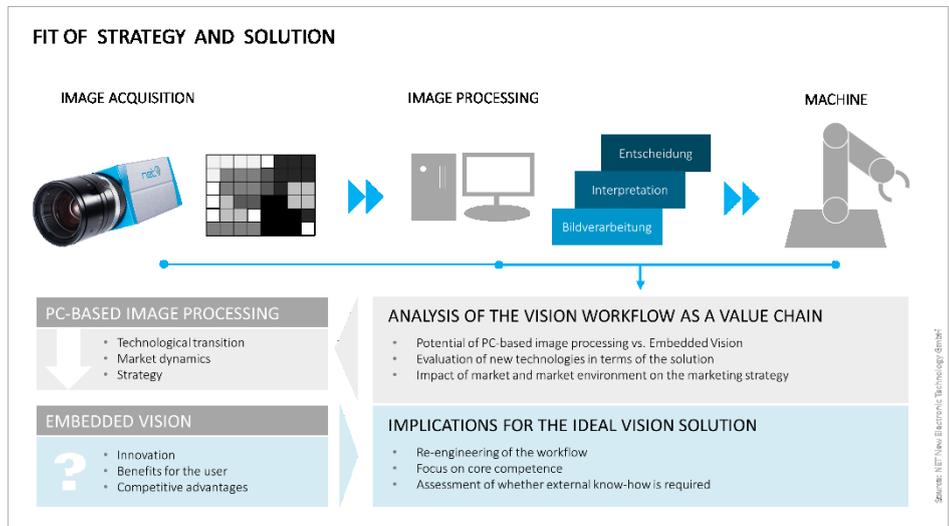
Analysis of the correlation between strategy and vision solution

The ideal combination of strategy and solution

The "right" vision solution optimizes the company's marketing function. The way in which the conventional issues discussed above are solved depends on the company's core competencies and how added value is created. Image processing as a value chain is therefore a useful instrument for analyzing the vision solution. In designing the solution, the technical aspect should also be viewed from an economic perspective to enable an analysis of the commercial benefits. In this regard, it may well be advisable to use external know-how to effectively fill any knowledge gaps.

The technological transition, changing market demands and a focus on in-house strategy are key benchmarks when it comes to designing a sustainable vision solution. These benchmarks can be used to draw up an agenda of important issues, which will make it easier to choose the right solution for the particular situation. Although the approach outlined here can and should be considered

an initial step towards debating what system to use in industrial vision solutions, a more in-depth analysis is, of course, necessary in practice. With a portfolio of open camera solutions, which can be individually designed for each application, together with real-time software and custom optics, NET has built up a wealth of consulting expertise. Focusing on the vision system as a whole, including an analysis of both the technical and commercial benefits, is crucial for overall success. Particularly now that image processing is becoming more flexible due to Embedded Vision, this way of thinking is increasingly gaining importance in terms of achieving a unique market position.

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