



Vision Solutions

Philips Applied Technologies' Vision group develops innovative solutions that turn images into meaningful information.

PHILIPS

sense and simplicity

Focus on Vision

The human visual system is our most important sensor. Shape, color, texture and context all play an important role in what we see. Advanced automated vision systems are able to replace the complex human visual system and can even interpret signals our eyes cannot detect, such as X-ray radiation. As a result, vision systems are becoming increasingly important, both in industrial applications and in consumer and healthcare products.

Vision Partner

Over the last 40 years we have built up a strong foundation of technological expertise, in a wide range of imaging modalities, to support Philips product divisions and other high-tech companies. Our vision specialists work in close collaboration with experts in our other technology and manufacturing process groups. We also have access to an extensive network of contacts, both within Philips and within external companies and universities, allowing us to re-use technology and carry out make-or-buy decisions. In short, we have the vision know-how to deliver optimal solutions in terms of technology and project execution for all aspects of product creation and industrialization.

Machine Vision

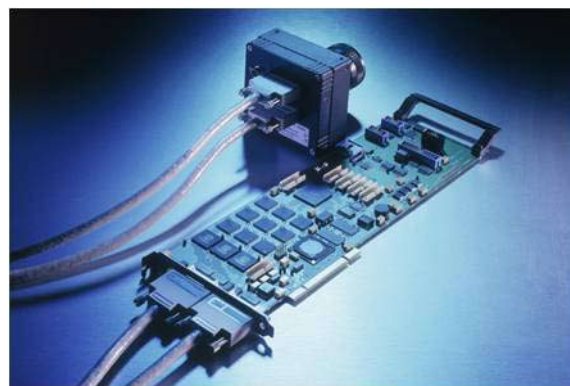
Since our beginning, we have developed and provided leading-edge vision technologies in a host of industrial sectors – from automotive to medical electronics, from semiconductors to heavy industry. Our customers apply these industrial vision systems to applications such as assembly verification, cosmetic inspection, laboratory equipment and precision guidance, in order to improve process efficiency, increase throughput and cut production costs.

Smart Sensing

Vision is a remote and unobtrusive way of sensing that delivers an enormous amount of information, making it highly attractive in applications or products that interact with users and their environment. Information such as the identity and behavior of individuals is extremely valuable for user interaction, smart environments or surveillance tasks. Observation of patient movement, for example, can improve the safety and workflow efficiency of medical systems for diagnosis and therapy.

Image Interpretation

Due to the widespread availability of digital content, fast interpretation of images and video is very important. Sophisticated image processing algorithms can classify semantic content to distinguish between natural and synthetic objects. Content-based search functionalities can quickly retrieve relevant content from a photo archive. Sophisticated image recognition and analysis systems can support physicians with diagnosis by recognizing anomalies in medical images.





Our Scope

We support our customers in all critical phases of product and production system development, from initial concepts to full industrialization. In every case we work in very close cooperation with our clients, gaining a thorough understanding of their business and technological requirements and translating them into successful designs.

During the concept phase, we develop innovative vision technology and laboratory equipment. We also carry out feasibility studies, technology assessments and proof-of-concept studies. By evaluating concepts from both a technical and commercial standpoint, we identify strengths, weaknesses and opportunities for improvement and further development.

Based on our customers' business and technology requirements, we create functional models and prototypes that allow all the key business and design issues to be addressed. Then we develop vision algorithms and platforms for products and production equipment, either in the form of complete systems or subsystems.

During the industrialization phase, we engineer solutions to a level of maturity that facilitates an efficient transfer to our client's organization. For example, mapping algorithms to customer platforms or delivering turnkey vision systems. We also have the engineering, logistics and support capabilities within our organization to translate technical concepts into volume production.

Capabilities

Our vision group comprises technologists, computer scientists, application engineers and system architects who work together as a coherent team. We know how to deliver added value by combining specialist knowledge and system-level thinking, based on our extremely broad competency in vision technology.

Opportunity identification

- Market and technology trend investigation
- Ideation and concept creation

Imaging

- Optics and illumination design
- Monochrome, color and multi-spectral imaging
- Laser scanning, stereo imaging and 3D sensing
- High-speed image acquisition and registration

Image processing

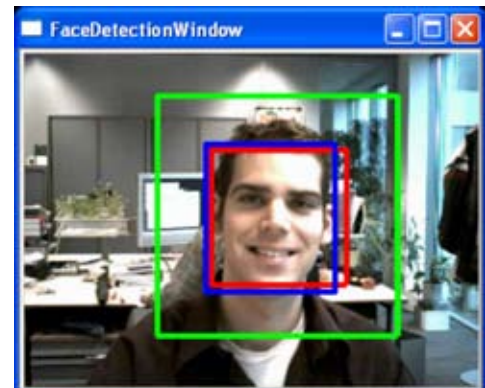
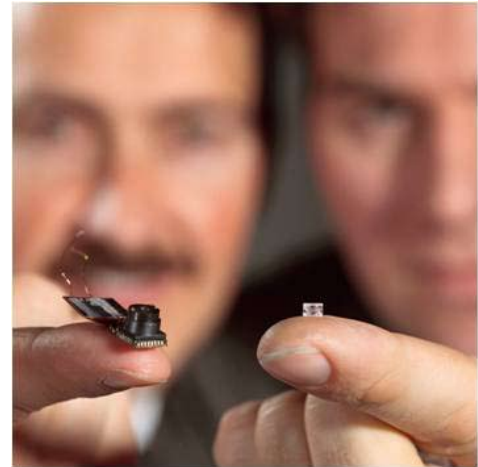
- Object segmentation, detection and recognition
- 3D reconstruction and visual navigation
- Geometrical measurements and camera calibration
- Classification and machine learning
- Person detection, tracking and recognition

Vision systems

- Embedded and PC-based image processing solutions
- High performance image processing platforms

Industrialization

- Supplier selection and manufacturing support
- Turnkey solutions and OEM design
- Translation of technical concepts into volume production



Applications

Philips Applied Technologies' Vision group recognizes the importance of understanding both the application and the customer's needs in order to select the best technology options. Through our many years of experience, we have particular expertise in many application areas, including:

Multimedia Experience

- Photo retrieval from collections
- User interaction and identification
- Video conferencing

Home & Building Automation

- Presence detection and person tracking
- Remote-controlled home lighting systems
- Ambient and responsive environments

Personal Care, Wellness and Beauty

- Baby monitoring
- Hair and skin characterization

Robotics

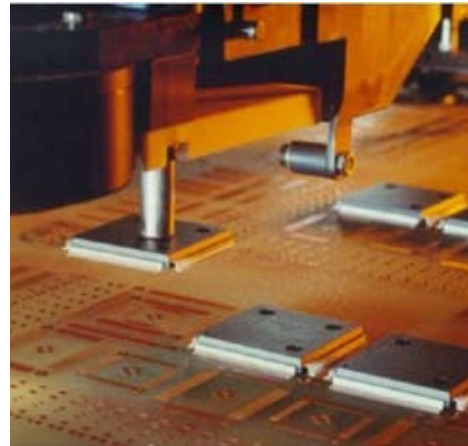
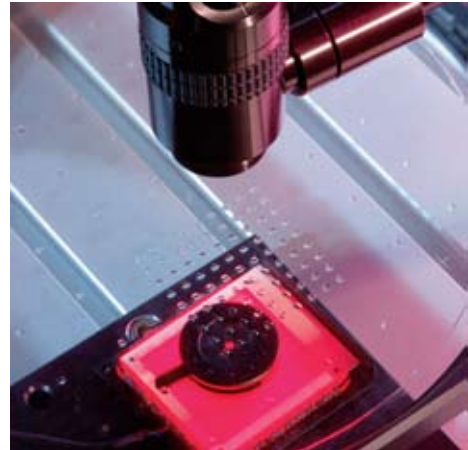
- Navigation of mobile platforms
- Adaptive and responsive devices

Healthcare

- Decision support systems for diagnostics
- Detection of physiological anomalies and internal organs

High Precision Systems

- Assembly in semiconductor equipment
- Quality inspection for lighting products
- Focusing of electron microscopes
- Laboratory equipment for molecular diagnostics



Proof points and project examples

Automatic shutter placement for X-ray imaging

Philips Healthcare wanted to automatically position an X-ray equipment shutter across the human lung while creating an image of the heart. The shutter is positioned in such a way that it enhances the heart image while also protecting medical staff from excessive radiation.

Localization of printed circuits boards for manufacturing

Assembleon, a supplier of pick-and-place machines for electronics manufacturing, needed to accurately position printed circuit boards before the placement of components. The algorithms we developed localize fiducial markers on the boards with extremely high accuracy in a very short time.

User-friendly retrieval of digital images

Our image tag library system simplifies the complex and difficult task of quickly retrieving content from a large database of private or professional images. It consists of advanced image-based search functionalities that enable fast, intuitive and flexible retrieval of images.

Dust particle detection on reticles

ASML Lithography needed a detector to check for dust particles on reticles to avoid poor or zero yield during wafer manufacturing. We have developed a pelliculised particle detector that uses laser optics to scan both the glass and the pellicle side of the reticle for particles as small as 5 microns in size.

Analysis of fluid streams for biosensors

During the development phase of Philips' Magnotech biosensor cartridge, there was a requirement to analyze fluid velocity. We developed a high-speed image acquisition system that records over 500 images per second for several minutes. The recorded images are processed off-line to determine fluid velocity in the cartridge.

Measuring skin aging

As a key contributor to a venture within the Philips Lifestyle Incubator, we developed algorithms to visualize and quantify skin aging. It required the incorporation of expert knowledge to assess properties such as skin type, sun damage and redness, and to detect lines, wrinkles and hair on the skin surface.



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