Machine Vision Beyond the Factory

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October 18, 2012
Beijing

Machine Vision is No Longer Tied to the Factory

Biometrics

Traffic Management

Automotive Machine Vision

Waste Management

Solar Panel Inspection

Laboratory Automation/Drug Discovery

Medical Imaging

High-end Security and Surveillance

Wind Turbines

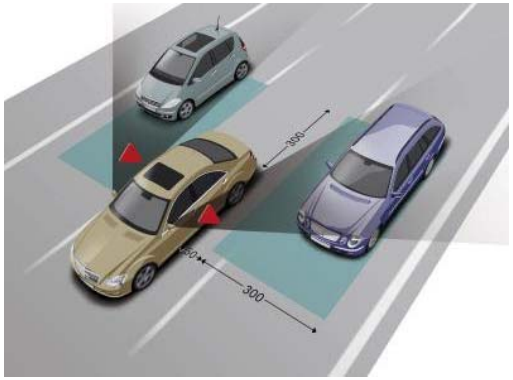
Robotic Warehousing

Traditionally, Machine Vision Involved Inspection, Detection and Measurement In Factory Production.
Today, Non-Factory Applications Abound.

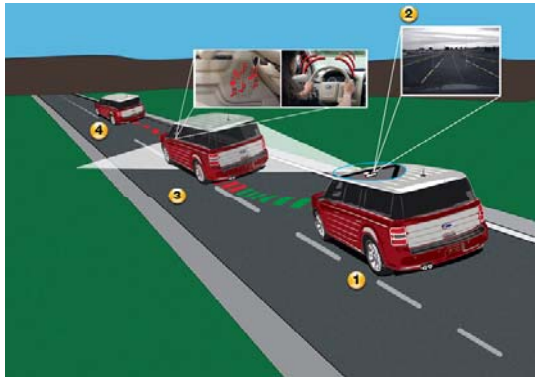
Automotive Machine Vision

Automotive IR Night Vision

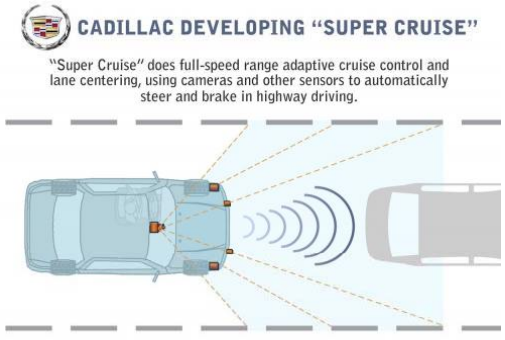
Blind Spot Elimination



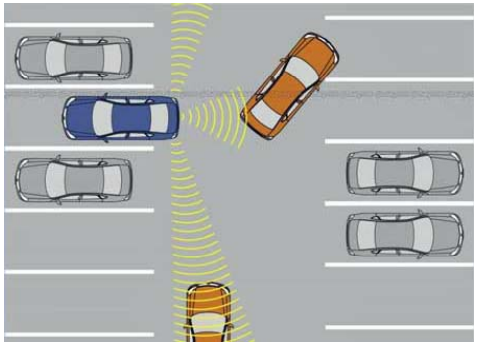
Lane Departure Warning



Adaptive Cruise Control



Collision Warning Systems

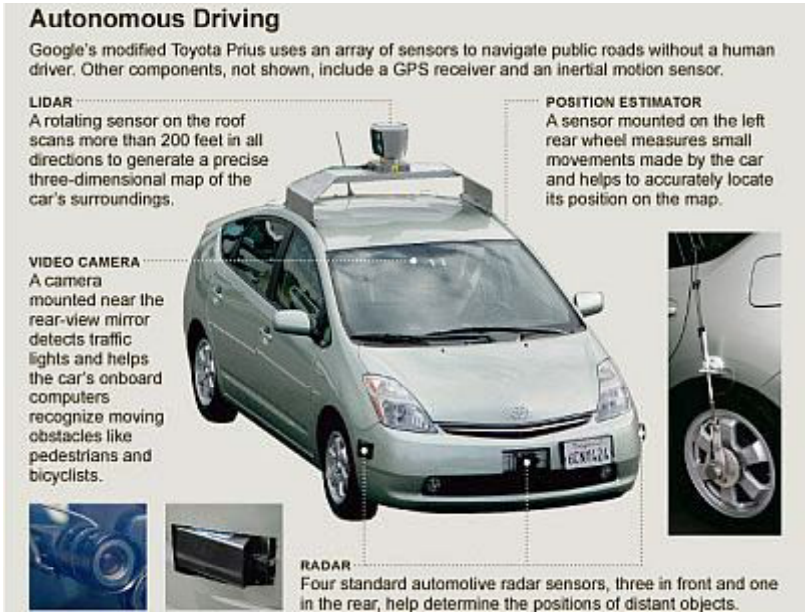


Rear View Cameras

Machine Vision is Becoming Increasingly Embedded in Cars

Automotive Machine Vision

The Ultimate Automotive Application: The Driverless Car



- ❑ **Google's driverless car uses vision technology (LIDAR* and video camera), radar and position sensors.**
- ❑ **Driverless cars are now legal in Nevada, Florida and California.**

*Light Detection and Ranging

Traffic Management

Traffic Control

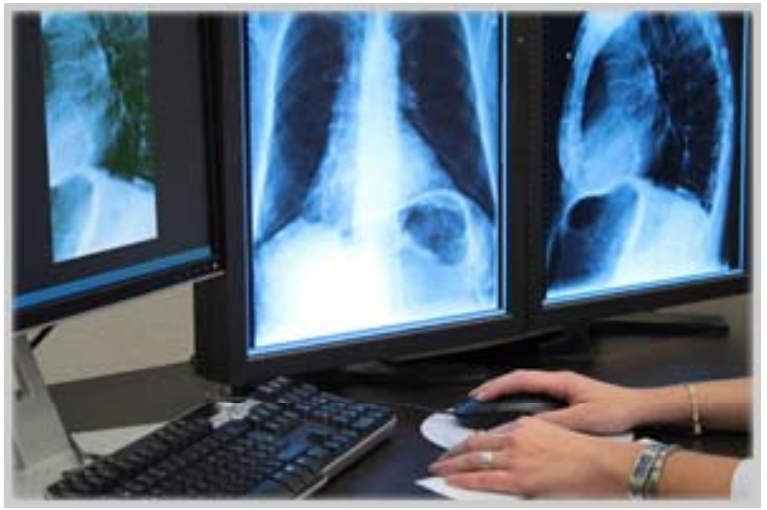
Electronic Toll Collection

License Plate Recognition

The *advanced traffic management* industry has begun to use machine vision for:

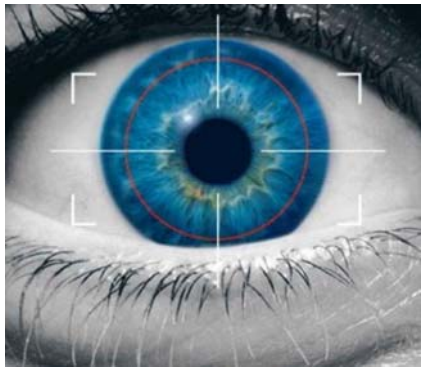
- ❑ **electronic toll collection**
- ❑ **license plate recognition**
- ❑ **traffic control**

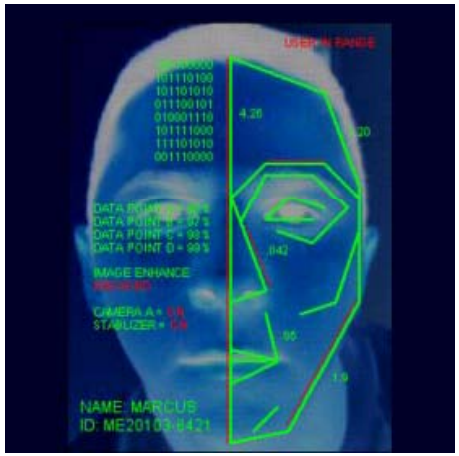
Medical Imaging

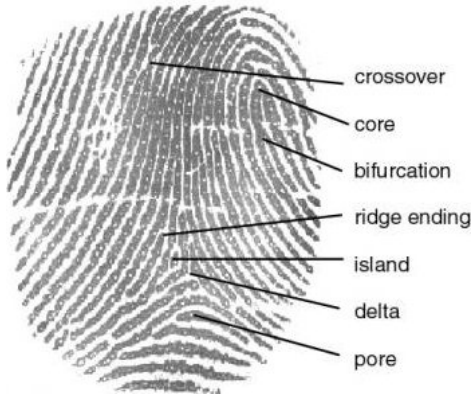


The *medical imaging* industry is increasingly replacing x-ray films with x-ray cameras and image processing equipment to capture and store digital x-ray images.

Biometrics







The *biometrics* industry relies on machine vision for:

- ❑ **facial recognition**
- ❑ **fingerprint recognition**
- ❑ **iris recognition**
- ❑ **retina scanning**
- ❑ **hand geometry**

High-end Security and Surveillance

The *high-end surveillance* industry is using machine vision equipment and software to:

- ❑ **greatly enhance human perception and**
- ❑ **Improve decision-making regarding security breeches**

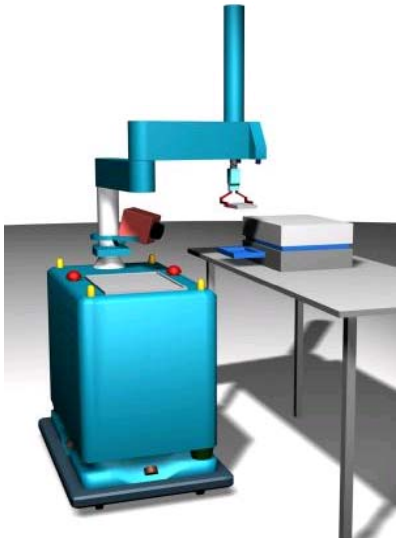
This will protect gatherings of people and critical infrastructure (such as bridges, buildings, etc.).

Waste Management

In the *waste management industry*, machine vision enables the efficient sorting of objects in the refuse stream by:

- ❑ **optically identifying objects to be recycled and**
- ❑ **guiding the process of separating these objects from the remaining material**

Laboratory Automation/Drug Discovery



Laboratory Robot

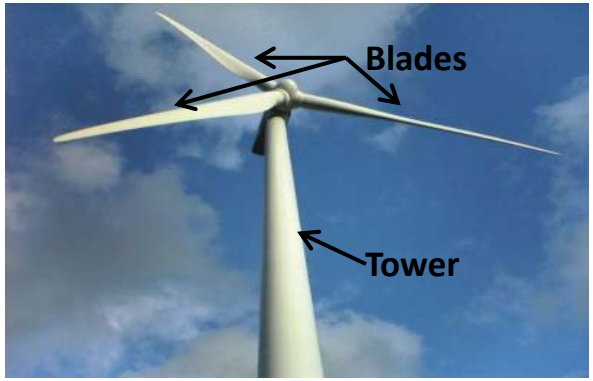
Microplate

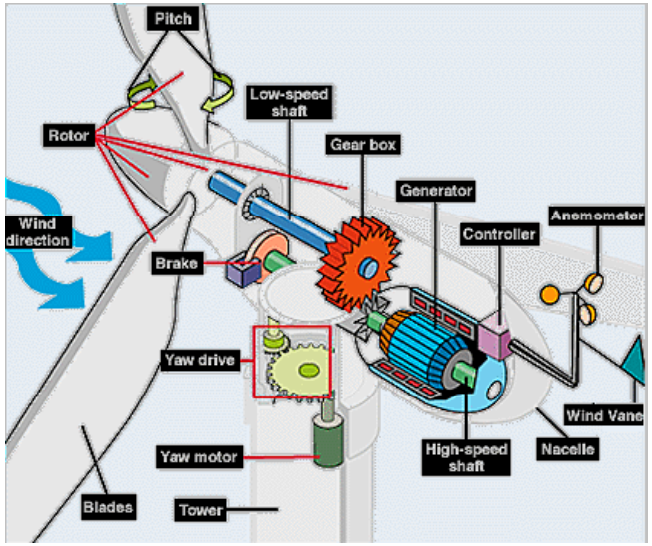
Laboratory Robot

In the *laboratory automation/ drug discovery* industry, machine vision is used for:

- ❑ **guidance of laboratory robots**
- ❑ **automatic reading of bar codes for identifying microplates containing potential drugs (“spots”)**
- ❑ **automated inspection of the spots to determine whether they fall within the desired tolerances**

Wind Turbines





Wind Turbine Components

- **Machine vision inspection of the assembly of wind turbine components (such as generators, pitch controls and yaw systems)**
- **Surface inspection of wind turbine brakes, gears and tower welds**
- **Guidance of robotic welding of tower rings and robotic handling of gears**

Solar Cell and Panels

Machine vision is also used for:

- ❑ **the inspection and sorting of silicon wafers, wafer blocks and ingots**
- ❑ **the measurement of wafers, curved glass and mirrors**
- ❑ **vision-guided, robotic handling of solar cells**

Robotic Warehousing

Seegrid GP8
(General Tugger Robot)

Kiva Mobile Robot

Vision-guided
Gantry Robot

Vision-guided
Palletizing Robot

The role of machine vision in robotic warehousing involves:

- ❑ **providing guidance to stationary robots, gantry robots and robotic arms**
- ❑ **Enabling maneuverability of state-of-the-art mobile robots**

Modified iPhone Used for Microscopy

$40 lens pared with an iPhone camera can provide an inexpensive, high resolution (1.5 microns) microscope in place of a high-end, commercial microscope.

Example of Comparable Resolution

Pollen and Plant Stems

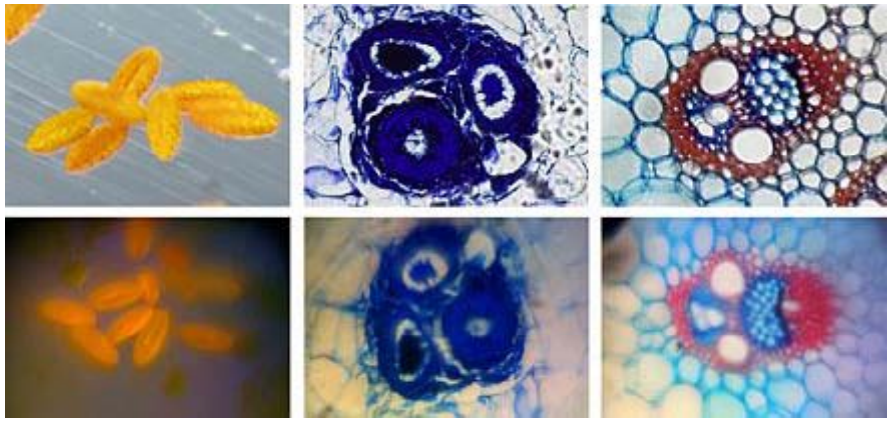


Image from Commercial Microscope

Image from Modified iPhone Camera

Machine Vision Offers Affordable, High Resolution Microscopy Solutions That Can Help Doctors and Nurses Diagnose Blood Diseases in Developing Nations Where Hospitals and Rural Clinics Have Limited or No Access to Laboratory Equipment.

Summary and Conclusion

- While increasingly important to industrial production, machine vision has moved far beyond the factory.
- Numerous machine vision applications have emerged and today serve a wide range of markets.
- These markets include biometrics, traffic management, autos, waste management, laboratory automation/drug discovery, solar panel inspection, wind turbines, fuel cells, medical imaging, high-end security and surveillance, advanced batteries and robotic warehousing.
- Machine vision technology is becoming increasing embedded in complex products such as cars.
- Going forward, far more innovative, high-tech applications are expected.

The Number of New, Cutting-Edge Applications is Limitless!

Meet the AIA

AIA is the vision industry's trade group, representing more than 300 member companies from 30 nations including several from China. Our membership includes manufacturers of complete vision systems, components, suppliers, system integrators, distributors, end users, consulting firms, academic institutions and research groups directly involved with machine vision and imaging.

AIA Mission Statement

Our mission is to advance the understanding and use of vision and imaging technologies to drive global expansion and growth through education and promotion.

Vision Online

www. VisionOnline.org

Vision Online is the world's leading resource for machine vision information. The site is visited daily by people all over the world seeking solutions to their machine vision and imaging needs. It offers company profiles of the industry's leading companies and includes products, videos, daily industry updates, insightful feature articles, informative technical papers and much more! Visit the site at www.VisionOnline.org and get a glimpse of what's new in vision.

AIA Activities

The Vision Show - The Vision Show is North America's premier vision and imaging event. Last held May 8-10, 2012 in Boston, Massachusetts, the show featured a vast array of machine vision components, systems and solutions, accompanied by an in-depth technical conference. For full details, visit the Events page on Machine Vision Online (www.VisionOnline.org). AIA members receive discounted exhibit space.

AIA Networking Reception – The 13th Annual AIA Networking Reception will be held November 7, 2012 in Stuttgart, Germany.

Automate 2013 - This biennial show, next held January 21 - 24, 2013 at McCormick Place in Chicago, Illinois, is North America's largest showcase of robot, machine vision and motion control solutions. For more details, go to the Events page at www. VisionOnline.org. AIA members receive discounted exhibit space.

AIA Business Conference - The annual AIA members only Business Conference is the industry's most important networking event where industry leaders come together to share updates on global issues and trends. This event is also a resource used by successful companies to expand their industry network, learn about emerging markets and to discover new applications for machine vision. The 21th Anniversary event is set for February 20-22, 2013 – in Orlando, Florida.

Our Services

Certified Vision Professional Program - AIA offers instruction and testing for individuals who would like to earn the designation of Certified Vision professional. Basic and Advanced designations are achievable. For full details, contact kstraight@robotics.org.

AIA Certified System Integrator Program – This program helps system integrators highlight their offerings. For details on individual or company certification contact dwalls@visiononline.org.

AIA Vision Standards – AIA supports development of vision standards, which play a key role in the vision and imaging industry by ensuring interoperability of components and shortening the time it takes to get new products to market. AIA currently hosts the Camera Link®, GigE Vision®, Camera Link HS™ and USB3™ standards. For more information contact bmccurrach@visiononline.org.

Market Data - AIA publishes quarterly machine vision market data that provides detailed information on the North American market. This comprehensive study is a critical tool for successful business planning. For details contact ashikany@visiononline.org.

Machine Vision Industry Directory - *The Machine Vision Industry Directory*, AIA's most requested resource, is published annually and distributed free to thousands of people each year seeking an integrator or supplier.

Publications and Training Resources - AIA provides educational resources about machine vision and imaging available for purchase in our online bookstore. Members receive discounts on all orders. In addition, we offer in-house training sessions customized to meet your company's needs. Visit our website (www. VisionOnline.org) for more details.

How Can You Get Involved:

It's easy! Contact Kathleen Straight at (734) 994-6088 or via email at kstraight@robotics.org. A full list of benefits and an online membership application is available at www.VisionOnline.org.

Thank You!

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