



PRIMECOMATE[®]

**SELF-LEARNING, DEEP LEARNING-BASED MACHINE VISION SOLUTION
FOR FULLY AUTOMATIC PART INSPECTION**

**WHAT IF IMPERFECTION
WAS NOT A DEFECT?**

Designed for real time checking of human-machine interaction, human, or machine actions within manufacturing. Guides human and/or machine actions with human-like, collaborative vision in order to improve efficiency, production quality and safety.

PRIMECoMATE

The first automatic "**zero setup**" system to control your products.

PrimeCoMate is the **industrial vision system** for quality control directly on the production line, capable of completely replacing human work, bringing the effectiveness and performance of supervision to new levels.

Its performance is constant repeatable and objective on 100% of the production. Thanks to PrimeCoMate, the

inspection of the products on your lines does not require breaks, is not subject to errors of evaluation or distraction and is not limited to the single visual analysis that is adopted by man.

PrimeCoMate is "**zero setup**": **intuitive and immediately usable**, it does not require configurations or settings and can be customized at any time to adapt to your tolerance meter.



HUMAN? NO, HUMAN-LIKE

It is not human, **because it does much more.**

What makes PrimeCoMate surprisingly superior to a human's performance is its ability to:

- ▶ Take advantage of its proprietary technology to learn independently, applying the acquired knowledge to the quality inspection of products
- ▶ Accurately distinguish product variations, ensuring precision in the exclusion of defective elements and tolerance for acceptable anomalies
- ▶ Improve its specific performances, through personalization and "safe improvement on demand" systems that allow a global improvement

But what makes PrimeCoMate not comparable to a human being is its ability to:

- ▶ Inspect each element impartially, without giving in to subjective evaluations
- ▶ Carry out an uninterrupted check, with a performance effectiveness not subject to the normal drops in performance typical of the human being
- ▶ Keep the rhythm and quality of the results constant, without distraction errors

COMPLETELY **AUTONOMOUS!**

It does not require any user intervention.
This is why it is **simple, fast and convenient.**

PrimeCoMate, with its "**zero setup**" technology, is able to independently undertake the observation of production elements directly on the line.

Having acquired the basic data, PrimeCoMate starts the proprietary **auto-classification** and, subsequently, **auto-learning** processes necessary to effectively implement its assessment.

When fully operational, the system works by exploiting the unsupervised learning method, using self-created knowledge thanks to exclusive **self-grading** and **self-learning** procedures.



CUSTOMIZABLE IF NECESSARY

PrimeCoMate learns from you too: with additional rules and personalized criteria.

The flexible system of PrimeCoMate allows you to modify, if necessary, the severity of the judgments relating to the three main evaluation criteria (morphology, color and aesthetic appearance) as well as manually adding control rules that will integrate with those that form the system automatisms.

This does not translate into an overlap of different and potentially conflicting rules:
PrimeCoMate is in fact able to apply the new cascade rules, running a fluid "selection of the selection" in order

to optimize the effectiveness of your inspection.

Each additional rule allows you to teach the system, through supervised training, to recognize specific details or defects of the product concerned. In this way PrimeCoMate will be able to:

- ▶ Detect the presence and quantity of these details or defects
- ▶ Get the degree of integrity of these parts
- ▶ Evaluate the severity index of these defects

MORE SENSES FOR MORE SKILLS

THE SEARCH FOR ANOMALIES EXTENDS FURTHER.

PrimeCoMate can be improved in its search for anomalies by extending the inspection to a plurality of senses, more developed than human ones. To the two-dimensional vision of the object, which allows its **morphological, chromatic and aesthetic** control, it is possible to combine **3D vision**, when the analysis of **shape alterations** requires third dimension, and **hyperspectral vision**, which allows the detection of **chemical alterations** in the element. Each of these "senses" can be implemented in PrimeCoMate individually or together with others, to offer you a more complete and detailed analysis.

Color vision



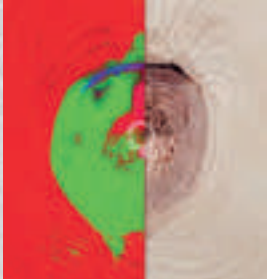
Changes in appearance

3D vision



Changes in shape

Hyperspectral vision



Chemical alterations

READY FOR ANY KIND OF PRODUCT

PrimeCoMate is the ideal system for analyzing automotive and non-automotive, products reducing the margin of error to zero. This is thanks to its exclusive human-like ability to evaluate the particularities of each element by accurately distinguishing acceptable anomalies from defects.



Vehicles

parts for engines, transmissions - controls - finishing elements etc.

Electronics

PCB - components - wiring - soldering etc.



Consumer products

cosmetics - household products - parts for home appliances etc.

Food

bakery products - frozen foods - confectionery, snacks - fruit, vegetables...



Medicines

pills - capsules - vials - blisters etc.

Other products

small metal parts, plastic etc. - castings, molds etc.



THREE CRITERIA FOR A VERDICT OF (IM)PERFECTION

PrimeCoMate performs three categories of check:



MORPHOLOGICAL

- ▣ Detects anomalies of shape and size, breakages, deformations, missing pieces etc.



CHROMATIC

- ▣ Detects color variations, cooking errors, composition anomalies etc.



AESTHETIC

- ▣ Detects imperfections whatever their appearance or size

The innovative PrimeCoMate system makes in-depth analysis possible, because it creates a complete and comprehensive image of the product, allowing the detection of any possible defect. Thanks to deep learning, the natural variations of the objects do not interfere with the inspection, focused on the **detection of anomalous details not known a priori**.

THE ADVANTAGES OF PRIMECoMATE

PrimeCoMate works automatically taking advantage of its built-in self-grading and self-learning procedures, therefore, for normal operation, it doesn't need to be programmed nor have data inserted by the user.

Where a standard system would stop working or would make a mistake because of its incapacity to distinguish a natural variation from a defect, PrimeCoMate **applies built-in customizable tolerance** criteria, drastically reducing the number of false rejects.

This system of inspection, thanks to its self-learning and self-grading qualities, does not require the coding of all possible anomalies in instructions for the machine, therefore it can be fully flexible to adapt to any given need, going way beyond any other existing system.

REAL-TIME
CHECK

WE LOOK BEYOND THE OBSTACLES. WE GUARANTEE CONCRETE RESULTS

Primeconcept, specialized in machine vision, was the first Italian company to use deep learning technology applied to industrial vision. Partner System Integrator (PSI) of Cognex was the only Italian partner of ViDi Systems before its annexation with Cognex, adopts the "**pay-for-performance**" formula to guarantee extraordinary results. With more than forty years of collective experience behind it, Primeconcept is professional in the design, engineering and implementation of machine vision and industrial identification systems.

The company's ability to integrate artificial intelligence with industrial vision have led to unprecedented and innovative solutions that have revolutionized quality control systems, research and detection of anomalies, recognition and classification.

PRIMECONCEPT[®]
DEEP VISION[™] SOLUTIONS

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Patent pending. The system described herein is not necessarily designed to meet specific cases.
The applicability and effectiveness of the system must be verified on a case-by-case basis.

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YEARS OF INNOVATION
PRIMECONCEPT

