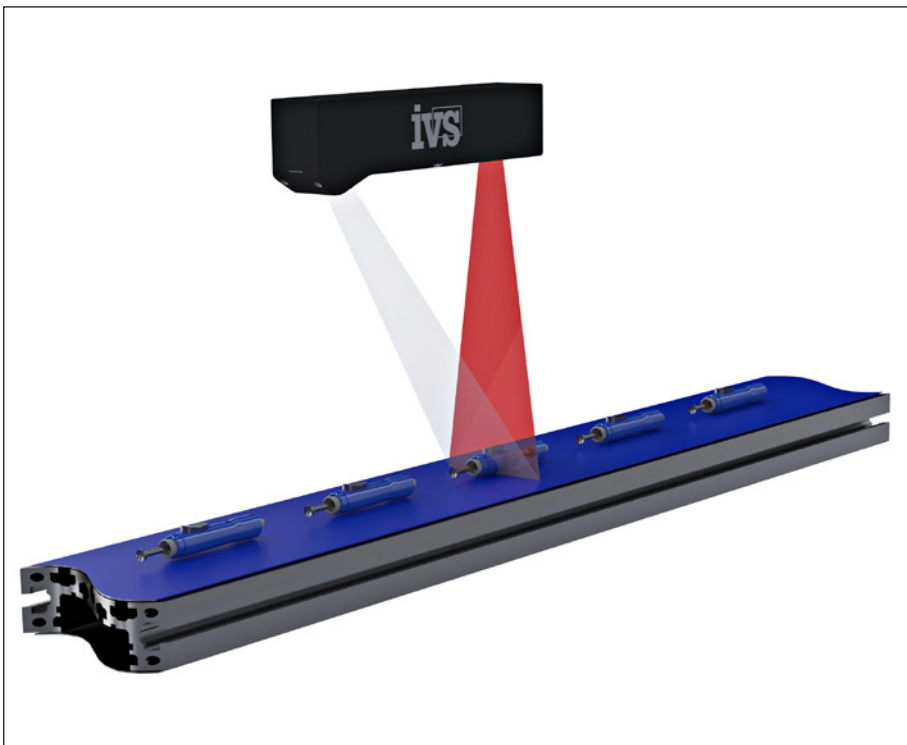


Case study

3D Vision Systems and 3D Machine Vision Technology

Structured Light: 3D Scanning and Surface Profiling



Simplified Diagram of 3D Laser Line Profiling

Until recently, industrial manufacturing inspection applications have been dominated by laser based solutions. By using a laser coupled with a 2D camera, object edges can be more easily located and “pseudo 3D” images can be produced. As a company committed to continuous innovation, Industrial Vision Systems Ltd has invested in an alternative approach using structured light technologies.

With structured light solutions such as laser line profiling and structured light profiling, IVS customers can now consider new approaches to their 3D imaging applications. Laser line profiling offers a cost effective alternative to full 3D imaging while still producing high quality 2D profiles of continuous webs and 3D profiles for whole parts. Structured light profiling allows for 3D imaging of a stationary part – removing the requirement for high accuracy motion systems.

Laser Line Profiling

Behaving similarly to a line scan camera, laser line profilers create an image of an object by piecing together single pixel wide lines of image data. However, instead of the data being of a 2D image, it is comprised of 3D structured light. Through the process of triangulation, the distance of each surface point is computed to obtain either a continuous 2D (X and Z) web profile or a full 3D profile of the object.

2D vs 3D Inspection

In the sensor’s “Profile Mode”, it takes continuous, real time measurements in the X and Z axis to monitor “web” products in real time. This type of inspection can be especially useful in the production of textiles, tyres, and any extruded or moving products.

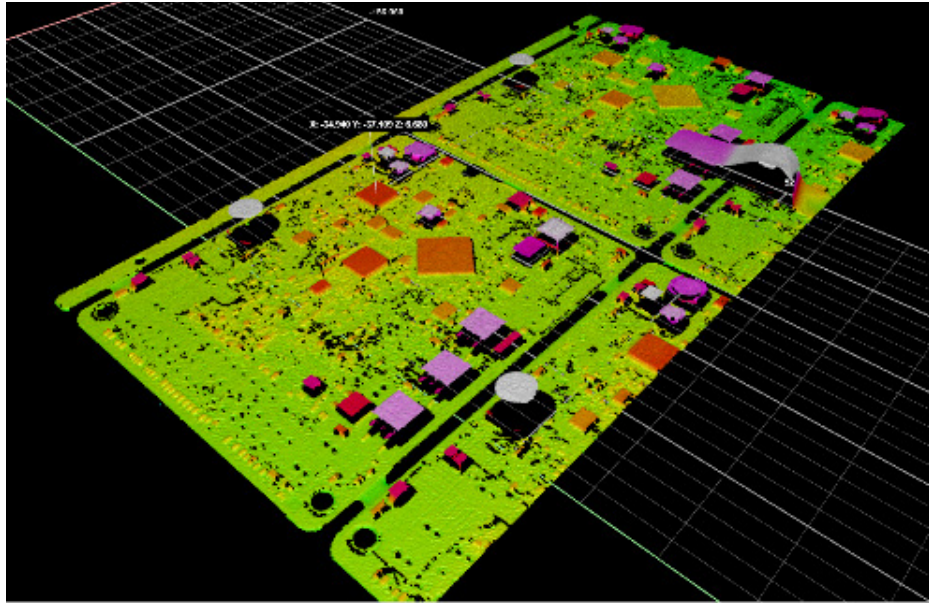
The sensor also has a “Whole Part Mode” in which it creates a full 3D profile of the object by stitching together the individual lines of image data into a point cloud. In this mode, the sensor has the capability to automatically detect the beginning and end of parts on a conveyor or other motion system. This technology lends itself to the inspection of complex assemblies and sub-assemblies such as PCBs, automotive parts, as well as individual components such as injection mouldings, processed foods or complex medical devices.

Case study

In either operating mode, the 3D profiler can be paired with multiple sensors to reduce occlusions or increase the field of view. These sensors are the ideal solution for detecting product surface defects as they work without the use of illumination – making it possible to create images of highly reflective products. Besides surface inspection, the sensors can also be used for 2D and 3D measurements (distance, area, volume, etc.), presence and position verification, robot guidance, OCR/OCV, and many other quality checks.

Features of IVS 3D Vision System Profilers:

- Automatic detection of beginning and end of parts and multiple simultaneous part tracking
- Large range of profile and whole part tools that are easy to configure
- Resolutions from 1mm to 0.014mm
- Easy to combine multiple sensors to reduce occlusions
- IP67 Rated enclosures
- No need for illumination
- High Speed – up to 5000 Hz



3D Profile image of a PCB created by IVS sensor's "Whole Part Mode"



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