



Surface Defect Detection System

General Vision's Defect Detection System (DDS) is a modular affordable system for the detection of anomalies in surfaces including glass and plastic, vinyl, wood, paper and pulp, fabrics, printing, and more.



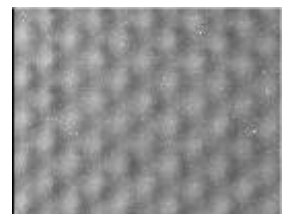
DDS is a **chain of Miniature Trainable Vision Sensors** (MTVS, also referred to as "sensor") mounted on a din rail and each featuring a powerful image recognition engine and neural network capable of high speed pattern matching. The sensors are spaced so their fields of view cover the entire width of the material to inspect. Each sensor is capable of learning a good texture, whether smooth or patterned, and detecting anomalies as small as 2x2 pixels at high speed and with minimum constraints regarding the stability of lighting and possible contextual variations.

The modularity of the DDS makes it easy to install and maintain.

- The light weight sensors are ready to snap on a din rail. They are connected together through a flat cable with IDC connectors at fixed intervals
- The height of the rail and the spacing of the sensors determine the minimum size of the defects to detect

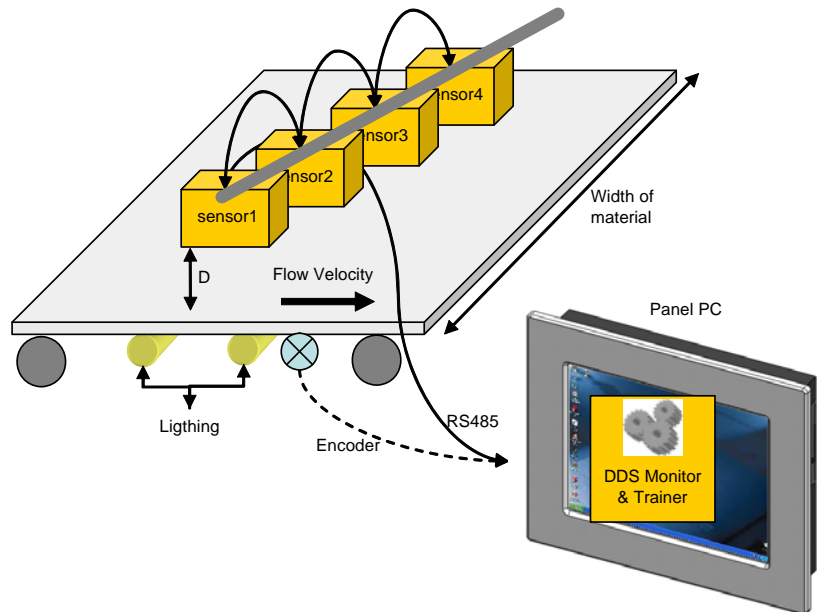
The training of the DDS is easy through the **DDS Monitor software**. The knowledge base of the representation of a "good" material is built by selecting examples in images collected by the DDS sensors on the production line. Different knowledge bases can be built and saved per type of material, type of client, etc.

Once all the sensors are loaded with a validated knowledge, they can inspect a full video frame in less than 75 milliseconds (independent of the size of the knowledge required to obtain an accurate detection!). The reporting of the anomalies then takes 4 microseconds per sensor over a serial line and this data can be processed by a controller interfacing with a marker, cutter or other equipment. Depending on the velocity of the material flow, the speed performance of the DDS may allow for multiple detections of an anomaly in the sensors' field of view thus reinforcing the robustness of the detection.



Uniqueness of the sensor module

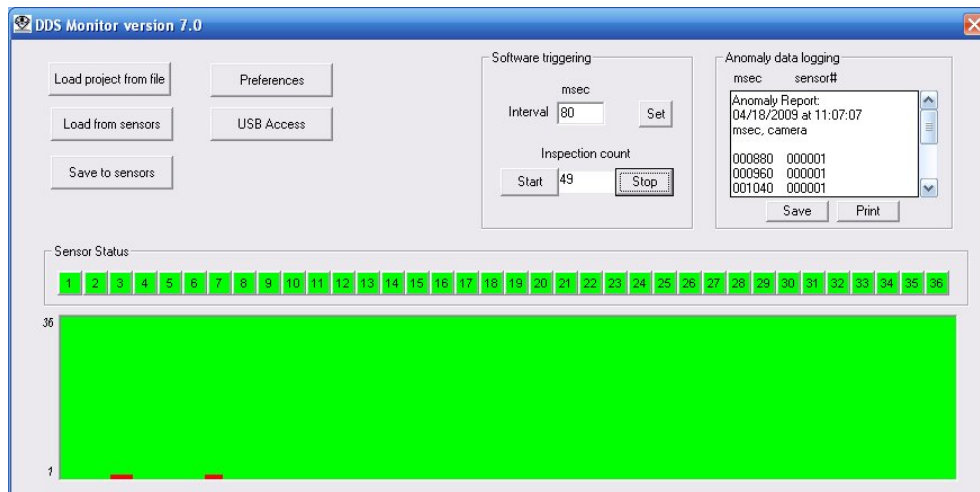
- High quality monochrome video sensor (725x480 pixels at 60 frames per second)
- Neural network chip with automatic model generator and high-speed non-linear classifier
- Capable of learning by examples
- The knowledge built by the neurons can be saved and exported to other sensors, and later expanded with more teaching
- Adapt well to fluctuations of the lighting if taught so by showing examples taken under different contexts
- Detects anomalies as small as 2x2 pixels in a video frame in less than 75 msec.



Case studies:

Width of the material	1.8 m
Velocity of the flow	127 mm/sec
Minimum anomaly to detect	0.1 mm
Distance from rail to material	60 mm
Number of sensors	50
Material displacement / video frame	9.53 mm
Maximum supported velocity	411 mm/sec

DDS Monitor control panel



Ordering information

- DDS Sensor units
- DDS Monitor/Trainer software
- Optional DDS cable with RS485 terminator
- Optional RS485 to USB adaptor

Other third-party components needed:

- Mechanical structure to mount the din rail
- Lighting fixtures running across the entire section to inspect
- Encoder to trigger each inspection as a function of the displacement of the material
- Panel PC running the DDS Monitor application and formatting the results for the selected output devices such as alarms, markers, cutters, etc.