

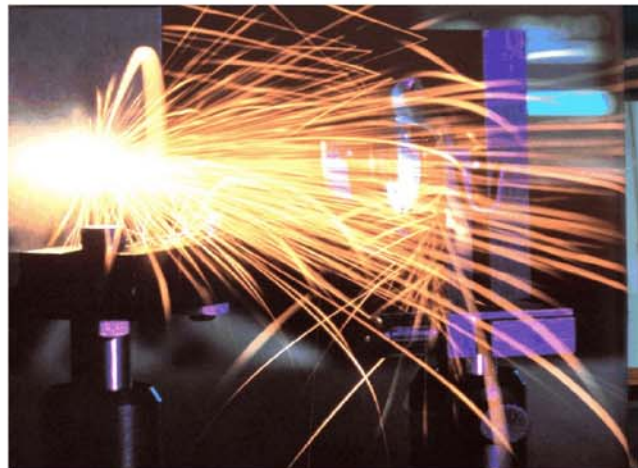
PyWelding

Quality Control System of CO₂ Welding

Description of the System

PyWelding is an application for the Quality Control of CO₂ welding through an expert Machine Vision System.

The application may be installed in linear axis or embedded in a robot, allowing for a large action radius to reconstruct the threedimensional form of the welding and its environment.



The machine vision system literally scans the welding with the laser, gathering all the required information in real time.

All the evaluated parameters during the process are sent to an expert system to verify the quality by classifying it in good or bad, indicating the type of defect.

Advantages of the System

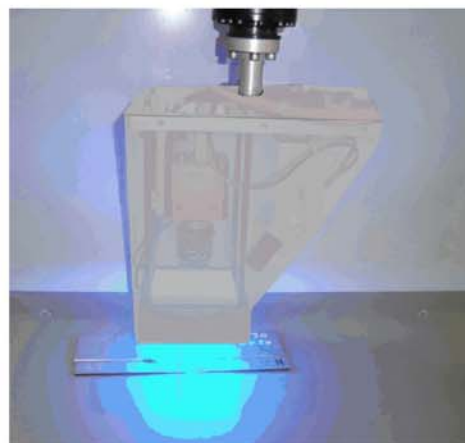
The main advantage of PyWelding is its reliability in guaranteeing 100% **quality control** of the welded items, **reducing the costs** caused by:

- Human mistakes due to fatigue
- Destruction inspection

Welding Types

The welding types that may be processed are the following:

- Butt welding
- Outer angles
- Inner angles
- Tube with Tube
- Tube with board
- Staggering of different layers



PyWelding, Butt Welding



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Machine Vision

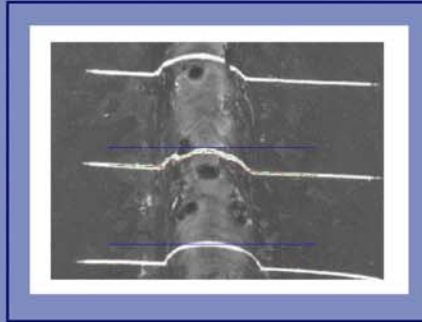
PyWelding

Analysis of the Quality of CO₂ Welding

The parameters for threedimensional reconstruction of the welding to control its quality are the following:

Global geometrical analysis

- Volume
- Linearity
- Curving
- Continuity



PyWelding, Analysis of Welding Outlines

Geometrical analysis by section

- Area
- Height
- Width
- Uniformity

Características	Valor	Regla Preclasificación	PreClasificación
Volumen Global	852.12	>500.00	Buena
Linealidad Global	0.31	---	Buena
Altura Máxima	4.12	>5.00	Buena
Altura Mínima	1.42	>2.00	Mala
Base Mínima	7.91	>5.00	Buena
Base Máxima	9.12	>12.0	Buena
Área Mínima	8.62	>5.00	Buena
Área Máxima	18.32	>10.00	Buena
Salpicadura Izquierda	1.00	>2.00	Buena
Salpicadura Derecha	3.00	>2.00	Mala
Poros	1.00	>2.00	Buena

Texture analysis

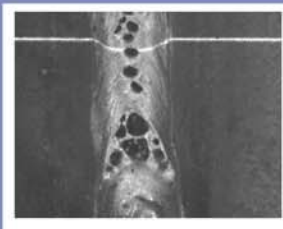


Image of welding with pores

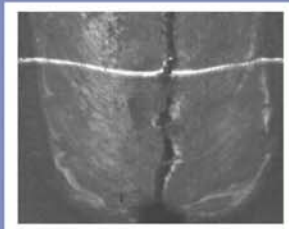
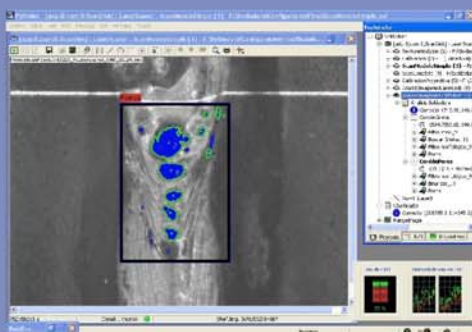


Image of welding with cracks

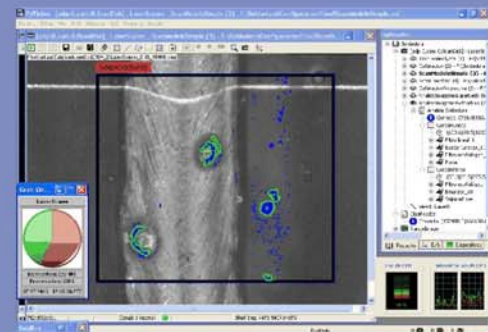
- Pores
- Cracks
- Appearance
- Splashes
- Projections

Results of expert System

PyWelding, is an expert system, that depending on the different welding defects, -either acceptable or not - is capable of autonomous learning and of classifying the different types of welding defects and the interrelation between them.



Software PyWelding - Processing of welding with pores



Software PyWelding - Processing of welding with splashes

Performances of the System

- Geometrical detail upto 0,1 mm
- Vision Field, 28x16 mm² continuous
- Scanning speed upto 50mm/s
- Scanning detail upto 10 lines/mm



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