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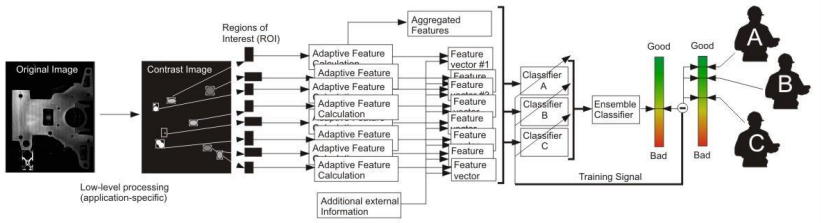

Structure of and work flow within a DynaVis system

DynaVis

Dynamically Reconfigurable Quality Control for Manufacturing and Production Processes Using Learning Machine Vision

Problem definition

In many industrial production processes, visual inspection by humans is still an important step of quality control. Whenever one wants to automatize such an inspection step, one has to implement in software the human decision-making process, i.e. the way how a "good"- vs. "bad"-decision is reached.

Up to now, the implementation and installation of such a system was tedious and lengthy. It involved (re-)programming and step-by-step parametrization of the software, tailored to the specific inspection task. To obtain satisfying results often took several months.

The results of DynaVis make it possible to learn complicated inspection tasks by means of human-machine cooperation. Each inspection task where a human expert rates images as either "good" or "bad" can be learned by a DynaVis system without further adaptation. It is also possible to divide the defect classes further into several "real defect" and "pseudo defect" classes, mark arbitrary regions of an image, and learn to classify defects using these classes.

Research topics

To develop a flexible and trainable inspection system, the project consortium focuses on the following research topics:

- methods to pre-process the given images, such as, complex segmentation algorithms, methods to calculate image features adaptively, etc.
- machine learning methods to extract relevant data out of the images and learn the inspection task
- methods to deal with multiple, possibly contradictory input by the human operators
- methods to predict the success or failure of the training process at an early stage
- online learning methods which are able to refine the current classification model with additional training data

Participants

- *Profactor GmbH* (Steyr, AT)
- *Katholieke Universiteit Leuven* (Leuven, BE)
- *University of the West of England* (Bristol, UK)
- *Johannes Kepler Universität Linz* (Linz, AT)
- *Sony DADC Austria AG* (Anif/Salzburg, AT)
- *Asentics GmbH* (Siegen, DE)
- *EurExcel* (Brussels, BE)
- *Atlas Copco Airpower* (Wilrijk, BE)

Duration

October 2005 – September 2008

Further informations

DynaVis is a research project within the 6th framework programme of the European Union.
Homepage: http://www.dynavis.org

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