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## Intelligent System for Radiogram Analysis – conception design and implemented algorithms

**Abstract.** In this paper an application and implemented algorithms destined to an Intelligent System for Radiogram Analysis ISAR (from polish *Inteligentny System Analizy Radiogramów*) for welds quality inspection is presented.

**Keywords:** Intelligent System for Radiogram Analysis.

**Słowa kluczowe:** Inteligentny System Analizy Radiogramów.

### Introduction

In this paper an application and implemented algorithms destined to an Intelligent System for Radiogram Analysis ISAR (from polish *Inteligentny System Analizy Radiogramów*) for welds quality inspection is presented. There is possible to use digital image processing and neural networks in industrial radiography. System ISAR has to improve information contained in the radiogram, extract defects and decide on welds quality taking into account the relevant regulations. The aim of ISAR is to detect weld defects in radiogram and help radiologist in his work.

ISAR contains both hardware and software solutions. ISAR consists of image acquisition and processing part, quality analysis functions, objects extraction part with thresholding and other specialized functions, e. g. IQI detection, distance matrix calculation and defects parameterization. Image processing part can effectively increase the quality of X-ray images and help with extracting information about weld defects. It is possible to select the way of image processing and define the commands' sequence. The view of a main menu and a main window of ISARview is shown in Fig. 1. Fig. 2 presents results of successive stages of ISARview processing.



Figure 1. The view of main window of ISARview application.

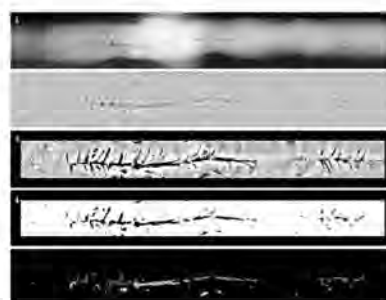


Figure 2. Results of successive stages of ISARview processing: 1 – area of radiogram selected for analysis, 2 – image after median background-removing, 3 – image after thresholding, 4 – image after morphological closing, 5 – image after indexation.

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### REFERENCES

- [1] R. Sikora, T. Chady, P. Baniukiewicz, P. Łopato, L. Napierala, T. Pietrusewicz, G. Psuj B. Piekarczyk, Intelligent System for Radiogram Analysis, QNDE'2010, Review of Progress in Quantitative NDE, San Diego, California July 18-23, Abstracts Book pp. 161
- [2] John C. Russ, The Image Processing Handbook, Fourth Editio, CRC Press 2002