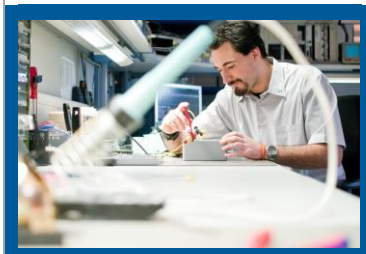
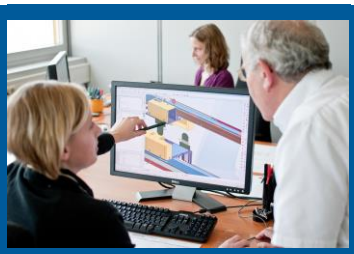
World Market Leader in Measuring Systems

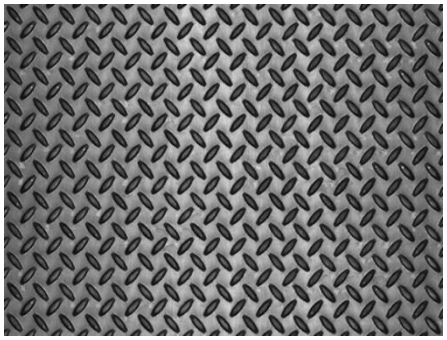





Located in Heiligenhaus, Germany, and with offices around the world, IMS Messsysteme GmbH is the world market leader in radiometric and optical measuring systems. We lead innovation in these high-precision, non-contact measuring systems. Our products are used worldwide in the production plants of the steel, aluminium and copper industries.

Master Thesis on
„Detection of periodic surface defects on hot-rolled floor plate images“

[Abstract]



Floor plate is a hot-rolled structural steel that has very high quality requirements regarding surface defects. Due to its textured appearance, standard detection algorithms based on gray value differences are not suitable.

The aim of this thesis is to develop an algorithm that is able to detect periodic defective lugs in the camera images of this structured surface. Besides the theoretical considerations, the algorithm must be implemented and tested. As a side aspect, a minimum runtime is required to be usable in our online applications.

[Your profile]

Ideally, you have a background in image processing and algorithms design. You have experience in C# or C++ to integrate your solution to our existing machine vision software framework.

[Your benefits]

We offer you a challenging and interesting activity in an internationally successful group with flat hierarchies and short decision-making channels. You enrich your work environment with initiative, responsibility and team spirit. Our cooperative and constructive corporate culture is flanked by interesting schemes to achieve a work-life balance and stay healthy. Our numerous training offers form a central building block in your personal development. Your knowledge is our success!

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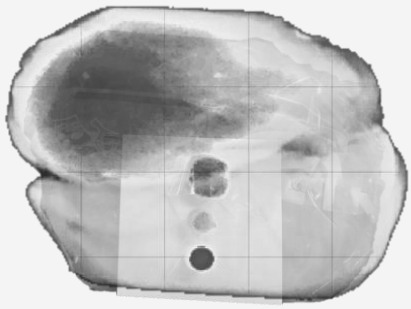
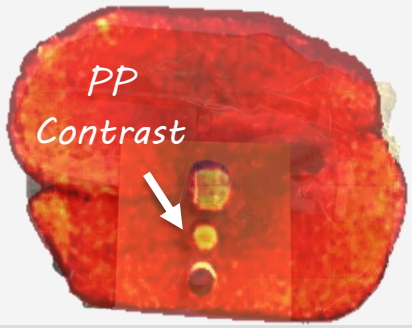
Abstract

Master Thesis on

„Dual-Energy X-Ray Imaging“

Foreign Object Detection (PP)	Conventional Radiograph	Reconstructed Image
		
Chicken Breast, Photography	Insufficient Contrast	Enhanced Contrast

Abstract

X-ray based dual energy methods are commonly used in the field of medical diagnostics and baggage / food inspection. The goal of this technique is to obtain an image providing information on the material composition of the sample of investigation by combining two x-ray images acquired at different energies. In food inspection tasks, major aims are the detection of harmful materials and the determination of other material related information.

The achievable performance of the method in terms of “material selectivity” depends on several different factors. However, as a significant contribution, the spectral distribution of the x-ray beam at which the data is acquired is to mention.

The aim of this thesis is the investigation and optimization of different spectral shaping approaches with respect to a concrete application in the field of foreign object detection. Besides theoretical considerations and development of algorithms, measurements should be made using an X-ray test stand at the IMS Röntgensysteme facilities.

About Us

Established in 1980, the IMS Group develops and produces isotope, X-ray and optical measuring systems for industrial use. As a hundred percent subsidiary, IMS Röntgensysteme GmbH has been developing and producing X-ray components for industrial applications for more than 15 years. Our know-how is requested and appreciated especially in steel mills throughout the world.
Our head office is located in Heiligenhaus, Germany, and we currently have a workforce more than 450 employees on five continents.

Interested…?

…then don’t hesitate to contact us via mail:

Responsible contact person: Simon Schlesinger
s.schlesinger@ims-roentgensysteme.de

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www.ims-gmbh.de

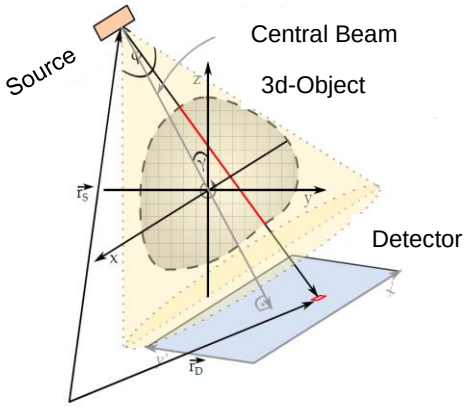
POWERED BY PEOPLE

Abstract

Master Thesis on

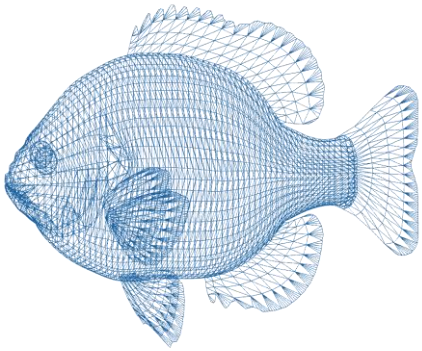
„X-Ray Imaging Simulation“

Model



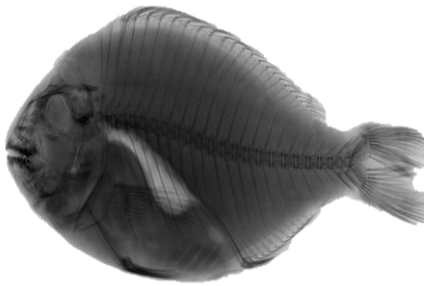
Simulation Geometry

Data Input



3D CAD Model

Simulation Output



Simulated X-Ray Image

Abstract

Radiographic simulation is a widely-used tool in many areas and a variety of X-ray image simulation programs are available. However, the underlying simulation methods used by the programs can be divided mainly into two classes: There are probabilistic, i.e. “Monte Carlo” based, and so called analytic, i.e. “Ray Tracing” kind of simulation methods. Although the Monte Carlo approach in general tends to produce more realistic images, it is also rather time consuming and thus not designed for “real time” usage. Using analytical methods, fast computation can be achieved, since only directly transmitted photos are simulated via Lambert-Beers law. Thus, adding more physical interaction processes (as scattering and fluorescence) in an analytical manner, the idea is to increase the accuracy of the simulated images while keeping the simulation time sufficiently low. In this way, the simulation routine can be utilized, e.g. for non-rigid image registration problems or image reconstruction algorithms.

The aim of this thesis is the development of a C# based software toolkit for fast radiographic simulation. Thereby relevant physical cross sections (~1-500 keV) must be implemented using tabulated data. Phantom and collimator data should be implemented via tessellated volume files and various source and detector properties must be parameterizable. Besides theoretical considerations and software development, validation measurements will be made using an X-ray test stand at the IMS Röntgensysteme facilities.

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