

# Development of algorithms and programs for an archiving and communication system for the internet-based administration of medical images

## Dissertation

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### Abstract

Since the end of the eighties a modern and high-quality medicine is not possible without use of data processing technology and communication technology. The physician manage the enormously big volume of medical data only with the help of computer-assisted information systems. In this regard the work deals with the concept and the construction of an intranet/internet-based radiology information system.

The work examine the evaluation of the radiological systems already available on market. After the analysis of relevant qualities of these systems they are measured in demands and criteria, posed before. From discovered disadvantages as for example lacking internet ability, insufficient platform independence, the major tasks of this work will be described.

In the first chapter a new concept is suggested for the construction of an intranet/internet-oriented, radiological information system for the transmission and archiving of data in clinics and local physicians implemented in modular structure, producer-independent DICOM-standardization, modern, independent of platform JAVA-technology and Intranet/Internet-technology.

The second chapter treats the problems of the medical image compression. After an introducing description of the known compression procedures the difficulties of the compression of the medical images is described. In accordance with these requirements the known lossy and loss-less compression-algorithms are measured. The results of the comparative examinations will get in a representative random check of more than 500 DICOM-images. Two new adaptive compression algorithms are developed by methods suggested in the work of the classification and appreciation of the quality of medical images.

The third chapter is dedicated to the implementation of the components of the developed intranet/internet-oriented radiology information system. First the different net communication scenarios for the data exchange between the components of the system on the basis of Java-technology are analyzed and than an own scenario is developed. The software is developed for the visualization and processing of DICOM-image projects. The last section considers the new internet/intranet-oriented radiology information system with whose draft the scientific and practical results of this doctoral thesis were applied.