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**Content-based access to medical images**

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**PURPOSE**

The increasing amount of digital radiological images requires new methods to archive and access this data. Conventional databases in picture archiving and communication systems (PACS) or electronic healthcare records (EHR) allow textual searches on meta data only. Since images can contain semantic information that cannot be completely conveyed by a textual description, an approach to content-based image retrieval in medical applications (IRMA, <http://irma-project.org>) is presented.

**METHOD AND MATERIALS**

In IRMA, image semantics is modeled on different levels: - Global pattern analysis is used to determine the imaging modality, the direction of view, as well as the body part and biological system imaged. - Based on this categorization, local image analysis is automatically parameterized and a hierarchical image segmentation is generated. This multi-scale approach supports queries on different levels of detail. - For each category, a prototype is defined and manually annotated to provide further semantics of objects in the image and their spatial/temporal relationships. The IRMA retrieval engine interfaces the PACS by standard protocols. More specifically, the application programming interface (API) at the radiologists viewing station is used (i) to pass the DICOM identifiers of images currently displayed to IRMA and (ii) to open a web browser window with the requested IRMA application on the desktop of the radiologists workstation. All information displayed in the IRMA browser window is requested directly from the PACS using the DICOM protocol, while global and local image similarity features are hosted in the IRMA core.

**RESULTS**

The IRMA query window allows the radiologist to mark a region of interest in the image, submit the query, and interactively refine the query by relevance feedback. Selecting appropriate images of those delivered by the IRMA system, the radiologist can access the corresponding medical records as means of decision support.

**CONCLUSIONS**

IRMA establishes augmented access to PACS and/or HER. Image processing techniques are applied to improve diagnostics as well as teaching.

**Disclosures:**

**No Disclosure:** Thomas Lehmann, Daniel Keysers, Henning Schubert, Klaus Spitzer

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