Anonymization of x-ray patient data for large multi-center trials

Supervisor: Manuela Kunz

Number of students in this project: 2

Objective

Large multi-center trials are a powerful tool to investigate new surgical methods and/or treatment options. The power of such trials is the large number of participating patients, which can involve hundreds of patients. However, often such trials require researchers to manage and evaluate a large amount of patient data. To protect the patients' identity and privacy, these data are used without any identifying marks. This is especially important for imaging data, such as x-rays.

To allow sharing of medical images (such as x-rays) taken with devices from different manufactures, a DICOM (Digital Imaging and Communications in Medicine) standard was developed. This standard provides a uniform format for x-rays images, which beside the image information contains additional data, such as patient name, birthdate, time of image taken, etc. For anonymous use of these x-ray images, a new x-ray image needs to be created, in which all identifying information in the file are replaced with non-identifying data.

There are a number of commercial and non-commercial software tools (DicomWorks, etc.) which already provide this functionality. However, these exciting tools are designed to anonymize a single x-ray image at the time, and is therefore very time-consuming to use in studies which require to remove identifying marks from a large number of x-rays. Goal of this project is to develop a safe and efficient software method to anonymize large sets of x-ray images.

Methods

The students will design software requirements and specifications based on various user inputs. A prototype of the proposed software method will be developed and tested using a set of x-ray images. Finally, a small user study will be performed in which a research assistant will test the software prototype and evaluate the complete removal of any identifying patient information, as well as compare the user friendliness and time requirements between a conventionally used method and the newly developed method.

Outline of student's role: (1) Work in a multidisciplinary technology research team specialized in computer- assisted surgery. (2) Learn concepts of DICOM standard; (3) Review third-party libraries for reading/manipulating and saving DICOM files; (4) Develop prototype software for image management and anonymization (on Windows); (5) Perform user study.

Please contact Manuela Kunz kunz@queensu.ca if you are interested.