Mobile image upload for radiology

Philipp Oggier[a], Henning Müller[a], Adrien Depeursinge[a]

[a] *HES-SO, Sierre, Switzerland*

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Introduction

Medical images are essential in diagnosis and treatment planning [1]. They are produced in exponentially increasing amounts [2]. With the availability and use of mobile phones additional images are used by medical professionals for diagnosis not always linked to traditional imaging devices. Images with mobile devices are taken directly after accidents before professionals have arrived to coordinate activities or of a skin lesion or wound after an operation. Such pictures have become common but images from mobile devices are currently not connected with clinical records. The work of this articles aims to better include external images as seen in Figure 1. Mobile devices are increasingly used for medical applications [3].

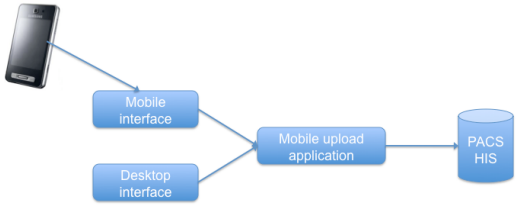

Figure 1- Images can be taken with a smart phone and transferred via a mobile application to the patient record.

Methods

Goal of this work is to develop a prototype usable on iPhones, Android and other types of smart phones. This required a web-based interface using HTML5 to be able to use the phone camera. For secure communication HTTPS was used and a MySQL database for storing the data. Other techniques employed are PHP for generating the code for the interface and Javascript to create an interactive interface with the look and feel of a desktop application. The GPS (Global Positioning System) of a mobile phone is used to allow transmitting the exact position of the person uploading an image. Most of the requirements were given from a radiology office that has identified exactly these problems in their workflow.

Results

A prototype was developed allowing user management via a web-based interface including rights management and the possibility to share images among users. Mobile upload of images to a database and linking of images with patients and patient identifications is equally possible. When an image is uploaded the GPS coordinates are transmitted with the image to allow showing on a map where the images was taken. It is possible to tag images with geo-coordinates after the acquisition. Figure 7 shows the gallery view of images in the application on a smart phone including the annotations.

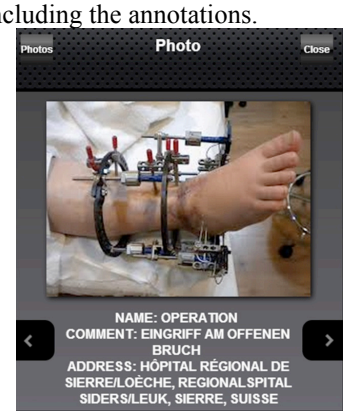

Figure 7 – Screen in the photo gallery with an image, allowing simple navigation between pictures of the patient.

In addition to the mobile application a desktop application allows functions such as rights attributions via a bigger interface. This allows completing data and transmitting it to a patient record, which was not implemented for the prototype.

Conclusions

The use of (private) mobile phones for professional reasons is a reality, also in medicine. The work of this article allows integrating such upload into the clinical workflow and creates a simple tool to upload medical images taken with mobile phones onto a secure platform, potentially linked to the EHR.

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Address for correspondence

Henning Müller, HES-SO, TechnoArk 3, 3960 Sierre, Switzerland

Henning.mueller@hevs.ch

[1] http://khresmoi.eu/