MobiCAP: A Mobile Application Prototype for Management of Community-Acquired Pneumonia

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1 Short Description of the Proposers

Daniel Welfer is a computer science Professor at the Federal University of Pampa - UNIPAMPA, campus Alegrete, Brazil. His areas of interest are medical image processing and analysis, mathematical morphology, computer vision, DICOM formats, and hospital information systems. He recently became a permanent member in the Graduate Program in Electrical Engineering (PPGEE) at the Federal University of Pampa.

Renato Cassol Ferreira da Silva received the Bachelor degree in medicine from Pontifícia Universidade Católica do Rio Grande do Sul, Brazil, in 2002. Currently, he is hospital infection control coordinator in Hospital Nossa Senhora da Conceição, Porto Alegre, Brazil. His expertise area is focused on infection and his major research interests are hospital infection control, clinical Infectious diseases, HIV, bacterial infections, and bacterial resistance.

Juliano F. Kazienko serves as a computer science Professor at Universidade Federal do Pampa, Brazil. He received the M.S. degree from Universidade Federal de Santa Catarina, Brazil, in 2003 and the D.S. degree in computer science from Universidade Federal Fluminense, Brazil, in 2013. He received the "IV Prêmio Marechal-do-Ar Casimiro Montenegro Filho" award from the SAE-PR Brazilian government agency in 2013 due to the contribution of his thesis to the advance of the Brazilian cybernetics defense area. His major research interests are information security, wireless networks, and embedded systems.

2 Presentation Way

The authors plan to present the prototype at the demos session.

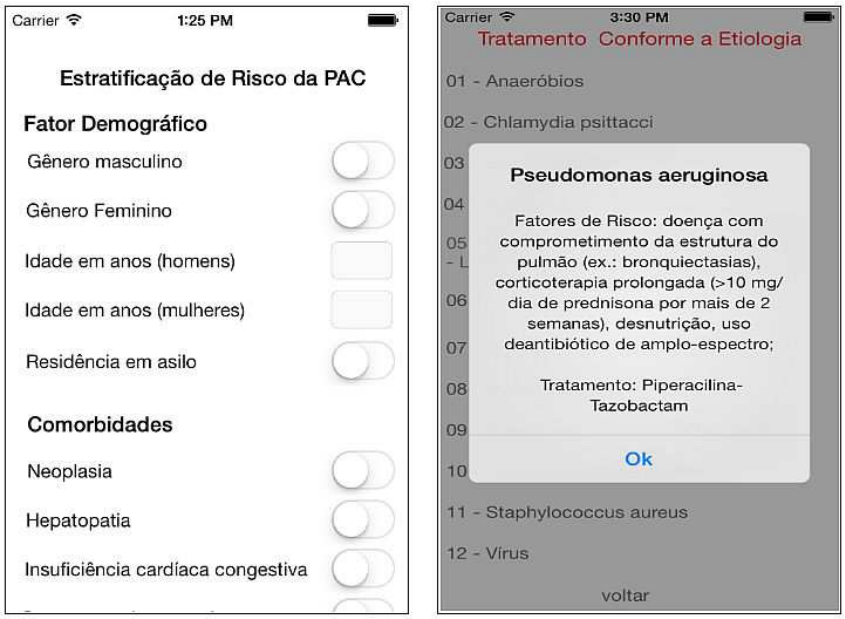
3 Demo Details

This demonstration aims at presenting the MobiCAP prototype. MobiCAP is a mobile application system for management of Community-Acquired Pneumonia (CAP). The system supports experienced end beginner physicians to deal with the CAP's diagnosis process problem. Thus, MobiCAP enables physicians to handle a high amount of variables and take a quick and precise diagnosis based on rules described by the internal guidelines previously established by hospital physicians.

MobiCAP was designed and developed in conjunction with specialist physicians from the *Hospital Nossa Senhora da Conceição* (HNSC)—placed in Porto Alegre city—and based on HNSC internal guidelines for diagnosis and management of the CAP. The system was written in the Objective-C language using a development approach called Model View Controller (MVC). The application was implemented to run on the iOS platform, more specifically under iPhone type devices.

As programming environment, it was used the Xcode 5.0.2 for the overall development of the application. In summary, three graphical interfaces correspond to the core functionality of the application,

namely: (a) a graphical user interface for the risk stratification of pneumonia (see Fig. 1); (b) a graphical interface for the algorithm treatment; and (c) a graphical interface to the treatment according to etiology (see Fig. 1).



(a) **(b)**

Figura 1: Two graphical user interfaces developed for the proposed mobile application. Part (a) depicts the graphical user interface for the risk stratification of CAP. Part (b) shows the graphical interface for treatment according to etiology.

4 Demo Experience

Currently, MobiCAP is deployed on the *Hospital Nossa Senhora da Conceição*. Experimental qualitative results were obtained using as a parameter the physician responsible for the hospital infection control at HNSC. To better understand the impact of the mobile application and the user experience, we transcribe two questions and answers given by the the physician responsible for the hospital infection control:

Question A: The software developed can be viewed as a mechanism for educational purposes. Is that correct?

"The mobile app is a great educational mechanism. As is easy to use and free to reach large amounts of physicians in training it is of great value. The new residents will arrive in 2014 will be instructed to use the mobile application. This mobile app, as far as can be ascertained, is the first to be used in this way for a hospital 100% SUS."

Question B: The mobile application is much more useful in the hospital environment than a traditional software installed, for example, in a desktop or notebook computer?

"For being the application on mobile platform it has the agility and penetration needed for medical care. The fact that he is "in the palm of the hand"gives the user a much better adherence and does not require a physical computer platform that is not always available at the hospital bedside."

Additionally, the use of MobiCAP by a infectious diseases specialist corroborates its important contributions for improving clinical practices, as (i) speed up the processing of high variables amount, (ii) precision improving in diagnosis by a specification of knowledge that can support medical decisions, avoiding erros and advising beginner physicians, and (iii) penetration needed for medical care through a mobile application.

5 Demo Technical Requirements

The single technical requirement for the presentation is the following:

- **iPhone** (The registered author will bring his personal iPhone for prototype demonstration);