e-UPU: Using technology to improve the emergency room triage

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ABSTRACT

Nowadays we are using computers and apps for almost everything and some aspects of our lives could be really improved by technology, like medical systems. This research focuses on the triage process in the emergency hospital room as one of the most important topics of our medical systems. Real experiences and needs collected from some hospitals in our area prompted the starting point of this application. Knowing this real demand, we developed a software application that could help both patients and doctors by digitizing the whole process.

CCS CONCEPTS

HCI → Interactive systems and tools;
Medical information policy → Personal health records;

1 Introduction

Our e-UPU application is a software system designed to improve the workflow of the triage process in the emergency hospital room. UPU stands for the Romanian name of the Emergency room triage (rom., *Unitatea de Primiri Urgențe*). We developed it to make everything computerized and integrated. The main topics this software tries to cover are as follows: (a) providing and displaying a waiting list based on the patients' priority, (b) making a code suggestion based on the symptoms of one individual and (c) making an electronic medical patient file.

In our architecture, the waiting list improves the real interface between the medical staff and the patients, the latter being able to know what priority they have and to be ready to wait a specific amount of time based on their conditions without risking their lives. Besides this, e-UPU makes its own code suggestion for the patient emergency level following the patient condition. Also, if everything is computerized, the patient file will not be anymore a piece of paper that goes from one place to another to gather all the information, but an electronic collaborative file for replacing the hand-written paper with the ready-to-use data in Statistics.

This software system represents an advanced improvement of the existing emergency room systems in our country.

2 System design

This software uses only SAP (*System Applications and Products*) technologies [2] and mainly the latest ones like SAP UI5 and Fiori. Out of the multiple methods for prioritizing emergencies, our approach values the ESI (*Emergency Severity Index*) method [1], which is adopted by Romanian medical system and more other European countries. ESI gives the patient one color out of five: red, yellow, green, blue and white.

For the moment, e-UPU is a web application that could be easily extended to a mobile app [3]. From the UI (*User Interface*) point of view, it has three main levels, which follow the real workflow of the triage process on three pages: (1) register patients into the system and make their personal data available to the medical staff; the data is stored in the hospital's database; (2) provide and display the waiting list based on the emergency level code and the individual time bar in progress; (3) register the important information meaning vital functions and symptoms [4]; at the end, the triage nurse may change the implicitly assigned code with a different color as that patient code. Being at an early stage, the program suggests a code based on a list of rules in the backend. This logic could be redefined using machine learning in the future. The unpleasant situations can be avoided by this app use of the waiting list scenario. If a patient has been waiting for too long the progress bar will change its color and hence the medical staff is alerted by this inconvenient situation.

The app can be used via tablets and screens in the waiting area.

It can be easily updated adding new indicators to the registered patients due to special conditions, like epidemics and even pandemics.

3 Conclusion and future work

e-UPU software has been developed to show how technology could fulfill the needs of both patients and medical staff by making the information available now and here. Furthermore, it is our plan to upgrade it with different topics like machine learning for making better suggestions and an offline module for a smart communication with ambulances.

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