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Instituto de
Investigación
Sanitaria La Fe

RISK OF 30-DAY READMISSION PREDICTIVE SOFTWARE

DESCRIPTION OF THE TECHNOLOGY

The technology is part of the healthcare management of complex hospitalized patients. Patients have a risk of readmitting in less than 30 days after discharge, causing unpredictable healthcare resource consumption. The reasons are unknown and the decision of following up these patients is limited to a maximum load of patients per professional. The predictive software is developed by researchers of the Polytechnic University of Valencia and the Healthcare Research Institute La Fe. This allows identifying which patients have a higher risk of 30-day readmission and therefore control, within the healthcare transition, exacerbations and thus avoid unwanted unplanned admissions.

The software technology is based on a group of predictive models for the identification of people with high risk of readmitting within 30 days or less after hospital discharge; and all the necessary associated software for integrating and deploying in the healthcare organization information systems in order to facilitate the decision to include them in a care transition program. The system consists of a generic 30-day readmission model and three 30-day readmission models for specific diseases: patients with respiratory problems, oncologic patients or cardiac patients.

Predictive models are developed using automatic learning algorithms: Naïve Bayes, Random Forests and logistic regression. The classification model is developed in a general purpose programming language (Java y/o C++).

MARKET APPLICATION SECTORS

The market application sector is either public or private healthcare.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

- Cost reduction. It is estimated that the rate of 30-day urgent readmission is between 10% and 20% depending on the type of hospital and the disease. 30-day urgent readmission represents an unexpected cost both for patient's health (intangible) and for the management of human resources and hospital material.

Assuming a hospital with 1000 daily patients and 120 discharges a day, with 10% 30-day readmissions and an approximated mean cost of 3000€ per hospitalization day, it will suppose an extra cost of minimum 1.080.000 €. Assuming that high risk cases are detected and that healthcare transition permits the reduction of readmissions in 50%, we will save around 500.000€ per month.

- Improvement in patients' health. The identification of patients with high risk 30-day readmission allows developing specific healthcare transitions to control patient's health and avoid or prevent a 30-day readmission.
- Easy adaptability and configuration in different sites using incremental algorithms

CURRENT STATE OF DEVELOPMENT

The development is in level TRL 3. We have obtained laboratory results from tests conducted with the cohort of patients from Hospital La Fe who needed urgent readmission 30 days after discharge from 2010 to 2013 (N=28.065) in order to adjust parameters and to check and analyze the predictions. Next step for the development is the integration of the components in the preproduction phase in Hospital La Fe and the



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evaluation of them as a group.

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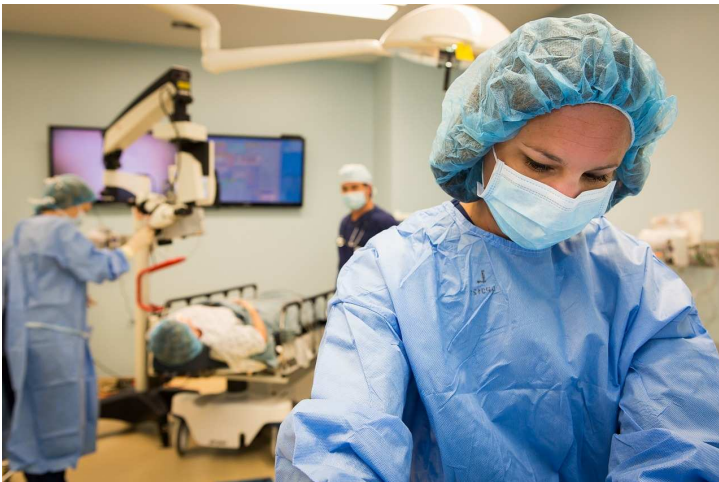
The software application has been developed by the Politechnic University of Valencia and The Research Sanitary Institute La Fe. The authors are: Dr. Bernardo Valdivieso, Dr. Juan Miguel García-Gómez and Dr. Salvador Tortajada.

COLABORATION SOUGHT

The exploitation model is open and therefore we sought the following collaborators:

- Hospitals interested in using this predictive service as a user. The service will be provided through a website and will be adapted to specific conditions if needed.
- Business containing the capacity to exploit the services and offer them to hospitals. In the latter, a signed Technology Transfer Agreement will be needed.

RELATED IMAGES



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