

Soft computing solutions help to predict survival of multiple trauma patients

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The NUP/UPNA-Public University of Navarre has developed a piece of work that applies soft computing solutions to predicting survival in multiple trauma patients. The study was carried out by A&E doctors in the Health Service of Navarre and lecturers in the Department of Automatic Systems and Computing and received an award for best paper at the Congress of Emergency Medicine held recently in Zaragoza.

The research work draws from the premise that systems for measuring severity are necessary to compare results following the care given to severe trauma patients in very different populations. In this respect, certain indices for measuring severity are very useful in predicting the possibility of [survival](#) yet they are difficult to obtain in daily A&E practice.

To make these predictions more reliable, the [work](#) proposes the use of soft computing techniques, a branch of artificial intelligence focusing on the design of intelligent systems capable of handling uncertain, imprecise and/or incomplete information properly. This quality makes it possible to tackle real problems by obtaining more robust, more manageable and lower-cost solutions than those obtained through conventional techniques.

462 patients

The study was carried out on 462 patients attended by the A&E medical

services of Navarre in 2013 and 2014; they all had a New Injury Severity Score (NISS) above 15 when alive on arrival at Hospital. In the NISS calculation the three most serious injuries are taken into account, irrespective of the part of the body affected.

To make the prediction, a multiple classifying system comprising two logistic regression models and the C4.5 decision tree was used. This system allows classification problems to be tackled using unbalanced data ensembles. The study also took into consideration other classical ensemble methods such as AdaBoost, AdaBoost-M1 and AdaBoost-M2, which are systems that build classification rules.

The results obtained show that through [artificial intelligence](#) techniques it is possible to build an algorithm that is highly intuitive from the clinical perspective and has a series of branches that include the patient's severity variables, age and other clinical parameters. The authors conclude that the use of a range of soft computing methods and the aggregation of the results is an appropriate solution for predicting the survival of [trauma patients](#).

The person in charge of the study was Dr Tomás Belzunegui, a doctor in the A&E Service of the Hospital Complex of Navarre and lecturer in the Department of Health Sciences of the NUP/UPNA. He had the collaboration of Dr Diego Reyero, a doctor in the Mobile ICU, and the lecturers José Antonio Sanz, Adrián Barbachano, Daniel Paternain and Francisco Javier Fernández, members of the NUP/UPNA's Artificial Intelligence and Approximate Reasoning Group (GIARA) led by Professor Humberto Bustince. The study was funded by a grant from the Department of Health of the regional Government of Navarre and was conducted by the Navarrabiomed Multiple Trauma Patients Research Group.

Provided by CORDIS

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