Neural Networks Application on Emergency Department Load Measurement

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The rising cost of healthcare services imposes pressure on healthcare providers to improve the management of quality, efficiency and economics for their organizations. One of the most urgent operational problems in hospitals is emergency department (ED) overcrowding. For optimizing the ED operations one first needs to measure current crowding load level, which is very difficult task due to lack of agreement on the major parameters and their contribution to the overall load.

This paper proposes Neural Networks based Load (NNL) measurement approach – an innovative approach for measuring the real-time operational load within emergency departments targeting to overcome the lack of agreement problem. NNL suggest a flexible framework—based on neural networks—that calculates user-tuned load values, based on a set of well-defined operational and clinical indicators. The operational load value is calculated by learning the weights of the raw operational indicators within a particular emergency department without the need for the methods we used to calculate the ED operational load.

We describe the neural network structure used and explain Major contributions of our work are the possibility to flexibly define user-specific function and the innovative dynamic learning method used when no explicit calculation exist for creation of training set.